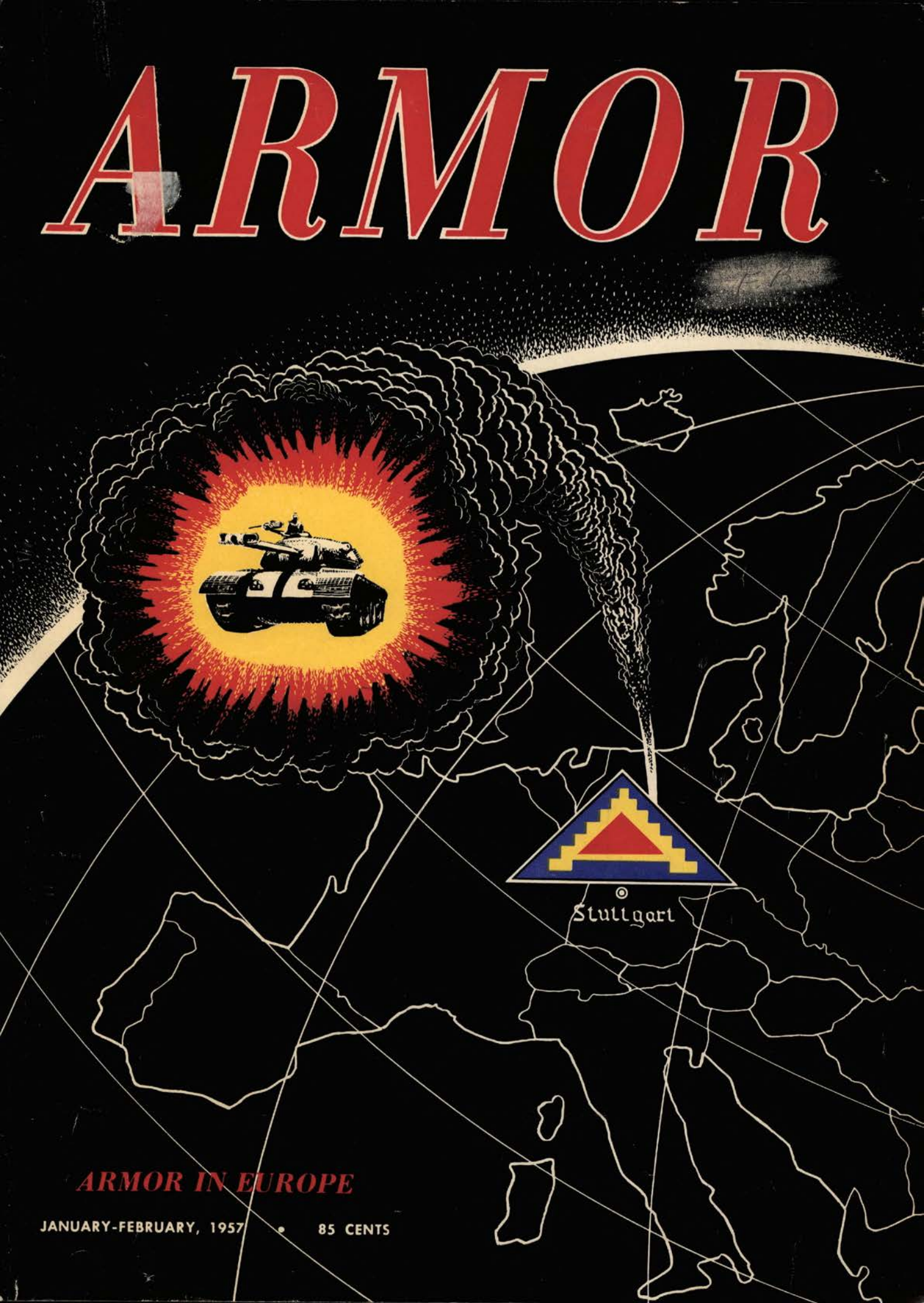
ARMOR



ARMOR IN EUROPE

JANUARY-FEBRUARY, 1957 • 85 CENTS

To be reviewed in the March-April issue by **Lieutenant Colonel Robert B. Rigg**

THE RED ARMY

B. H. Liddell Hart, Editor

This book presents an authoritative appraisal of the modern Russian Army by a group of leading military experts. Their aim has been to review the striking force of the USSR both in the wider perspective of Russian history and in the light of lessons learned in the last war. *The Red Army* gives a lively and coherent picture of the Russian Army's present and potential strength.

All aspects of the Army and its organization, technical, political and human, have been covered by the contributors, many of whom are eminent soldiers who fought either with or against the Russian Army. They include the French Generals Guillaume, Niessel and Weygand; General Keating and Colonel Ely of the United States; and the Germans' Field-Marshal Manstein and Generals Guderian, Blumentritt, Dittmar, Bayerlein and Student. Sir David Kelly, former British Ambassador in Moscow, contributes a penetrating study of the Soviet soldier, and other British contributors include General Manners-Smith, Leonard Schapiro and J. M. Mackintosh. The editor contributes an introduction and a study of the strategy of the Russo-German campaigns.

480 pp. **$6.00**

To be reviewed in the March-April issue by **Major General Ernest N. Harmon, Ret.**

IN TORNADO'S WAKE

by Captain Charles R. Leach

A HISTORY OF THE 8TH ARMORED DIVISION

Here is the story of the 8th Armored Division from the day of its activation at Fort Knox, Kentucky in 1942 until its deactivation at Camp Patrick Henry, Virginia in November 1945. It is the account of a young division, a division that did more than its share of training men for combat, and of sweating out the Louisiana maneuvers, before at last taking up the burden of war itself. Recorded in this history are the highlights of the division's activities from Stateside through England, France, Holland, Germany and Czechoslovakia. The record of this division speaks for itself and this book is a fitting and lasting tribute to the men who made it.

231 pp. **$5.00**



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ARMOR

The Magazine of Mobile Warfare

Continuation of THE CAVALRY JOURNAL

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Volume LXVI JANUARY-FEBRUARY, 1957 No. 1

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ARMOR magazine is published under the auspices of the United States Armor Association, and is not an official publication. Contributions appearing herein do not necessarily reflect official thought or indorsement. Articles appearing in this publication represent the personal views of the author and are published to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of military affairs.

Publication and editorial offices: 1757 K Street, N.W., Washington 6, D. C. Copyright, 1957, by the United States Armor Association. Second-class mail privileges authorized at Washington, D. C., additional entry at Richmond, Va. Terms: Domestic subscriptions, including APO's $4.75 per year. Foreign, including Canada & Pan America, $5.50 per year. All subscriptions payable in advance. Single copies, 85¢.

LETTERS TO THE EDITOR

The Same Result—A Different Approach

Dear Sir:

I agree with the conclusion the author of your lead article "What is a Tank" in the September-October issue reaches but disagree with most of the arguments whereby he reaches it and the level at which he would achieve the balance between firepower, mobility and armor protection.

The first criticism is in regard to the illustration for "Heavy firepower—is this a tank." The Russian SU-100 shown did not sacrifice armor or mobility for firepower. It sacrificed the turret with all round traverse for limited traverse and heavier gun. A better vehicle to illustrate this would be the monstrosity shown over the caption "Heavy armor —is this a tank?" It obviously has terrific firepower but could only carry very thin armor over its vast areas and its mobility would be low. (We will take the blame for reversing the pictures.—Ed.) But to transpose these two pictures would not be correct. The "Heavy armor" picture would be at best a Matilda or Churchill tank both of which had heavy armor but poor firepower and poor mobility.

The *experiment* designed to *prove* that a heavy tank may be superior to a faster one because of better ride characteristics is meaningless. The conclusion might be true but the experiment did not show it. The experiment only illustrated the well known fact that the slow part of a journey may cut down all vehicles to a close average speed. For example, if a five mile course begins with a ditch that takes two vehicles 15 minutes to cross and then one vehicle covers the remainder at 60 miles per hour and the other at 30 m.p.h. the fast vehicle averages 15 m.p.h. and the slow 12. Little difference, but one vehicle covered most of the distance twice as fast as the other. Isn't that important? To put it on a divisional level—Two divisions take five days apiece to force a river crossing. Then the slow division exploits 10 miles, the fast exploits 100 miles the next day. The average speed over the first 10 miles plus the river crossing is very much the same but look at the difference in exploitation!

Indeed his *experiment* might be interpreted in exactly opposite fashion. The heavy tank did not exceed the average speed for any of the faster tanks even though it had top speed sufficient for more than twice its average. Therefore didn't it give a worse ride than the others?

The author's statement that fast tanks "have to mount a light gun to save weight" applies only to the discredited English school which mounted light guns in both their heavily armored but slow and light armored but fast tanks. If the airborne can have a 90mm gun on a seven ton s.p. carriage you can put one in a 25 ton tank.

The author's habit of denying that tanks he considers bad tanks are tanks at all is nonsense. A tank is a self-propelled, tracked, armed and armored vehicle. Because the M4 could not beat the Tiger in single combat is no reason for denying the M4 was a tank. The M59 APC would be a tank if the 50 caliber machine gun were armored.

With the author's argument that besides gun power and mobility a tank needs fairly good armor I am in full agreement. A tank that comes unstitched when attacked by 50 caliber machine guns or 37mm antitank guns is not very useful. But when the author says you should armor up to the 50 ton load limit the bridges can carry I disagree again. I am sure I could design a 36 ton tank that could outfight the present mediums and have far greater mobility with lessened fuel consumption.

Sincerely yours,
Dr. H. Karl Boyer
2336 Bancroft Way
Berkeley, California

Maps and Archives

Dear Sir:

We are grateful to you for sending us a copy of the September-October edition of *ARMOR* in which there is an article on "Maps for the Civil War" by Colonel H. V. Canan.

Colonel Canan spent some time here in the National Archives, a portion of it in our Branch, examining and interpreting many of the records. His article is a welcome and helpful addition to our source materials on the Civil War.

I want to commend you for having such an attractive and stimulating publication as *ARMOR* appears to be.

Herman R. Friis
Chief Archivist
Cartographic Records Branch
National Archives & Records Service
Washington 25, D. C.

Public Relations, Uniforms and Morale

Dear Sir:

The article by Lieutenant Kennedy in the November-December issue of *ARMOR* advanced some excellent suggestions which were all worthy of serious consideration. I particularly like the idea of having armored units wear the famous black beret and the readaptation of the terms "Troop" and "Trooper."

I would like to modify one of the Lieutenant's suggestions, however. He speaks of a pipe band in full tartan costume. This is basically an excellent idea but for the fact that the tartan is, to American taste, just a little too outlandish. Indeed, I understand such a band has already been raised by one unit only to fail of acceptance on an Army wide scale. I think the solution to the problem of making the bagpipe acceptable on an Army wide scale lies in the tartan. Could not an "American" tartan be designed in colors red, white and blue with stars of any sort carefully omitted? With this material clothing the leather bag of the pipes and fashioned into a cape (please refer to a whiskey advertisement) of traditional cut I think the bagpiper might be properly Americanized. The piper would retain the white sash across the chest, the cuffed white gloves, the white pistol belt and the white leggings. He must not wear a kilt or a bearskin cap. He could well wear the projecting shoulder device in the national colors in the same proportion as they might be used in the red, white and blue tartan. The German Army also had its bandsmen wear just such devices whenever they carried instruments.

ARMOR is published bimonthly by the United States Armor Association.

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Advertising: ARMOR is the professional magazine of the United States Armor Association; a nonprofit, noncommercial educational publication. We DO NOT accept paid advertising. Such advertising as does appear in ARMOR is carefully selected by the Editor and concerns only those items which may be considered an adjunct to a professional career.

Manuscripts: All content of Armor is contributed without pay by those interested in furthering the professional qualification of members of the Armed Services. All manuscripts should be addressed to the Editorial Office, 1757 K Street, N.W., Washington 6, D. C.

Change of Address: All changes of address should be sent to the Editorial Office in time to arrive at least weeks in advance of publication date of each issue, which is the 25th day of the even month of the year: *i.e.*, Dec. 25 for Jan-Feb issue, Feb 25 for the Mar-Apr issue, etc.

Rates: See bottom of contents page.

Instead of equipping the pipeband on the regimental level as Lt. Kennedy advises I rather think it would be better for each infantry company to have its own Piper and perhaps Second Piper. Whenever sufficient units form up together they could mass their pipers into bands.

The Army tartan might be predominantly red, the Air Force predominantly blue, and so on, or there might simply be one "American" tartan as I suggested earlier. At any rate we must incorporate this splendid, stirring instrument into the U. S. military tradition. In five years, provided it were shorn of its more foreign and outlandish trimmings, the piper tradition might be thought by the younger soldiers to be authentically American.

As General Patton says, it is by such simple devices as this that military morale is fostered.

ROY O. MANNING
1571 East 19th Street
Brooklyn 30, New York

Glad We Are Helpful! ! ! !

Dear Sir:

I am enclosing a check for another year's membership in the Armor Association. As Regimental Motor Sergeant I find the magazine helpful in my work. In your last issue the article on "Driver and Crew Maintenance" was very interesting in comparing it with our maintenance problems we have in Germany. I hope that all commanders read it. Being the first Gyroscope unit of Regimental size to come to Germany, we encountered many problems in maintenance, which over a period of time have been overcome by hard work and good Ordnance support.

Being a member of the best outfit in the United States Army I would like to see an article on our unit and its mission in Germany.

MSGT JOHN D. DOYLE
Service Company
3d Armored Cavalry Regiment
APO 696, New York, N. Y.

A Tanker's Song

Dear Sir:

One of the great needs of the armor people that has become apparent over many bars and beers is the lack of a tanker's song.

While not proposing this song as one that fulfills the need, but rather hoping that it might heckle some competent author into writing one, the following song, to the tune of *The Yellow Rose of Texas*, is submitted for consideration.

CHORUS:
Oh, I am just a tanker,
Now that is plain to see!
My yellow scarf is waving,
It shines for all to see!
I love to hear the engines roar
And the crashing of the guns
And I will be a tanker
Regardless of what comes.

1st Verse:
Oh! They speak of the Queen of Battle
And of St Barbara's Own
And we will find a place for them
In the Soldier's Home.
But if you want to win the war
And live to a ripe old age
You'll have to get those tankers
Acharging in the fray!

2d Verse:
Now the Air Force say that
They're the best and they will win the war!
But you and I as tankers
Know that's just Air Force lore!
For when they have an objective
That they must seize and hold
They call upon those whom we find
In the Tanker's Fold.

3rd Verse:
Now it's great to help the doughfoot
And leave them in the dust
We'll keep our tanks arunning
For us it is a must
It's fun to have the red—legs
And muffle—out their boom
They'll have to move out faster
For laggarts there's no room!

CAPTAIN THOMAS W. BOWEN
57th Tank Battalion
APO 28, New York, N. Y.



THE COVER

ARMOR is indebted to Lt. Gen. Bruce C. Clarke and all who assisted in assembling this material from Germany which is of interest to all members. For the cover we put out a call for help to Fort Knox. Through MSgt Conn, Chief of Art and Drafting TI&R Dept., we asked Mr. Jack H. Bain, civilian illustrator, TAS, to draw this sketch, emphasizing the importance of Seventh Army to U. S. and NATO.

PRINCIPLES OF

INSURANCE

AND

GOVERNMENT BENEFITS

FOR SERVICE PERSONNEL

by

Associates in Social Science, USMA, West Point, New York

This book is recognized by officers and men as THE authoritative source on matters relating to family security. It outlines general programs showing the interrelation of the new dependency and indemnity compensation, social security, government insurance and other benefits. This book is an indispensable tool for the serviceman who desires to plan adequately for the future security of his family.

The text has been extensively revised to explain the many changes brought about by the recent Survivor's Benefits legislation.

$2.00

Again, this year, the Chief of Staff of the Army has recognized the anniversary of the first mobile arm of our Service in a message to all the members of Armor, which takes cognizance of the service the branch has rendered since its inception 180 years ago and which reminds us all of the proud tradition which it is our duty and our privilege to maintain and continue to flourish. As in previous years, we are privileged to bring General Taylor's congratulations and wishes to our members on the opposite page.

In previous columns of *Reconnoitering*, we have urged that the twelfth of December, Armor's birthday, be recognized by all commanders through ceremonies, parades, displays and similar activities, as is done by many of the service branches. We are pleased to learn that our suggestion has been adopted by several units and that serious consideration is being given it by others. It is our earnest wish that this practice will continue to grow until "Armor Day" becomes an integral part of the calendar of every member and every unit of the arm of decision.

Our 67th Annual Meeting of the Association was held at Fort Knox early in the year. This was covered comprehensively in our issues of May-June and July-August. However, we would like to reemphasize that the attendance at this meeting exceeded that of the previous one. This expanding interest in the problems of Armor and the Army—for they are inseparable—seems to indicate that our hopes for an even larger representation at our next Spring Meeting are well-founded. Once again, this meeting will be held at Fort Knox, and tentative plans discussed by the Program Committee at the last Executive Council Meeting indicate that the subjects to be considered and the displays and exercises to be presented will be even more stimulating and thought-provoking than in the past. We sincerely hope that all our members who can arrange to attend will make every effort to be at this meeting, both for professional reasons and the pleasure of meeting once again their old comrades.

The Draper Trophy (formerly the Cavalry Leadership Award) was re-established as the Armor Leadership Award. Each year all tank platoons in a particularly designated armored division will compete for this award. The 2d Armored Division was so designated for 1956 and the tests were recently completed. As we go to press, we learn that the winner is 1st Platoon, Company B, 57th Tank Battalion.

The Fall Meeting of the Executive Council of the Association was held on the fifth of December. We should like to emphasize one motion that was adopted during that session. Then, it was agreed that the Association would present an award to the Honor Graduate of the Armor Officers' Advance Course at The Armor School each year. It is presently contemplated that this trophy will be a silver bowl appropriately engraved. We feel sure that this incentive will provide a whetstone for the competition in those classes—competition which has always been honed to a keen edge.

The year brought with it continued advances in new equipment and concurrent developments, principally in the missile field. Many of these innovations were reported in the pages of *ARMOR* of November-December 1956 from observations of the tests made at Aberdeen Proving Grounds during the meeting of the U. S. Ordnance Association. The XSSM-A-23 DART antitank missile was displayed to the public for the first time at this meeting. Two other items, which were not covered, and which are certainly of interest to all members of Armor, are the Mechanical Mule and the M56, 90mm, SPAT. The "Mule," a lightweight cargo vehicle capable of transporting 1000 pounds of material over unfavorable terrain to where it is required, can not only be transported by ordinary methods, but is also able to be carried by helicopter and even parachuted. The SPAT, a tracked-chassis vehicle constructed of lightweight metals, yet mounting a high-powered 90mm weapon which can serve as both an antitank gun and an assault rifle, is also air-transportable. These additions to the arsenal of Armor are enhancing our traditional mobility and bringing us closer to the role that we must play in the three-dimensional nuclear battlefield of future war.

The principal unit change during the year was the departure of the 3d Armored Division from Fort Knox in May, when it was transferred to Europe to become part of our share of NATO forces there. This doubled our armored division punch in Seventh Army. Newest units reported to be scheduled to *Gyroscope* are the 6th Armored Cavalry Regiment and the 11th Armored Cavalry Regiment; the 6th returning from Germany to Fort Knox, and the 11th replacing them.

Altogether, our reconnaissance enables us to report that Armor, the branch, the Association and the journal, are growing, and that we can look back upon the past twelve months with satisfaction and look forward to the next year with a determination that the trend will continue. As a final word, we are pleased to state that, in January, the first issue of *ARMOR's* Newsletter will be published and mailed to all of the Association's members. As we have said heretofore, this Newsletter will be an amplification of that which was published by The Armor School, and will reach the membership during the interim month in which *ARMOR* is not published.

UNITED STATES ARMY
THE CHIEF OF STAFF

TO THE MEMBERS OF ARMOR

On the 180th anniversary of the Army's first mobile arm I extend congratulations and best wishes to the officers and men of Armor.

Imbued with the spirit and traditions of Sheridan and Patton, and possessing modern fighting skill, Armor constitutes a vital combat arm designed for quick decision on the battlefield. With fire-power proportionate to the power of its leadership, Armor symbolizes the Army's modern military combination of men and machines designed to prevail on the battlefield.

Each of you has the solemn duty to insure the combat readiness of your arm, so that in times of emergency you may carry out your traditional mission with boldness and success.

Maxwell D. Taylor

MAXWELL D. TAYLOR
General, United States Army
Chief of Staff



U. S. Army

The following series of articles, sub-titled Armor in Europe, *are the result of material received from the Seventh Army Armor Conference held this past Summer at the direction of the Commanding General, Lieutenant General Bruce C. Clarke. Although the material is based on the prevailing local conditions in Europe, the tips on training, maintenance, gunnery, etc., are of value to all Armor personnel. General Henry I. Hodes, Commander in Chief, USAREUR, in his opening remarks said, "Certainly, it (Armor) has increased greatly in importance in Europe, and if I see the modern battlefield correctly, it is going to continue to increase until such time as we do not require movement over land. * * * There is no other way designed today to cross country except with mechanized vehicles."*

TRAINING PROBLEMS OF ARMOR IN GERMANY

By MAJOR GENERAL ROBERT W. PORTER, JR.

TRAINING problems of armor in Germany are many. Heading the list are restrictions to minimize maneuver damage, shortages of suitable armor training areas at home stations and the need to maximize the use of time and facilities at major training areas.

Because training areas are extremely limited, the 3d Armored has examined its mission in Europe against the job it would have if there were a general alert or if some other combat mission were assigned to it. As a result, training priority at home stations is given to those tactical subjects which can be taught in classrooms or with limited facilities at the Kaserne. Time at major training areas is spent entirely in the field either on gunnery or combined arms problems.

At major training areas the 3d Armored Division places initial emphasis on the ability of small units to attack and defend positions, to move during both daylight and darkness under all weather and terrain conditions. Officers and men must know the principles of delaying action, must be adept at developing barriers and minefields, and be able to communicate over extended distances. Training for the battalions of each combat command progresses through the team and task force level and culminates in a two or three day combat command exercise. Under the direction of Seventh Army, company and battalion tests are taken yearly.

Applicable Army Training Programs in Europe are sound and practical. Because of armor training problems in Germany, however, actual hours alloted to various phases of training have to be tailored to local training area situations and to the condition of the men and situations found in the major commands.

Each of the major combat units, tank, armored infantry, reconnaissance battalion, armored artillery and support, will be discussed in some detail against the backdrop of these objectives and limitations.

Tanks

Little can be done about obtaining more land in Germany, or reducing present German restrictions. The crux of the tank problem, then, is how to get the most out of the major training areas, and how to train tankers inside the Kasernes without space to maneuver tanks.

Driver training inside the Kasernes includes everything that is physically possible to do there, so major training area time and space can be devoted exclusively to advanced driver training.

Even in a limited Kaserne area, much worthwhile tank driver training is being accomplished. In a space as small as 200 yards by 40 yards, a tank driving proficiency course can be laid out to train a driver so he knows exactly where he is placing his right and left tracks at all times. Colored stakes are placed in the ground to form a twisting driving course, much like a slalom run in skiing. The stakes can be tall at first, then shorter as the course becomes more difficult.

This method is then expanded to include driving buttoned up, blackout with or without luminous markers and infrared driving. It can include the team of tank commander and driver, or special teams of drivers and ground guides.

Training also includes basic mechanical principles of the power train, so every driver understands the torque multiplication of the cross-drive transmission. He is taught why neutral steer is sometimes dangerous, and exactly what happens when he downshifts at too high a speed or shifts into reverse while the tank is still

MAJOR GENERAL ROBERT W. PORTER, JR., a 1930 USMA graduate, served in Europe during World War II. Subsequent to the War he held several important posts in D/A. Attending the National War College he was next CG of the 2d Armored Division. In 1952 he was assigned as Chief of Staff, X Corps in Korea. Returning Stateside he was the Military Advisor to the Director of FOA prior to his assignment to the 3d Armored Division where he is now the Division Commander.

moving forward. He should know what causes crankcase explosions and hydrostatic locks. He is shown the fouled sparkplugs resulting from too slow idling or driving at too slow speeds for a long period of time.

In some Kasernes, small ditches and earthen hills have been constructed to teach new drivers the capabilities and limitations of his tank, and to afford a modicum of training in overcoming obstacles. The problem of training in long blackout marches is, as yet, unsolved.

Another tank training problem involves the proper selection of firing positions. Where there are small hills or folds in the ground, drivers and tank commanders practice moving into turret defilade position, selecting a target, moving into hull defilade, simulating firing, then backing away under cover and moving to an alternate firing position. This exercise is observed by other tank commanders and drivers from the position of the target. The instructor at the target position has radio contact with the tank and corrects errors on the spot.

Outside the Kasernes, much is accomplished by tactical rides in trucks or jeeps to the battalion alert area or other critical terrain. There, firing positions are selected either dismounted or from jeeps. The complete tank crew is required to study each position. The platoon leader and platoon sergeant conduct instruction on the spot. This includes preparation of the range card, means of improving fields of fire, plans for distribution of fire, selection of the natural obstacles or artificial obstacles to create enemy tank targets; selection of alternate positions and means of improving concealment.

Care must be taken to avoid undue emphasis on the slow deliberate selection of a firing position. Often it will be necessary to select positions quickly with no prior reconnaissance. Quick selections are practiced in the major training areas after the basic principles have been mastered in and out of the Kasernes.

The major tank training problem facing the 3d Armored Division is that of welding the individual crew members into an efficient firing tank crew. The solution to this problem is not satisfactory in that our training areas for crew training are split. The NORTHAG Tank Ranges, operated by the British Army, are the finest in the world and are made available to Seventh Army for the annual qualifications of tank gunners. These ranges provide facilities for service firing of Table V through VIII and also include "battle runs" which test the proficiency of tank crews under simulated combat conditions. Because these ranges must be shared between all NATO forces, the time allocated Seventh Army permits the firing of only two men per tank crew. Normally, the tank commander and gunner are sent to these ranges after preliminary training has been conducted at home stations. Other members of tank crews are given gunnery training at Grafenwohr or Baumholder.

Maintenance training presents another serious problem. The difficulty of teaching crews and maintenance sections how to perform maintenance on the march can be solved only by having tank units make long marches. A solution is to have each tank battalion march overland to its major training area at least once a year. The company and battalion maintenance sections then receive much needed practice and accumulate valuable experience tables on spare parts requirements. The 83d Reconnaissance Battalion has conducted a most successful reconnaissance problem from home station to Grafenwohr, a distance of over 200 miles. It is hoped to conduct a similar problem for tank battalions at least annually. However, the proposal to march these battalions overland to Grafenwohr appears costly in terms of track wear, gasoline, maintenance and the obvious damage



U. S. Army

Long marches are necessary to teach tank units how to perform maintenance.

to the German roads and highways.

Effective training for night tank operations must be conducted in a major training area. Many principles, however, are taught inside the Kasernes before a night tank problem is attempted in a major training area. Classroom instruction covers tactical principles involved to include the required control measures. This instruction can be presented as a sand table exercise in which student commanders select routes, boundaries, the objective, assembly areas, attack positions, lines of departure, etc. Free discussion is encouraged on what formation to use, route and zone markings, methods of identification, width of zone attack, rate of advance and responsibility for organization of the objective.

The most important problem peculiar to a night attack is control. Radio is entirely adequate for reports and commands but there must be means of visual control and identification of individual vehicles. This is accomplished by use of luminous discs and luminous vehicle markings, signals from filtered flashlights, illuminating shells and searchlights when available. These means of identification are practiced inside the Kasernes.

With the adoption of the new tank cupola and the relocation of the range finder, the tank commander now must possess all the skills of a fighter pilot. The question of how best to train new tank commanders and how to insure retention of skill among the old ones is a training and retraining problem of considerable complexity requiring careful planning and much practical work on the equipment he must master. A great deal of this skill can be attained in the motor park.

The present tank commander must possess technical skill, manual dexterity, and mental alertness in a greater degree than almost any other person in the armed forces. He must expertly supervise the maintenance and stowage of his tank, look out for the well-being of his crew and lead them in battle. It takes a tremendous amount of energy and devotion to duty on the part of the individual. It requires exceptional ability. A good tank commander is worth more than any stripe that can be pinned on him.

Armored Infantry

Training of armored infantry units in Germany has to be adapted to the restrictions of limited maneuver areas, maneuver damage, available fuel and ammunition. It should be remembered that the problems confronting an armored infantry battalion commander in training are basically the same as those confronting the tank battalion commander. This stems from the concept of employment of cross-reinforced units as the normal mode of operations and the general similarity of equipment.

Many aspects of armored infantry training are conducted in the immediate vicinity of the Kaserne, which includes such things as dismounted drill, communications training, scouting and patrolling and the like. This training allows all the time spent by the armored infantry unit in major training areas to be devoted to teaching the armor concept of tactical employment of armored infantry units. It has been demonstrated that armored infantry units can march over German highways in tactical formations mounted without causing prohibitive maneuver damage. Actually, the only training that cannot be conducted at or in the vicinty of home Kasernes are mounted maneuvers and tactical exercise in which units are employed in cross reinforced tank-armored infantry operations supported by artillery.

Armored infantry units will be nearly ready for unit tests when they arrive in major training areas. These training tests are given progressively from platoon to the battalion level test during the month that the battalion is at Grafenwohr. One field exercise conducted at each level prior to administering the army training tests is adequate preparation for these tests if maximum advantage has been taken of training time and facilities available in home Kasernes or in the immediate vicinity thereof.

Field exercises that have been conducted on a combat command or division level within the 3d Armored Division indicate that the greatest weakness in the armored infantry units lie within the command groups at all echelons. The units themselves appear to function with the same effectiveness that the headquarters functions. Therefore, additional time is being spent by all armored infantry units to include the company headquarters in command post exercises stressing all aspects of troop leading procedures. This training fits in well



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Armored infantry training problems are like those of the Tank unit commander.

with the restrictions imposed upon units of the division by lack of training areas and the need to minimize maneuver damage. Only by perfecting our troop leading procedures through means of command post exercises, map exercises and terrain rides, do we obtain the desired proficiency in command groups and the resulting confidence of the individual soldier in his leaders. Further, by giving this training in the vicinity of home Kasernes, greater advantage is taken of the time that is then available for unit training in major training areas.

Closely allied to this training of command groups is the necessity for well planned and well programmed officer and noncommissioned officer schools. Herein lies the key for preparing junior leaders to properly train their units under the circumstances we find in Germany.

Armored infantry units of the 3d Armored Division are required to move to major training areas both overland and by rail. When an armored infantry battalion, reinforced, moves to a major training area, every element of the battalion to include personnel, equipment and basic loads of supplies must be moved efficiently and quickly so as to minimize the loss of combat effectiveness for the period of the move. With short periods of simple training and preparation, an armored infantry company can be trained to move to the siding, drive their combat vehicles aboard the train and be ready to roll within approximately one hour. This requires that the vehicle crews be complete and that the lashing and blocking equipment be present on the vehicle as OVM.

It is believed that the combat effectiveness of armored infantry units need not fall below an acceptable standard during that phase of the gyroscope cycle when AUS personnel rotate back to the U. S. and replacements are received. However, during this critical period, leadership at all levels must be alert and aggressive. These replacements now being trained by the 4th Armored Division at Fort Hood, Texas, can be effectively integrated into the existing armored infantry teams if the leaders at all levels understand and appreciate the urgency of remolding the team. The advance training of these replacements as members of the armored infantry team can be accomplished in two ways, integration on the squad and platoon level at the home Kaserne and integration on the company and battalion level during the first scheduled period at a major training area.



U. S. Army

The mortar squad must select firing positions and use cover and concealment.

The Reconnaissance Battalion

To properly train a reconnaissance battalion, large areas with adequate roads nets must be made available. Communications, both CW and Voice must be taxed to the maximum. Should the number of troops utilizing the major training areas seriously restrict areas and roads available, a reconnaissance battalion will have tremendous difficulty in realistically engaging in company and battalion level training and also in conducting realistic combat firing problems. Platoon, company and battalion level training must approach that which one can expect under combat conditions.

This problem has been partially solved by permitting the 83d Reconnaissance Battalion to march overland to Grafenwohr while conducting route reconnaissance over a wide front. On approaching the reservation proper, the battalion then fights its way onto the reservation.

The real problem is training in the vicinity of the home Kasernes.

There are no problems in training scout sections on section, platoon and company level. Good secondary roads, not excessively traveled, are easily obtained and can be used for tactical movements. Unlimited means are available to train scouts on terrain appreciation, communications, OPs, LPs, column protection and flank protection. However, integrated platoon training is restricted to the training area close to the Kaserne and is quite limited in type terrain available.

The most difficult elements to train in and around Kasernes are the tank sections of each reconnaissance platoon. One method that is successfully employed to partially alleviate this situation is the use of ¼ ton trucks for tanks. These simulated tanks operate with the balance of the platoon on secondary roads in normal tactical roles. Problems include selection of firing positions to include range estimation, routes of movement, "going" terrain, refueling points, cover and concealment and the technique of overwatching fire.

The armored infantry squad, for training, presents a problem only in its integrated platoon and company



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To be effective in combat an armored artillery unit must train as a battalion.

training. Basically this involves the tank-infantry team and its coordination. No problems exist for the squad itself. However, on platoon level, the infantry squads are mounted on 2½ ton trucks and approximate the employment of simulated tanks in tactical exercises across the German countryside.

Training of the mortar squad presents a problem only in selection of firing positions and proper utilization of cover and concealment. Crew drill, to include manipulation, by the use of "tear-drop" ammunition can be employed. "Scrambling" of mortars can be directed and trained in small training areas by the use of this type ammunition to include movement, infiltration and displacement. Mortar squads can be given terrain rides, within proposed areas of employment, to supplement their training. The critical training, even though partially attained by training ammunition, is the proper training of FO's in fire adjustments. This includes tankers, scouts, infantry and air observers.

Training the air section presents no special problem. Both planes are utilized on platoon level exercises to enhance training in camouflage, concealment, dispersion and communications within the squad, section and platoon. Flights for company commanders, staff officers, and EM and selected noncommissioned officers are planned to teach orientation, aerial observation, recognition and communications. Areas of planned or possible employment are reconnoitered by all responsible parties to include possible landing fields and heliports. The only training for the air section that suffers in Kaserne training is mortar and artillery fire adjustment, both for pilots and assigned observers who normally fly the planes. This must be emphasized in major training areas. In addition, the use of the air section is being tested to explore its capability for landing of reconnaissance patrols, photography, aerial resupply, communications relay, command and marking of targets.

Other than in these major training areas, company and battalion level training is accomplished by CPXs. The platoon, company and battalion headquarters are periodically moved into the field of logical tactical locations and at extended distances. A control group, at battalion, utilizing actual map play with reference to their locations, then feeds enemy information to platoon leaders on their nets. In this manner, realistic tactical play is accomplished while operating radios over normal distances.

The one training problem, at company and battalion level, that cannot be solved by CPXs, sand table, or map maneuvers, is the company and battalion "scramble." This is the regrouping within the company of all scouts, tanks, armored infantry and mortars under single command to form striking forces. The "scramble" is an important formation that must be utilized many times in reconnaissance battalion missions and it requires much practice for coordination, communications, control and dispersion. This type training, to include live firing problems, must be accomplished in major training areas. Many problems, at these training areas, must include this type of mission.

The supply platoon is given convoy training, map reading, cross-country driving and testing on individual runs. Practical problems involving realistic turn around distances and times for the supply platoon are used. In addition, individual trucks are dispatched with strip maps, or normal maps marked with check points. These trucks then move throughout the assigned area simulating arrival with supplies and finding companies and platoons in unfamiliar surroundings. This training can be accomplished in and around the Kaserne much more realistically than at major training areas.

Armored Artillery

Armored Artillery in Europe is faced with the same general training limitations that have been discussed. Certain specific problems are peculiar to armored artillery, however.

One of these is that artillery units, to be effective in combat, must train as battalions. Another is that antiaircraft artillery training requires the use of jet airplanes for effective target detection and for effective tracking. Restrictions on flying over certain areas complicate this problem. A third specific problem is that effective training of artillery battalions requires participation in combined arms exercises. This places an additional requirement on the limited time available in suitable training areas.

The training of the 3d Armored Division Artillery's small, self-contained

units—fire direction center, survey, communications—is accomplished readily at home stations or in any suitable training area. However, this training requires considerable ingenuity and imagination. Howitzer and gun sections are trained in the mechanics of gun drill only at home stations. At home Kasernes they are pressed for effective training in use of terrain, a prime requisite. They cannot be trained as a battalion at their home station.

Maintenance training in home Kasernes, even at the battery level, does not consider maintenance problems encountered following day-to-day field operations. When vehicles remain in unit motor parks throughout the major portion of the year, maintenance training cannot be accomplished.

A partial solution to integrated battalion training is tied around the employment of communications exercises with limited troop participation. This helps weld the battalion fire direction control unit and the command control into an entity. If these exercises are well planned, they can be effectively run in the field outside of major training areas without excessive maneuver damage. This is particularly true if wheeled vehicles are substituted for tracked howitzers and if aiming circles are used in lieu of artillery sights for proper laying of batteries. One drawback is the inability to play terrain and its effect on operations and control. Thus, proper terrain appreciation, driver and crew training, and proper testing of ability to move effectively day or night as part of a combined arms team is sacrificed. However, effective training is gained for key officers and noncommissioned officers.

An aggressive use of map exercises and terrain rides in the 3d Armored area has been initiated to train commanders and noncommissioned officers in the effects of terrain on their operations and the selection and organization of positions. Actual problems of movement, of tactical handling of combat and field trains and of various support problems suffer because factors which would limit these operations in an actual situation are absent.

Liaison and forward observer sections participate with tank and infantry units in preliminary training, leading to effective fire planning, observation and liaison. This is accomplished both at home stations and at major training areas. However, this reduces artillery personnel available for unit training within the artillery battalion.

Shifting to antiaircraft artillery problems, target detection, early warning and tracking exercises depend upon the use of jet aircraft. This problem has not been resolved to our satisfaction. The 3d Armored's AW battalion can seldom be moved to an active air field where operational flights could be used for training as this would make the battalion unavailable for its primary operational mission in the division area.

The antiaircraft battalion is located in a jet-restricted area, an area 40 miles in radius surrounding Frankfurt and the Rhine-Main-airfield. The ideal solution, and one that has to date been unsuccessful, is to schedule continued jet operational flights into the area.

Exercises

The discussion covering each of the training areas points up the pressing requirement for effective training time in major training areas and for command post exercises and field training exercises at all levels of command. These exercises must fill the gap in training resulting from the many training deficiencies at home stations and at major training areas.

Frequent command post exercises are proving essential to maintaining proficiency in staff procedures and communication techniques. There are relatively few opportunities to move the division or larger units to the field for a field training exercise. During these command post exercises, new tactical concepts, procedures and techniques are tested. If the test indicates the new idea has merit, then it is tried later during field training exercises under more realistic conditions. In Seventh Army these command post exercises are scheduled periodically. In some command post exercises, only the division headquarters takes the field; in others, headquarters down to the battalions and separate companies are involved. These command post exercises are always carefully planned and promptly critiqued to insure the maximum return from the effort expended.

Normally, field training exercises for elements of the division to include the combat commands are held at Grafenwohr. During the winter



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CPXs are a must to maintain proficiency in staff and communication procedures.

months when the crops have been harvested, field training exercises are staged in the German countryside. These exercises are essential if units and their commanders are to be successful in combat.

For armor units, the field training exercise is an expensive training mechanism. Much gasoline, maintenance parts, control personnel and a large area are required. A sizable number of control personnel are required who normally can be drawn from nonparticipating units. This burden is in a large degree offset by the fact that the officers and men on the control teams get much valuable training from participation in the exercise.

In Germany the control of maneuver damages is of major importance, both from the point of view of German-American relations and dollar funds. Armor units, unless carefully controlled during field exercises, have caused excessive maneuver damage claims to be submitted. It takes detailed and conscientious effort on the part of all commanders to keep maneuver damages within bounds. Coordination with German foresters and local civil officials as well as briefing of participating troops precede each exercise. With the troops properly indoctrinated and civil officials brought into the picture, profitable field training exercises are being conducted outside of the major training areas.

Within major training areas, field training exercises can be conducted with few restrictions but are too infrequent to maintain a high degree of combat readiness. Near home Kasernes, small field training exercises, chiefly of platoon size, are conducted with the objective of maintaining proficiency achieved at the major training areas.

Support Units

One king-size support problem in the 3d Armored Division is in training its Ordnance personnel in the mandatory subjects required by Seventh Army. Tank, armored infantry and artillery units are scattered about in six widely separated localities. Supporting these widely dispersed troops, coupled with maintaining a "tired" set of wheeled vehicles, leaves little time for formal training of Ordnance personnel.

Ordnance units are emphasizing on-the-job training Monday through Friday noon, concentrating on mandatory subjects Friday afternoons and Saturday mornings. One obvious remedial measure is vigorous command emphasis on unit maintenance to reduce the workload on Ordnance units. The 3d Armored Division does this.

Quartermaster, Medical and Signal commanders are confronted with the problem of insufficient opportunity to exercise their role of supporting the division during combat operations because of maneuver restrictions. Although CPXs provide abundant training for commanders and staffs of support units, they do not help the man in a service unit to get the feel of actually supporting other divisional units in the field.

The support units take advantage of their opportunities to move to the major training areas. Their attendance at Grafenwohr actually furnishes much more support in the major areas than would be normal for the troops involved. This is justified in order to train the support units. Actual participation by support units in all field exercises is strongly stressed.

Recent large-scale field exercises have convinced the 3d Armored that communications in the division sector are a difficult but manageable problem. The solution hinges largely on a combination of technical training of the division's signal company and a thorough knowledge of the effects of the terrain. The signal company mounts up small teams in wheeled vehicles, avoiding repercussions from the use of tracks. By keeping the teams small, they do not have to go through road-clearance routines. They cover the sector in a systematic fashion and will eventually result in a complete reference on the signal characteristics of the 3d Armored Division sector, an invaluable asset in active combat operations.



U. S. Army

Communication in an armored division sector is a hard but manageable job.

Summary

The 3d Armored Division achieved a high state of combat readiness prior to arrival in Germany. This armored "know how" resulted from the concentrated training program followed while at Fort Knox which included the completion of battalion tests for all combat and support battalions, and culminated in a one week divisional field training exercise.

We have proved to ourselves that this hard won battle capability can be maintained and vastly improved in Germany despite the many obstacles in our path.



U. S. Army

Maintenance and Other Problems with Armor Equipment

By Col. J. R. Pugh, Lt. Col. W. R. Pershall and Lt. Col. J. M. Snyder

IT would be presumptuous indeed to even think that any panel could solve the many problems connected with armor equipment. Our equipment becomes ever-increasingly complicated and the tour of duty of our draftees remains at a two year tenure. There is no magic formula for this situation. It is the basic assumption of this discourse. By the time they receive a modicum of training, our draftees are gone, and we who stay behind can only hope that the training which they have received will not be forgotten in the event of an emergency.

Thus we make every effort to simplify material contained in the TM's and FM's, and at the same time make it provocative. We have found that our two-year men are always interested in subjects which they are able to associate with their future life. Obviously they do not expect to command a tank in the future, but if, for example, they believe the knowledge of a tank will assist them in using and maintaining a tractor efficiently and economically, the problem lessens. Most of our young men of today are mechanically minded. They can learn quickly, if they are motivated, and do not get the idea that the instruction is beyond them.

Great emphasis should be placed on, first, getting a man in the job he likes, be it tanker, clerk, cook, supply man or mechanic. The last-named is a breed unto himself. We never come upon a good mechanic, school-trained or otherwise, who is forced into the job against his will.

Therefore, our problem in the field of maintenance evolves itself into training mechanics from those men who desire to be mechanics, and providing clear, concise, and provocative instruction in the field of what we

call "driver maintenance" for the others.

Each driver should carry a paper outlining our desires in this respect. It should be a part of his OVM. It should be written simply. Any grown man, be he layman or technician, should be able to understand it. It should pull together in one small document all that is expected of him.

Maintenance Problems and the Conduct of Maintenance

The achievement of a high standard of maintenance in an armor unit is dependent upon a number of factors. These, we believe, are as follows:

1. The commander must know the maintenance situation within his unit from day to day, and must participate in the conduct of maintenance.
2. The officers within the unit must be trained not only in the theory but must be competent in the practice of maintenance. They must be able to show their juniors how it is done.
3. A supply of the necessary parts and other material required to keep vehicles operational should be available.
4. Trained mechanics, motor sergeants and motor officers must be made available for their maintenance duties.
5. Sufficient time and adequate facilities for the conduct of maintenance must be provided.

With respect to knowing the maintenance situation within his unit from day to day the commander can obtain this information from daily maintenance status reports and from other periodic maintenance reports. He should inform himself daily of the number of vehicles for duty by type and organization; the cause for deadline by type and organization; the parts required to repair these vehicles with the date and requisition number; and the vehicles which have been deadlined for longer periods than normally required to obtain parts. *See Figure 1.*

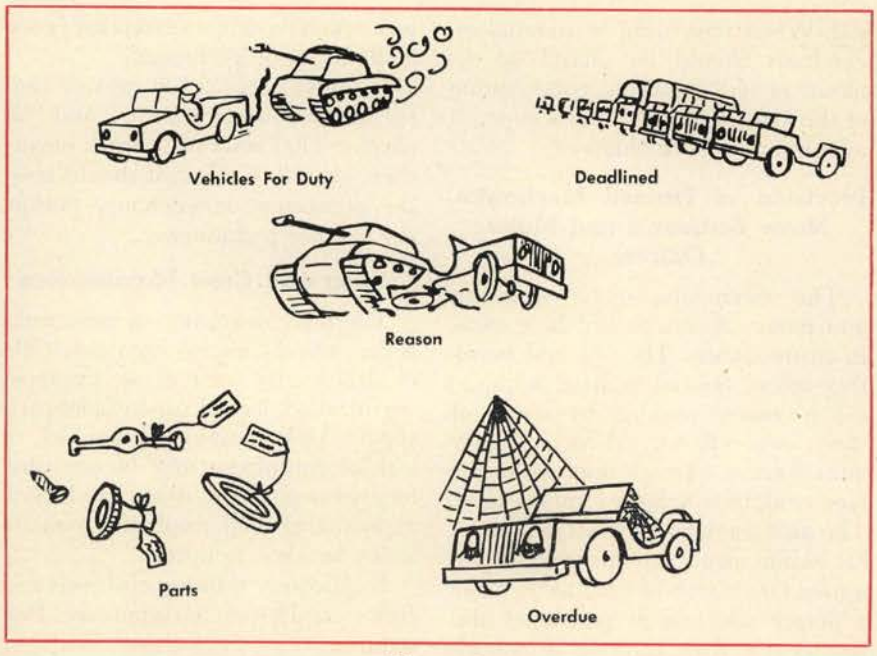


Figure 1

In addition he should inform himself periodically with respect to: The results of spot-check inspections; accident data to include motor pool accidents; the status of "C" and "D" checks; and shortages existing in OVM equipment. Analysis of this data will enable him to determine the weak points in the maintenance system and to take prompt corrective action.

Training of Officers in Maintenance Procedures

A training requirement exists to insure that officers are thoroughly trained in maintenance procedures and that each officer has the ability to show his juniors how maintenance operations should be performed. This training program should be of such a nature that the officers are actually required to perform the maintenance operations on each type of vehicle with which their unit is equipped. It has been found advantageous to make each vehicle the subject of an officers' class where maintenance operations are performed by each officer. Sufficient vehicles will be provided to insure that each officer will be required to perform all operations. This system of officer training develops the confidence of the officers in their ability to supervise the conduct of maintenance in their units.

Supply of Parts and Material for the Conduct of Maintenance

There is nothing so discouraging to good maintenance as a lack of parts and supplies necessary for keeping vehicles in top condition. Command action should be taken when vehicle status reports indicate that parts are not being made available within a reasonable time. Paint and materials necessary to maintain the appearance of vehicles are very essen-

THE AUTHORS

COLONEL JOHN R. PUGH, Armor, a 1932 USMA graduate, was in the Philippines at the time war was declared and was taken prisoner at the end of these operations. Subsequent to the war he attended C&GSC and remained there as an instructor. Attending AFSC he was a battalion and regimental commander in the 325th AIR. After an assignment in D/A he attended the National War College prior to his present assignment as CCA commander, 3d Armored Division.

LIEUTENANT COLONEL WILLIAM R. PERSHALL, Armor, graduated from the University of Illinois in 1937. During World War II he served in the Pacific in the G2 Section, Sixth Army. Subsequent to the War he attended The Armor School. He was assigned to the G2 Division, USAREUR. Returning Stateside he was assigned to D/A prior to his present assignment to the 3d Armored Division, then at Fort Knox. He is presently the Commanding Officer, 709th Tank Battalion, 3d Armored Division.

LIEUTENANT COLONEL JAMES M. SNYDER, Armor, received his BS and MS degrees from West Virginia University. During World War II he served in Europe as Executive Officer, CCR, 20th Armored Division. Subsequent to the War he served in AGF, the Constabulary and G3, D/A. Next he was assigned to the G2 Section, I Corps. Returning Stateside he attended The Armor School and was a battalion commander, 3d ACR. He is now Executive Officer, CCA, 3d Armored Division.

tial. When repainting is undertaken, emphasis should be placed on removal of old paint and conditioning of the vehicle in order that a superior appearance will be obtained.

Provision of Trained Mechanics, Motor Sergeants and Motor Officers

The mechanics, motor sergeants and motor officers should be experts in maintenance. They should be either school trained or have acquired the necessary training by virtue of their own efforts. Above all they must have a natural interest in the type work in which they are engaged. The unit commander must determine his requirements for this type of personnel far enough in advance to make a proper selection of personnel and provide for their training or schooling, to replace contemplated losses within his unit.

Time Required for Maintenance

Maintenance requires time. The amount of time needed will vary with the state of training of the unit and the efficiency with which maintenance activities are organized; the conditions under which vehicles are being operated, and the facilities available.

If vehicles are being operated every day, a period of at least two hours per day must be provided. Shorter periods are not profitable because too much time is taken in issue and turn-in of tools and other necessary items. In addition to the normal daily period at least one longer period of not less than four hours per week should be provided. Such a period is necessary in order that those maintenance services which require an extended period of time can be performed.

It is also necessary to provide time for the performance of "C" and "D" checks. The crews of vehicles having these services performed should assist the permanent maintenance personnel in their performance.

Driver and Crew Maintenance

The basic deficiency in most units is driver and crew maintenance. Other deficiencies such as an improper organization, lack of supervision, parts supply, lack of trained personnel, or lack of equipment may be contributory causes. Good driver and crew maintenance will result if command action is taken to insure:

1. Adequate training of drivers and crews in Driver Maintenance Procedures.
2. Officer participation and supervision at all levels.
3. Periodic inspections to insure that required maintenance standards are maintained.
4. Stability in driver and crew assignments.
5. Emphasis upon improving vehicle appearance to develop driver and crew pride in their vehicles.
6. Recognition of outstanding achievements by drivers and crews.
7. Adequate back-up by company, battalion and higher maintenance echelons.

Maintenance Problems Peculiar to the M48A1 Tank

The M48A1 tank is a beautiful piece of machinery. But like any mechanical thing it has certain peculiarities which must be taken into account if maximum service is to be obtained from it. If these peculiarities are known and methods of dealing with them are developed, obviously the usefulness of this vehicle will be increased. *See Figure* 2.

Suspension System

Shock Absorbers and Snubber Brackets on the two front and rear road wheel arms have been shearing. *See Figure* 3. These brackets are secured to the roadwheel arm by four ¾ inch bolts. They are shearing because they have loosened. Bolts should be checked after each period of operation and tightened to 400 foot-pounds with a torque wrench. In the event of shearing, brackets should *not* be welded to the roadwheel arm unless authority is given by supporting Ordnance.

The compensating idler is subject to failure unless care is exercised. *See Figure* 4. The idler spindle can be broken or the hole in the hull elongated if the tank is driven with abandon or the bolts holding the spindle flange to the hull are permitted to work loose. These bolts should also be tightened to 400 foot-pounds torque at each B check.

In addition upon receipt of a new M48A1 Tank, the clearance between the spindle bracket and the hull must be checked. This check is made by loosening the three bolts holding the spindle and checking the clearance with a feeler gauge. If the clearance is found to be more than 0.005 the tank should be job ordered to supporting Ordnance for shimming.

Leaking road wheel seals will be a source of trouble, if tanks are not driven periodically. *See Figure* 5. Upon arrival of CCA in Ayers and

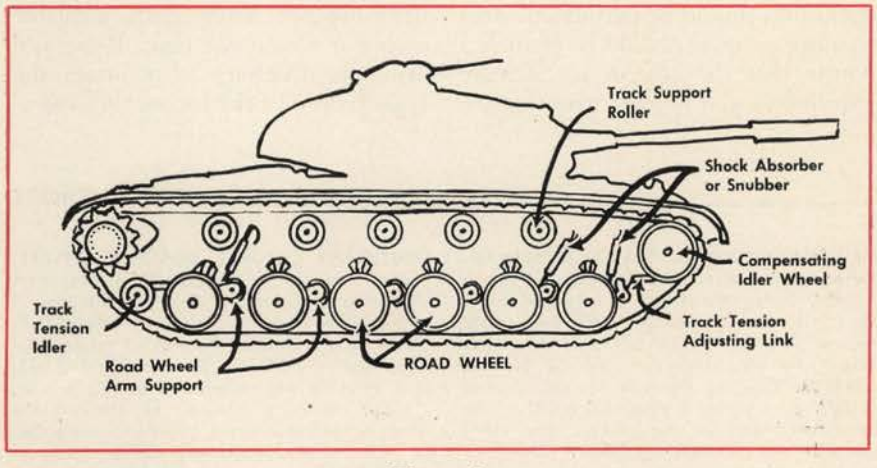


Figure 2

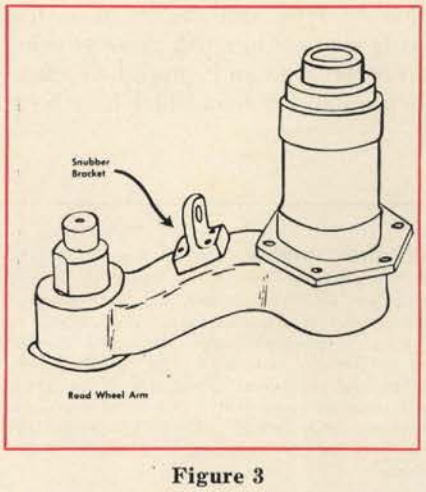
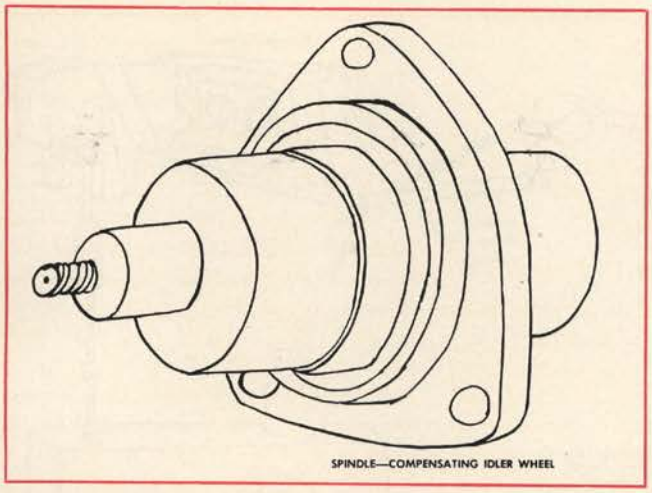
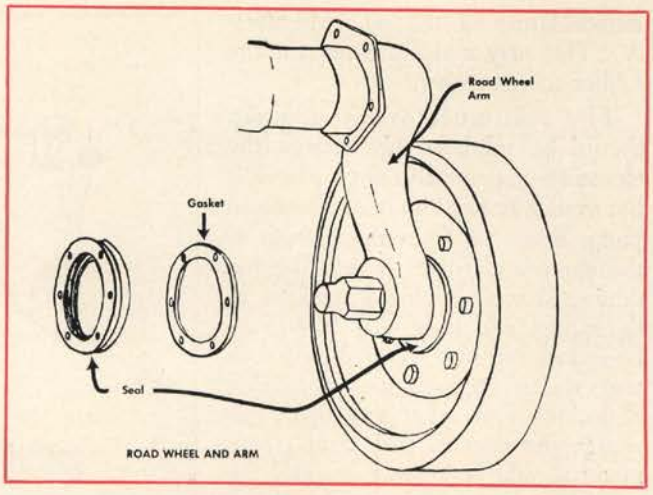


Figure 3



SPINDLE—COMPENSATING IDLER WHEEL

Figure 4



ROAD WHEEL AND ARM

Figure 5

Schloss Kasernes, this was a vital problem as movement of track vehicles was limited to one road. Local negotiations with German authorities coupled with gestures of good will and becoming a part of their community have virtually obviated this difficulty. We now have a network of roads cleared which enables us to meet this requirement.

Certain changes in lubrication procedures for suspension systems have been directed. *See Figure 6.* OE 50 oil should be used in compensating idlers instead of OE 10. The tension idler may be found to have either a grease or oil lubrication system. A program is in progress to convert all tension idlers to grease lubrication. Oil should be used in idlers fitted with an oil plug until the required modifications have been made.

A rule to indicate the time when track blocks should be removed has been developed. When the distance between the dust shield on the track adjusting linkage and the track adjusting nut is six inches or more, a track block should be removed.

The same oil is used in final drives as is used in the main engine. Final drives may be used on either side. Thus, in an emergency, any final drive can be used to replace an inoperative one.

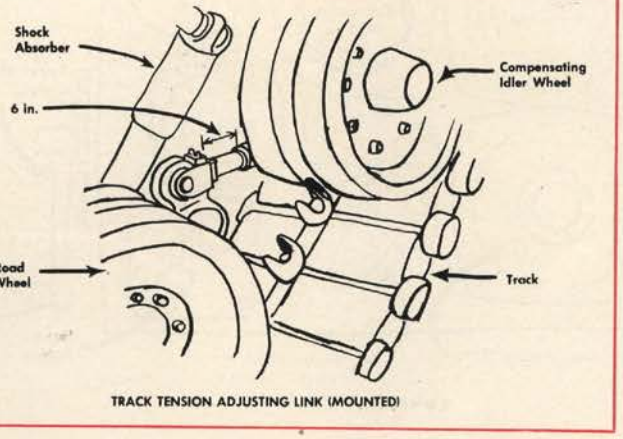
Final drive sprockets should be permitted to have at least ¼ inch of wear on the second side before being replaced.

When operating the tank in cold weather, care should be taken to insure that mud or ice is not permitted to accumulate behind the track support-rollers. Accumulation of any kind may result in their freezing to the hull at the halt. In the event that the tank should become frozen to the ground, it should be broken loose by another tank which is free. The final drives may be damaged by attempting to move a frozen tank under its own power.

Turret Controls

The Republic Relief valve will fail, if the turret of the M48A1 is continually kept out of the travel position. *See Figure 7.* The failure of the relief valve is due to the fact that the gun is breech-heavy, which causes a high back pressure and reduces the tension of the valve spring. When the valve spring fails, the gun will drift when out of travel lock.

It is possible to confuse the oil used in the recoil system with that used in the hydraulic system. Both oils are red in color. Oil used in the recoil system is Mil-05606; oil used in the hydraulic system is Mil-6093-A. This may seem complicated. It can easily be recorded in one's mind by remembering that recoil system oil contains no A. The word "HYDRAULIC" contains an "A" and so does the



TRACK TENSION ADJUSTING LINK (MOUNTED)

Figure 6

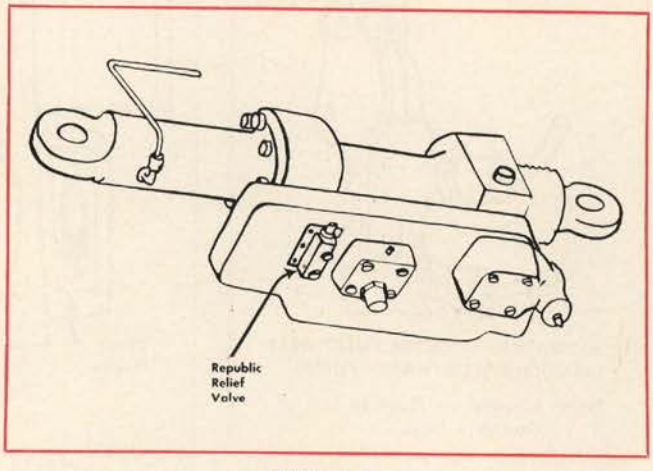


Figure 7

nomenclature of the oil (Mil-6093-A). This may make it easier for the soldier to remember.

The accumulator hand pump should be used to supercharge the elevating system only when power is not available. *See Figure 8.* The hand pump draws oil from the bottom of the sump and forces it into the hydraulic system. If dirt is present in the sump, and it usually is, it may be introduced into the hydraulic system, which increases the possibility of locking valves hanging open. To charge the system, the turret power motor should be turned on, and the hand pump should be used only in an emergency.

Commander's over-ride solenoids being burned out due to improper usage by tank commanders. To prevent burning out the solenoid, commanders must depress the over-ride switch before moving the handle in any direction.

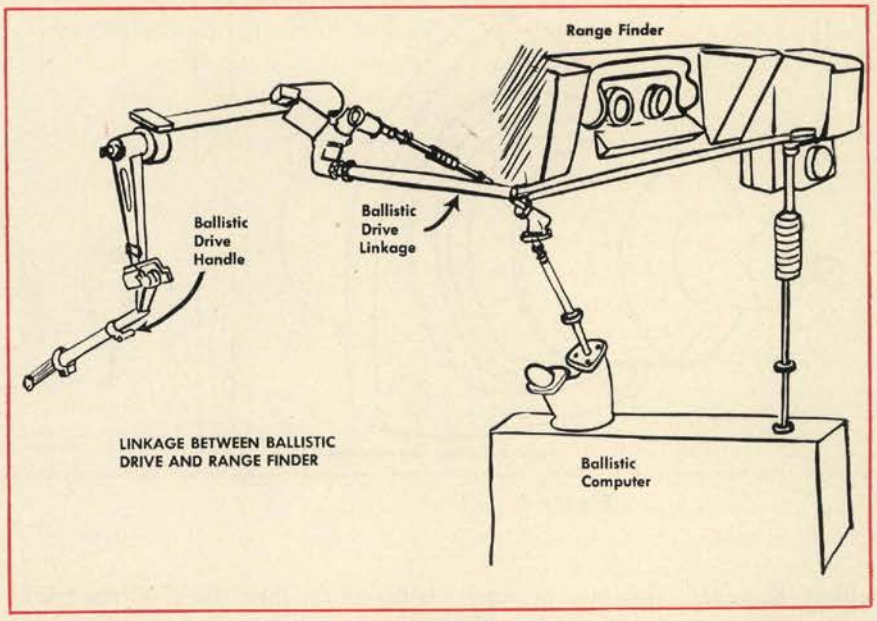
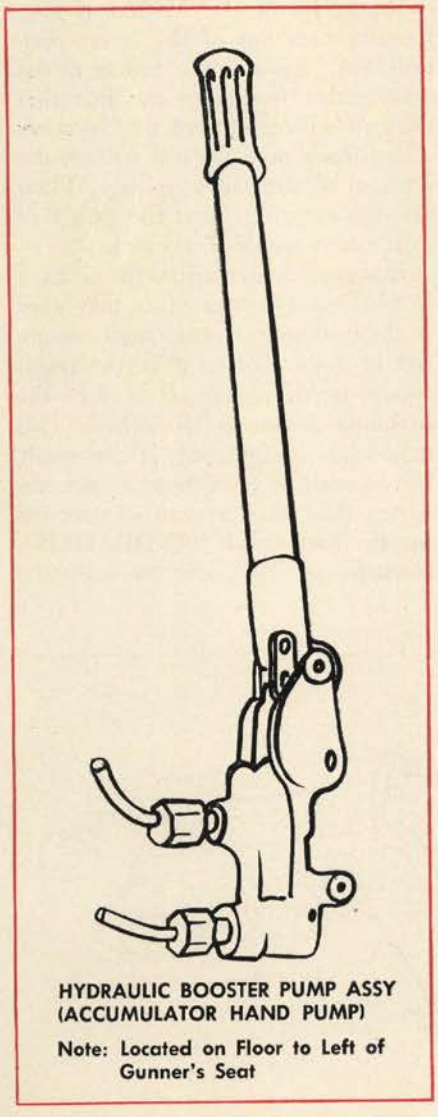


Figure 9



HYDRAULIC BOOSTER PUMP ASSY (ACCUMULATOR HAND PUMP)

Note: Located on Floor to Left of Gunner's Seat

Figure 8

Fire Control System

The linkage between the range finder and the computer is pre-set at the factory to insure synchronization. *See Figure 9.* Ordnance units are not equipped to make adjustments on this linkage. Using units should make no adjustments. This is a depot job.

Replacement of lamp bulbs with the light switches on will almost always result in the new bulb and the circuit resister being burned out. The light switches should be in the OFF position when bulbs are being replaced.

Lamp Cap assemblies can be fitted into the lamp in only one way. They will be damaged if forced into the housing. Care should be taken to avoid damage to these assemblies as the range finder is inoperative when the light sytem is out of order.

T31 Computer

A quick check to see if the computer system is qualified can be made

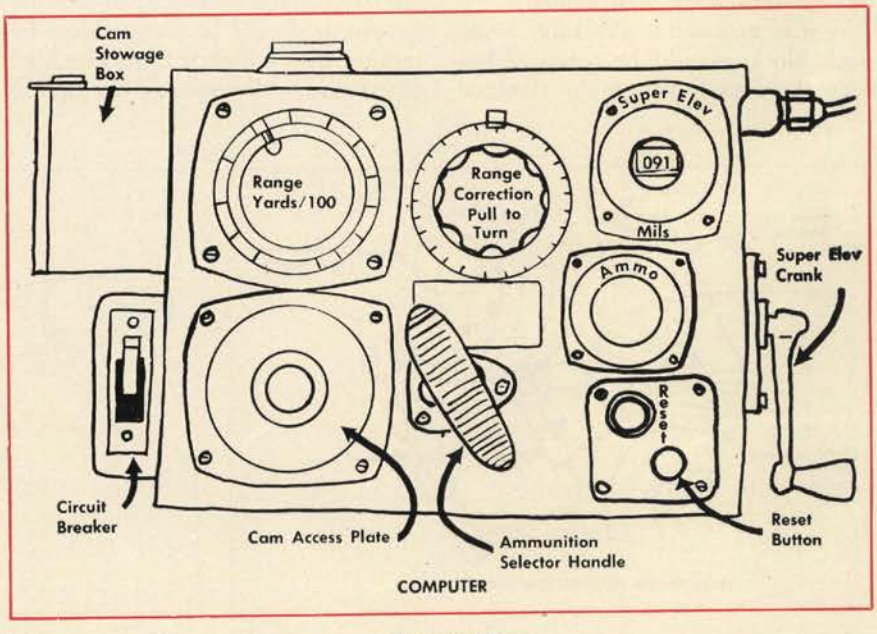


Figure 10

by following this procedure: Set the ammunition selector handle at APT-33-E-7. *See Figure 10.* Set the range scale at 1500 yards. The Mil scale should then read 9.1 plus or minus 0.2 mils or less. If the computer is unqualified, no tinkering should be attempted by the using unit.

The ammunition selector handle is subject to abuse by personnel who do not know how to operate the computer. The handle has been used as a footstep in getting in or out of the turret. This bends the shaft and causes the ammunition handle to freeze in its bushing. The handle has been completely pulled out of the computer by some inexperienced personnel. The handle should be rotated 30 degrees to the right and then pulled out 1½ inches very easily.

Using units should not attempt to replace ammunition cams. The cams installed in the computer should be checked to determine if they correspond with the ammunition being used. If the wrong cams are installed, supporting ordnance should be requested to make replacement.

The rubber boot on the circular circuit breaker switch should be removed, if it has not been removed prior to issue of the tank.

Caliber .50 Machine Gun on Antiaircraft Mount

The caliber .50 machine gun mounted on the antiaircraft mount fitted to the M48A1 Tank presents a number of problems not encountered in previous AA mountings of this gun.

Certain units have reported that parts are missing, when tanks have been received from issuing centers. Investigations indicate that units have not always unpacked all material carefully and that small parts were inadvertently discarded with packing material. All packing material should be carefully checked.

All personnel who are concerned with the operation of the M48A1 Tank should familiarize themselves with the material contained in Change 1 to TM 9-7012 covering the caliber .50 AA machine gun mount, turret type.

The interlock of the M.30 Cupola is not intended for use as a travel lock for the mount. The friction type azimuth lock is used for this purpose. *See Figure 11.* It will perform this function satisfactorily if properly adjusted by means of the two screws located on the top of the lock.

Principal difficulties with the machine gun itself relate to the functioning of the solenoid, breaking of the wires leading to the solenoid, functioning of the charger and the feeding of ammunition to the gun.

The charger of the .50 caliber MG is subject to wear caused by repeated disassembly. The charger should not be disassembled. It will be modified on request by supporting ordnance units to prevent disassembly. The cable on the charger will break easily if pulled too hard. This is particularly true if the cable is not pulled downward over the pulley.

The lead wire to the solenoid and the solenoid itself are subject to breakage due to becoming entangled with the clothing of personnel entering the tank, rotating the turret and the solenoid working loose due to vibration resulting from firing the gun. *See Figure 11.* In order to maintain the gun in operating condition it is necessary for personnel to exercise care in entering the tank. Care must also be exercised to avoid rotating the cupola more than 2½ turns before the direction of rotation is reversed lest the wiring be damaged.

Changing Assemblies on the Cal. .50 Machine Gun

Changing assemblies on the Cal. .50 MG while mounted in the M30 cupola is very difficult due to the limited space available. The headspace and timing should be adjusted with the gun dismounted and all accessories mounted on the gun. It should then be mounted in the cupola, and should fit without forcing.

Malfunctions of the Cal. .50 MG

In addition to stoppages common to the normal Cal. .50 MG, malfunctions may result from the following:

1. Bent or defective feed chute assemblies;
2. Insertion of the single link into the gun instead of the double link;
3. Improper alignment of the metallic link ejection chute with the link port on the mount causing the port to become clogged;
4. Breakage of the charging cable due to failure to pull it down over the pulley.

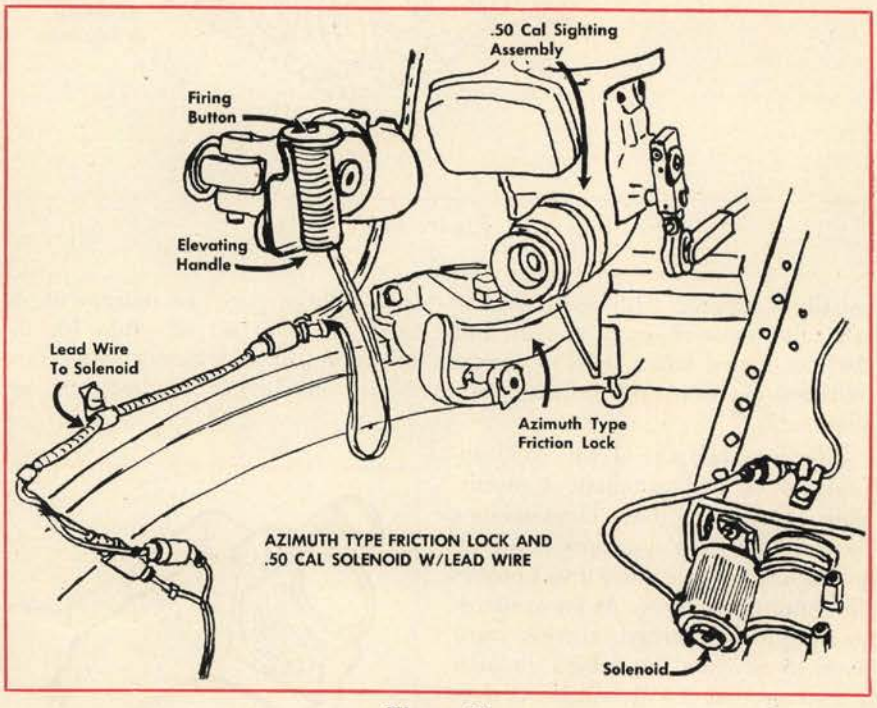


Figure 11

Maintenance Problems Peculiar to the M59 Personnel Carrier

In the Armored Division, the M59 AIV is the most used and the most troublesome tracked vehicle. Maintenance problems in this vehicle are

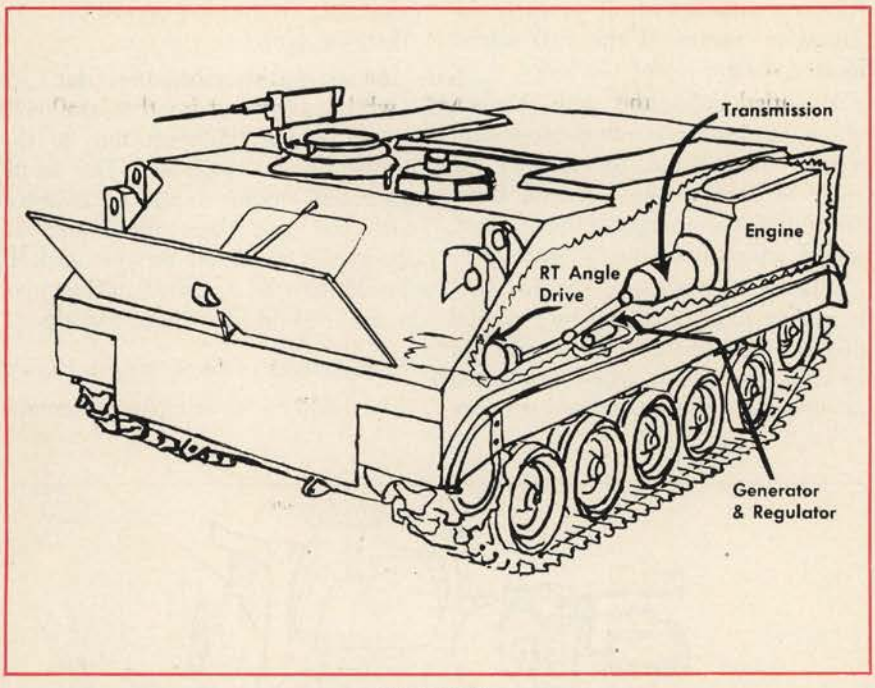


Figure 12

usually associated with the transmission, alternator electrical system, and the left engine when used to charge batteries in command vehicles. *See Figure 12.*

The weakest part of the M59 appears to be the automatic transmission. Damage to these transmissions has resulted from improper band adjustments, improper driver techniques and improper towing. As far as driver training is concerned, drivers must learn to navigate the vehicle in such a manner that the transmission does not "hunt" continuously for the proper speed range.

It is believed that the alternator electrical system difficulties can be alleviated at least in part by proper slaving techniques, placing batteries in the vehicle as prescribed, and keeping "hands off" the output adjustment. These rather elementary suggestions we believe to be of the utmost importance as radio vehicles, both ¼ ton and ¾ ton, will be equipped in the future with an alternator type electrical system.

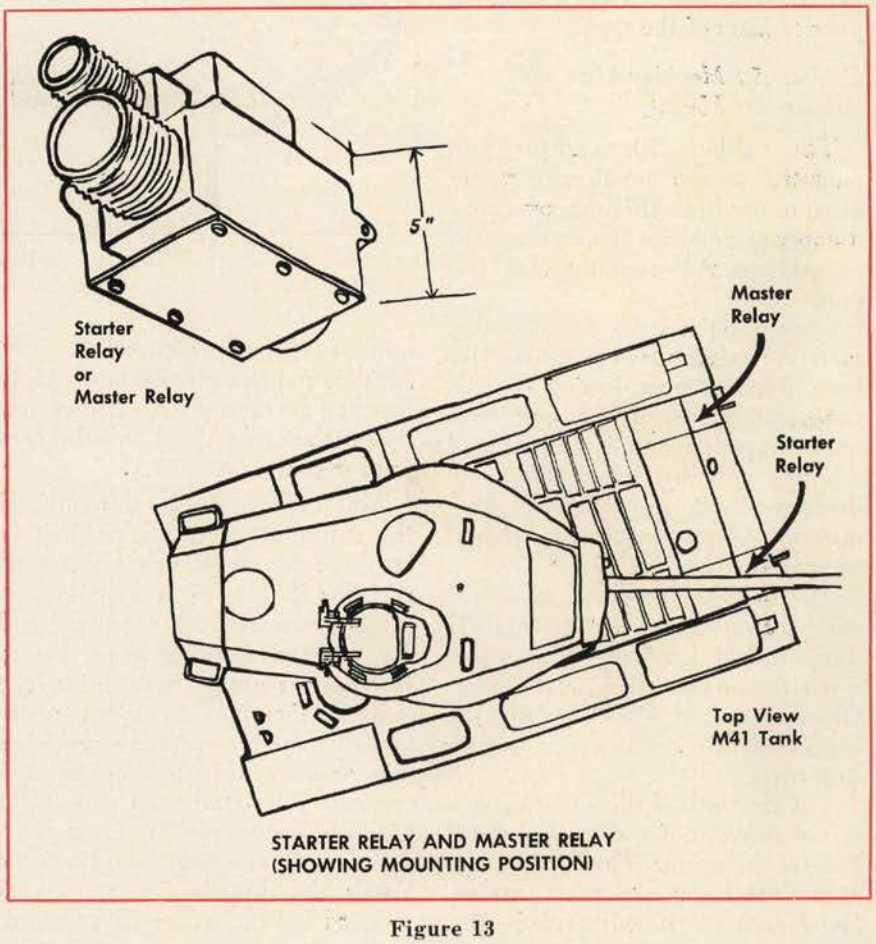
When the M59 is used as a command vehicle it is necessary to idle the left engine to charge the batteries for radio operation. This results in carboning of the spark plugs and poor engine performance when the vehicle is moved. The only workable solution to this problem not involving additional equipment is to clean the spark plugs prior to movement or carry an extra set of plugs for installation just prior to movement. Battalion and higher headquarters using M59's as command vehicles have used successfully 24 volt auxiliary generators such as a dismounted auxiliary generator from a tank.

Maintenance Problems on the M41 Tank

Although the M41 Tank presents maintenance problems it is probably the most satisfactory track vehicle now in service from the standpoint of maintenance.

Master and Starter Relay contacts sometimes arc or create short circuits due to dampness. *See Figure 13.* Arcing is also caused by switching the master switch to ON or OFF position with the main engine, or more often with the auxiliary engine running. Arcing may also be caused by improper "slave starting" procedures. Shorts due to dampness are usually caused by loose cable connections and worn packing glands.

Other difficulties include transmission burnouts, broken or excessively worn U-joints and ruptured gasoline tanks. Transmission burnouts are usually due to prolonged towing over



STARTER RELAY AND MASTER RELAY (SHOWING MOUNTING POSITION)

Figure 13

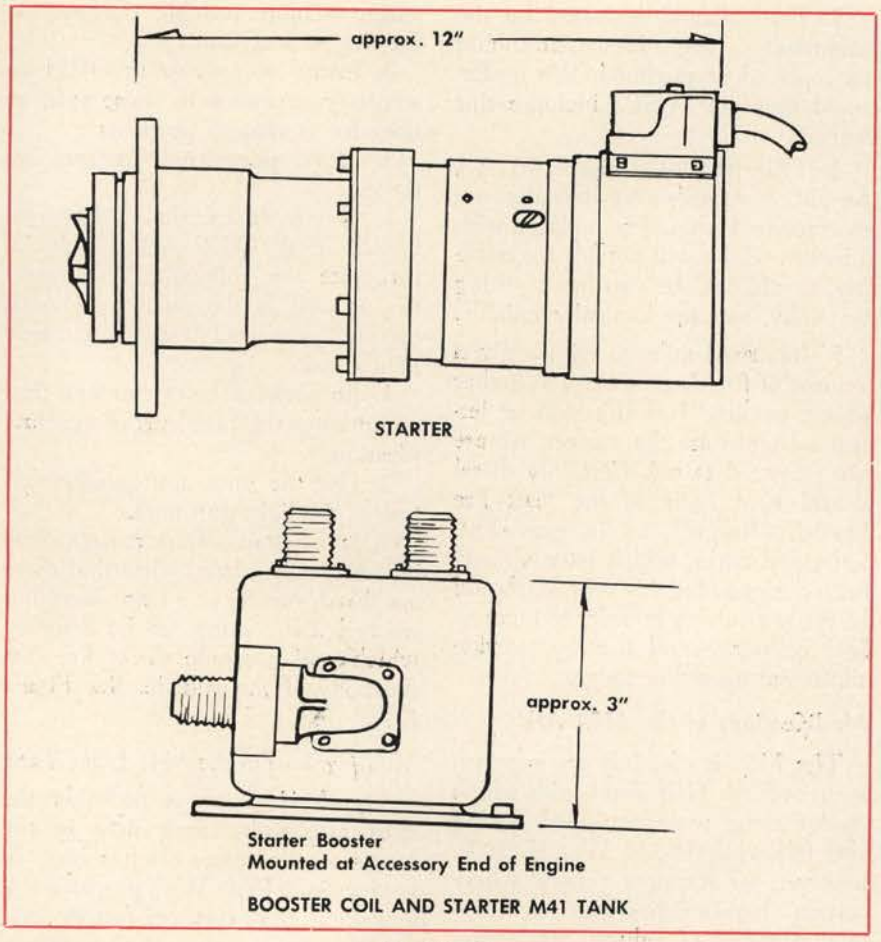


Figure 14

long distances at high speed with U-joints connected, and U-joint failure may also result. Ruptured gasoline tanks may result by improper disconnection of U-joints prior to towing. A serious fire can result from a ruptured gasoline tank. These failures can be prevented by proper disconnection of U-joints prior to towing.

Starter and Booster Coil failure may occur. *See Figure 14.* The starter clutch gear pack may burn out or the starter to the engine adaptor gear may be broken or teeth sheared. The latter normally snaps the oil pump tower gear, necessitating engine replacement. The booster coil may burn out or expand. These failures are caused by repeated starter or booster use in attempting to start an engine without allowing a cooling-off period. Proper instruction of crews on starting procedures for this engine will avert the majority of such failures.

Auxiliary engine failure may occur due to prolonged operation at maximum load resulting in overheating. This failure usually occurs when the heater switch is in the ON position. It is caused by unnecessary operation of the auxiliary engine, improper setting of the pre-heater vane to the Winter position in Summer and the heater toggle switch left in the ON position. Auxiliary engine failure can largely be prevented by instruction to crew members in regard to the permissible period of operation of the auxiliary, and the necessity for keeping the heater off unless heat is absolutely necessary due to extreme cold weather.

Generator and turret control boxes fail to function properly because of grounds developing in main voltage control boxes, slip ring boxes and other turret boxes. *See Figure 15.* These failures are caused by improperly using slave cables which may result in burning out the main voltage control box, improper stowage of OVM which may result in broken boxes, and the use of high pressure hoses in the turret for cleaning purposes. These failures can be largely eliminated by proper stowage of equipment, instruction in the use of the slave cable and prohibition of the use of high pressure hoses in the turret.

The seals on the breech ring and replenisher of the Tank Gun may develop leaks. *See Figure 16.* These failures are largely due to the seals developing a set and subsequent breakage of the seal when the gun is used. If the guns are exercised

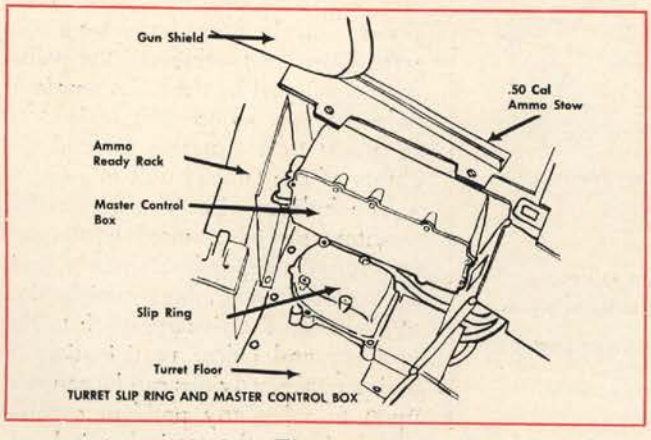


Figure 15

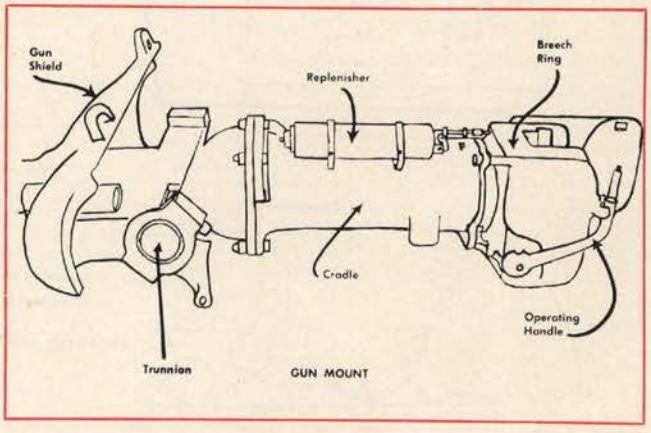


Figure 16

regularly most failures of this type can be averted.

Maintenance Problems Peculiar to the M75 Armored Personnel Carrier

The major components of the M75 Armored Personnel Carrier are similar to those of the M41 Light Tank. Maintenance problems with this vehicle parallel those of light tanks so far as the power train and suspension system are concerned.

Modification of Armor Equipment

Having discussed some of the problems of maintenance of the equipment we now have, we would like to turn to possible modifications of this equipment, which would tend to improve its durability and usefulness.

Modifications to the M48A1 Tank

We believe that the M48 Tank is the best medium gun tank with which the Army, thus far, has been equipped. However, we would like to take this opportunity to suggest certain modifications which we believe will increase the usefulness of this vehicle.

1. Shock absorber and snubber brackets on road wheel arms should be redesigned with a shoulder to remove bolt stress.

2. A new relief valve which will not be subject to failure should be installed on the elevation cylinder manifold as a replacement for the Republic Relief Valve. Obviously a stronger valve is necessary for a breech-heavy gun.

3. The solenoid activated by the commander's override switch should be replaced or modified. We understand that the M48E2 includes this feature.

4. The M30 Caliber .50 AA Mount is regarded as basically unsatisfactory. It should be replaced with a mount which will provide for tracking an aircraft, be capable of firing vertically, and mechanically reliable.

5. Increased mileage with a given volume of fuel is necessary. Whether diesel, gasoline fuel injection or jettisoned tanks are the answer, we are not prepared to say. Certainly diesel would lend itself to the least fire hazard. However, as an expedient, jettisoned tanks, which have already been designed for this vehicle, should be made available in order to increase fuel gallonage and thereby provide additional operating range.

Modifications to the M59 AIV

The M59 is certainly an improvement over the Half Track with which Armor units were equipped during and following World War II. It is, however, an economy vehicle where certain characteristics were sacrificed in the interest of reduced production costs. In this case we would like to discuss modifications aimed at correcting weaknesses in the vehicle and others which would change its characteristics. The following modifications to the vehicle as it now exists are considered worthy of consideration:

1. Modify the transmission or substitute a more durable transmission for the present unit.

2. Install or provide as OVM an auxiliary generator in those vehicles used for command purposes.

3. Have personnel heaters installed.

It is our belief that subsequent models of the M59 AIV should incorporate the following characteristics as well as the auxiliary generator and personnel heater previously mentioned.

1. Be powered by one engine thus eliminating the problems of synchronization.

2. Use the same transmission system as the light gun tank.

3. Incorporate a front ramp instead of a rear ramp. We realize that there are disadvantages to a front ramp but we feel that a ramp can be designed which will preclude direct fire into the body of the vehicle. *See Figure 17.*

Modifications to the M41 Light Tank

The M41 Tank is probably the most satisfactory tank now in the hands of the troops. It has been in service since 1952. With proper maintenance it gives very satisfactory service. Any modifications to this tank in its present form except that of sealing the right fuel tank, new caps and baffling the fuel tank connecting tube, now in process, are believed to be of doubtful value.

Conclusions

The majority of the problems existing in our equipment stem from fragile components or components which require complicated procedures on the part of the operator. Complicated devices, such as automatic transmissions, present no particular problem, provided they are rugged and simple to operate. Fragile components on the other hand are a constant source of trouble and the palliatives developed by the units represent only the best adjustment which can be made to a situation beyond the ability of the tactical unit to solve.

We believe that the successful maintenance of armored equipment is primarily dependent upon a positive approach and officer participation at all levels. Positive approach to the problem and officer participation in maintenance activities can be counted upon to solve any problem capable of solution at the tactical unit level.

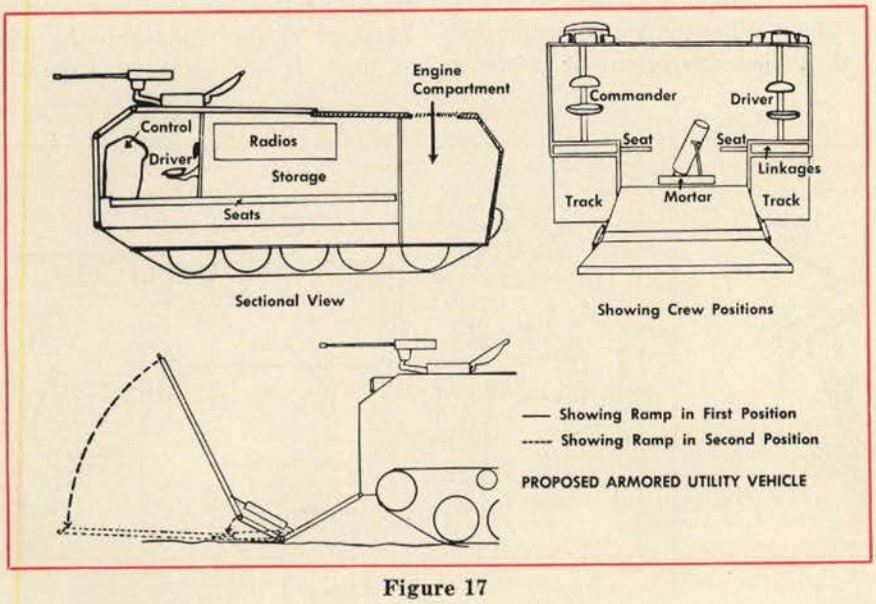


Figure 17



U. S. Army

TANK GUNNERY TRAINING IN THE SEVENTH ARMY

By LIEUTENANT COLONEL CHARLES A. HENNE and FIRST LIEUTENANT RICHARD M. MEYER

The object is an expert gunner. He is not a production line product; he is a tailor made specialist, and his making lies in the doing.

GUNNERY training problems of tank units of Seventh Army do not differ from those confronting tank units stationed elsewhere except for the urgent demand for the ultimate in individual proficiency. This need establishes our gunnery training objective which in brief is 100% expert gunner qualification of all gunners and tank commanders.

There is nothing radically new in the field of gunnery training. Those techniques that have proven effective in the past remain equally effective. Most of these are well developed in current official publications. The developments in matériel have introduced new problems for both the veteran and novice tanker. However, none of these has opened new gunnery fields but they rather enable the gunner to achieve, on the range and in the field, results heretofore considered wishful thinking. This is fact and is so evidenced by the numerous possible scores recorded in Seventh Army Gunnery Competitions.

The expert gunner is our objective. He is not a production line product. He is a tailor-made specialist. His making lies in the doing. The doing is a step by step process which begins with his introduction to his equipment and never ends. From the commander's point of concern, the making is outlined as follows:

The Objectives of the Gunnery Program

1. The training objective (where

LIEUTENANT COLONEL CHARLES A. HENNE, Armor, served in the Pacific during World War II. Returning Stateside he served at Knox with School Troops, attended the advance class and remained as an Instructor. Completing C&GSC he went to Europe, commanding the 759th Tank Battalion prior to his present position as Assistant Commandant of the Tank Training Center.

FIRST LIEUTENANT RICHARD M. MEYER, Armor, was the 1953 Distinguished Military graduate from Michigan State University which was the source of his Regular Army Commission. He served in the 81st Reconnaissance Battalion, 1st Armored Division prior to his present assignment as an instructor in the Gunnery Section at the Seventh Army Tank Training Center.



U. S. Army

Instructing in firing from the Model 30 Cupola at the Tank Training Center.

are we going?). It must be compatible with a unit's needs, time available, skills and equipment.

2. The training program (how do we go?). Gunnery programs should be quite comprehensive and care must be taken to avoid omission of essential requirements, no matter how seemingly minor.

3. Positive command interest. Rarely do we have a gunnery program that is more effective than the commander's influence on it.

4. Motivation of personnel. In brief the gunner must possess the desire, will and confidence, which are the essential ingredients of success, to achieve expert gunner qualification.

5. Provide for success. This item is considered separately from motivation of personnel for purposes of emphasis only. Success breeds success. The gunner must improve and be impressed with knowledge of the fact. This can be best achieved by establishing tough though attainable intermediate objectives within the gunnery program. These objectives, which may beneficially culminate in the form of inter and intra unit competitions, should be designed to serve the needs of the individual.

6. Record progress of trainees. We know that some men learn less rapidly than others. Who are they? What are their needs? Answers to these questions are the bases of corrective action.

7. Provide high quality concurrent and integrated training. This tests a commander's ability to fully exploit his training resources. Current and continuing training deficiencies are manifested in the failure of most units to effectively plan and prepare concurrent and integrated subjects. Concurrent and integrated subjects should be related to the principal subject or main issue. The possibilities for current and integrated training within the gunnery program are unlimited.

Utilization of Training Aids

Training aids used by this command and other units of Seventh Army comprise conventional charts, large scale reproductions and the tank itself. Charts and models are procured through AG channels or are self-made. It is noteworthy that the most effective aids used in gunnery training are large scale working models of gunnery components and the tank. The tank alone provides the training aids required to accomplish all gunnery training objectives.

Gunnery matériel is more complex than ever before. Its complexity creates problem areas that are especially acute during periods of transition from old equipment to new. Most recently this has concerned the M48A1 Tank which has completed its first year of service in this theater. Much of the gunnery matériel that is new on this tank has been the subject of critical comment and deficiency reports. Some deficiency reports have been proven valid. All deficiencies have been determined correctable. Upon receipt of deficiency reports the Gunnery and Ordnance Sections of the Tank Training Center immediately develop corrective procedures and modifications. The latter, when approved, are promptly disseminated to all using units. The M48A1 Tank, unqualifiedly, is a proven weapon possessing great combat potential. All of its gunnery components and accessories satisfactorily serve this capability.

This Center is heavily committed to gunnery training. Gunnery training predominates in three courses of instruction and is strongly emphasized in a fourth course. These courses con-



U. S. Army

A view of the Gunnery Training Aids in Patch Hall at the Tank Training Center.

sist of M48 and M41 Advanced Armored Crewman Courses, Gunnery Instructors Course and the Tank Company Course. In addition the facilities and experience of the Center are made available upon request to all units of Seventh Army.

The Center's History

Near the village of Vilseck, approximately 50 miles northeast of Nurnberg in the US Zone of Germany, stands this Armor School of Europe —The Seventh Army Tank Training Center. It was formerly a German Wehrmacht training area.

In 1938, the German Army established the Vilseck-Grafenwohr training area for cavalry, artillery and infantry units. Well known units which received training there included the SS Viking Division, the Spanish Blue Devils, and Hungarian and Italian Divisions.

An American armored unit occupied the camp shortly after VE Day. It was then used successively as a Third Army Stockade, an UNRRA camp for Polish displaced persons and as an IRO camp for Jewish displaced persons.

In September 1948, 10 officers and 34 enlisted men of the US Constabulary dropped their baggage on a dusty street of the deserted and by then dilapidated camp. They carried orders instructing them to establish a Tank Training Center to be used by US Constabulary units in conducting training which, due to terrain and range limitations, was not feasible at home stations.

Prior to June 1948, the US Constabulary was strictly an occupation police force, as opposed to combat-ready troops, equipped with motorcycles, jeeps, armored cars, light M24 tanks and horses. With the world situation changing rapidly in 1948, the mission of the Constabulary was also changed. Under the reorganization which officially took place on 20 December 1948, three armored cavalry regiments (light) were formed.

The change-over from motorcycles, armored cars and horses to light and medium tanks made it imperative to establish a Tank Training Center. So it was that the Tank Training Center came into being—to convert "policemen" into tankers.

Year	Officers	Enlisted Men	Total
1948	10	138	148
1949	64	905	969
1950	167	907	1074
1951	134	990	1124
1952	184	2728	2912
1953	220	3482	3702
1954	240	3114	3354
1955	258	2724	2982
1956	294	2380	2674

Figure 1

In June 1950, when the build-up of the U. S. Army in Europe began, the Department of the Army reactivated the United States Seventh Army. All Constabulary facilities (including the Tank Training Center) were absorbed and expanded by Seventh Army.

An indication of the growth and importance of the Center can be seen by the number of U. S. students graduated annually. *See Figure 1.* The Center has graduated, since its activation, a total of 18,905 U. S. officers and enlisted men as of the middle of November 1956.

While the Seventh Army Tank Training Center was established primarily for the U. S. forces, students from NATO armies have long been welcome. To date, more than 1000 students from Belgium, Denmark, France, Greece, Italy, Norway, the Netherlands, Portugal, Spain, Turkey, and Germany have completed courses at the Center.

The Center's Mission

Today, the Seventh Army Tank Training Center is a modern, up-to-date Army school with the following mission:

1. Prepare and conduct instruction in the techniques of tank gunnery to include operation and maintenance of weapons, turret compartments and fire control equipment of current armored vehicles.

2. Prepare and conduct instruction in the care, maintenance and operation of armored communications equipment.

3. Prepare and conduct instruction in procedures of conducting scheduled maintenance inspections and services pertaining to first and second echelon levels of maintenance; to make minor repairs, adjustments and replacements of sub-assemblies; and to familiarize maintenance personnel with the proper techniques of field expendients and recovery pertaining to tank vehicles.

4. Prepare and conduct instruction for the Tank Companies of the Armored and Infantry regiments in automotive first echelon maintenance, communications, gunnery and tactical platoon and company problems.

5. Operate the Tank Crew Proficiency Course for Seventh Army tank units.

6. Establish and maintain an M48 tank pool at Grafenwohr for use in training by Seventh Army armored units.

7. Conduct such other training activities as may be directed.

8. Provide ordnance field maintenance support to the Tank Training Center, to units training in the Vilseck-Grafenwohr training area, and to such units permanently stationed there as may be designated by Headquarters Seventh Army.

The Tank Training Center exists primarily to serve the needs of Seventh Army Armor units. In the field of tank gunnery we are proud that our contributions have assisted and will continue to assist units to achieve the high degree of excellence demonstrated each year in Seventh Army Tank Gunnery Competitions.

"The tank crew proficiency course is the best vehicle we have to train the crew to do all the things necessary to place the tank guns in action in 15 seconds or less when faced with a situation in which they must shoot their way out."

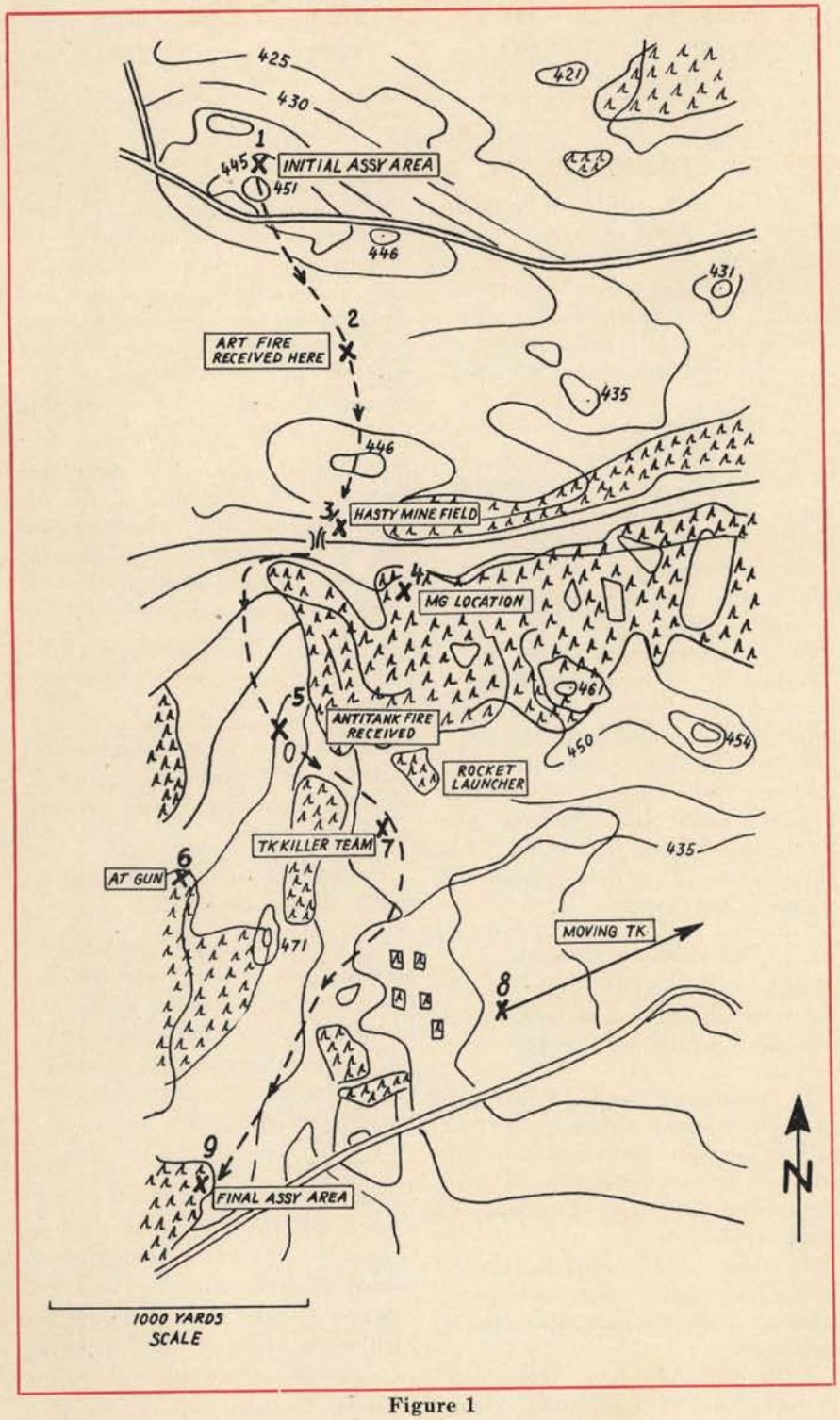


Figure 1

WHEN the tank company commander receives a large number of replacements he is faced with the problem of developing crews that will be combat ready in the shortest time possible. He will assign the men to a crew position after personal interview and a study of each man's records. These men may be well qualified individually but to weld these individuals into fighting tank crews is the commander's problem. The problem can best be solved by use of the tank crew proficiency course. It is the best vehicle we have to train the crew to do all the things necessary to place the tank guns in action in 15 seconds or less when faced with a situation in which they must shoot their way out.

When each crew member is qualified individually the team work, coordination and reaction to surprise targets should be developed on non-firing type courses.

In the non-firing course emphasis must be placed on seeing that each crew member does everything that would be required of him to fight the tank. The tank commander must designate the target by proper fire command (range on the M47 or M48). The gunner must set all data on sighting system and lay on the target, and the loader simulates loading and announces UP. The driver complies with the tank commander's orders.

In setting up a non-firing course every effort must be made to make it realistic. Some things that can be used are: blank ammunition, ground

TANK CREW PROFICIENCY COURSES

By LIEUTENANT COLONEL ROY L. DEDMON

charges to indicate location of AT weapons, aggressor squads to man AT targets, aggressors as personnel targets, tanks and other vehicles as moving targets.

Figure 1 shows a non-firing course developed at the Seventh Army Tank Training Center. On this course the crew is trained on the three basic armor roles to move, to shoot and to communicate.

Targets are relocated and combat type situations are changed each time a crew re-runs the course.

Figure 2 is a layout of a course on a small area. This may be used as a firing course for subcaliber firing if range space is available or a non-firing course for restricted areas.

In conducting this course the control officer will designate targets at random for the tank to engage. When this course is conducted as a firing exercise the personnel targets can be raised and lowered from pits such as are used on transition rifle ranges and a target tank used for the moving vehicle target. Six foot square cloth panels may be used as AT targets.

If the course is conducted as a non-firing practice exercise, use of troops to man AT positions and serve as personnel targets adds a great amount of realism to the course.

Figure 3 is the JINX type course, developed and used very successfully by the British in training their crews. Many of the US tank units fired this

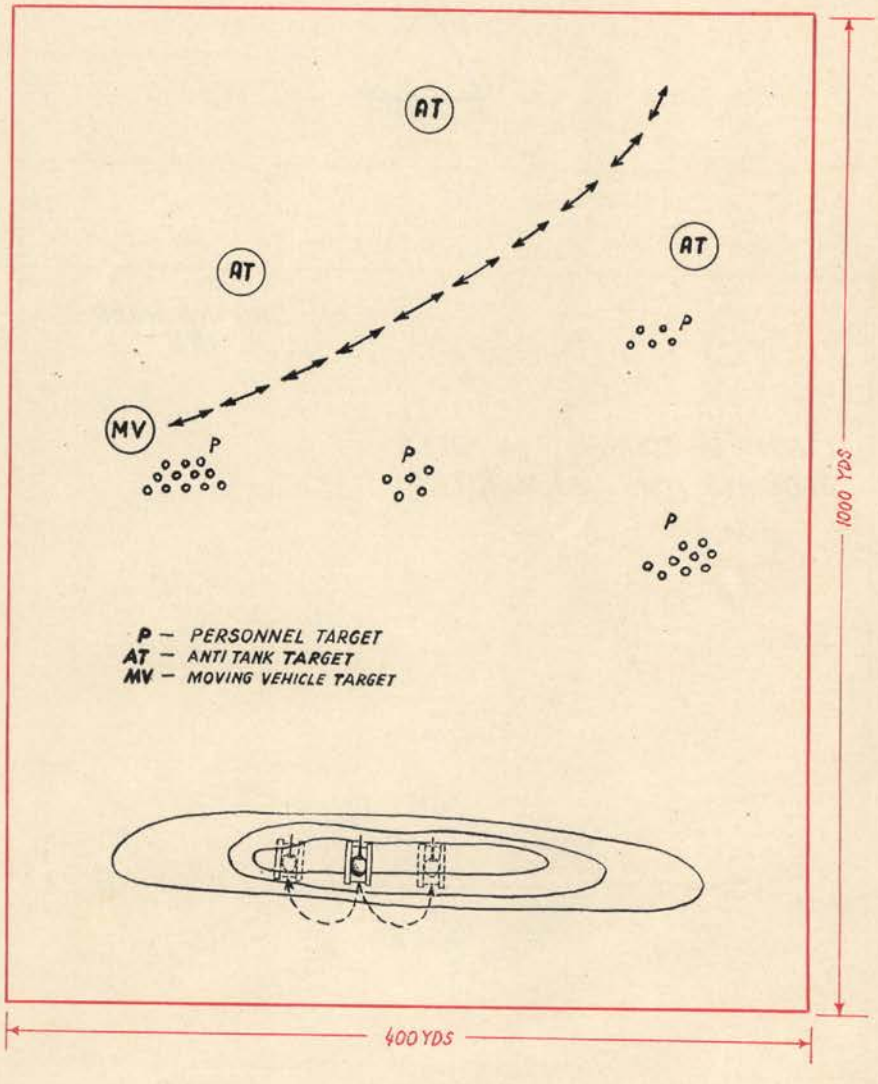


Figure 2

LIEUTENANT COLONEL ROY L. DEDMON, Armor, served in Europe during World War II. He reverted to civilian status in 1945. Returning to duty he was assigned to the 773d Tank Battalion. He served in Korea with Headquarters, 3d Infantry Division and as Executive Officer, 73d Tank Battalion. Returning Stateside he was assigned to civilian component duty. Attending TAS and C&GSC he was next sent to Europe to his present assignment as Executive Officer for Training at the Tank Training Center.

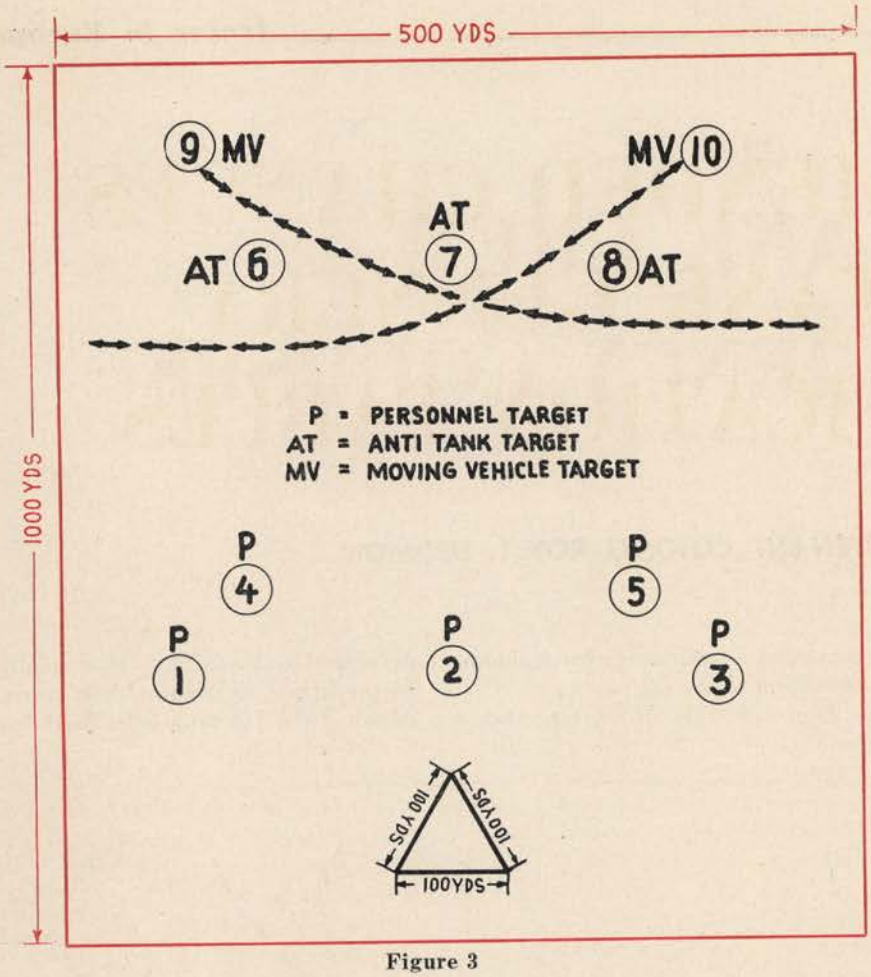


Figure 3

course while stationed in England during World War II.

The weapons that can be fired on this course are dependent on the range area available.

In the conduct of this exercise the tank must travel on a triangular course as shown at the bottom of this chart in a direction given by the training officer. Dangerous direction is played by rotating the turret to keep the gun pointed down range. The training officer rides on the tank and designates the target to be engaged.

Some units have established modified courses where the crew is mounted on a ¼ ton truck and moved along a road where the crew is confronted by tactical situations which they must solve. Each crew member must fully explain what his action would be if he was in a tank and faced with the same situation.

Figure 4 is the layout of the Seventh Army Tank Crew Proficiency Course in the Grafenwohr Training Area. This course is designed to provide the tank crew with targets necessitating employment of all tank weapons. It is anticipated that all tank units utilizing Grafenwohr Training Area will have an opportunity to run each of their tank crews through this course once each year.

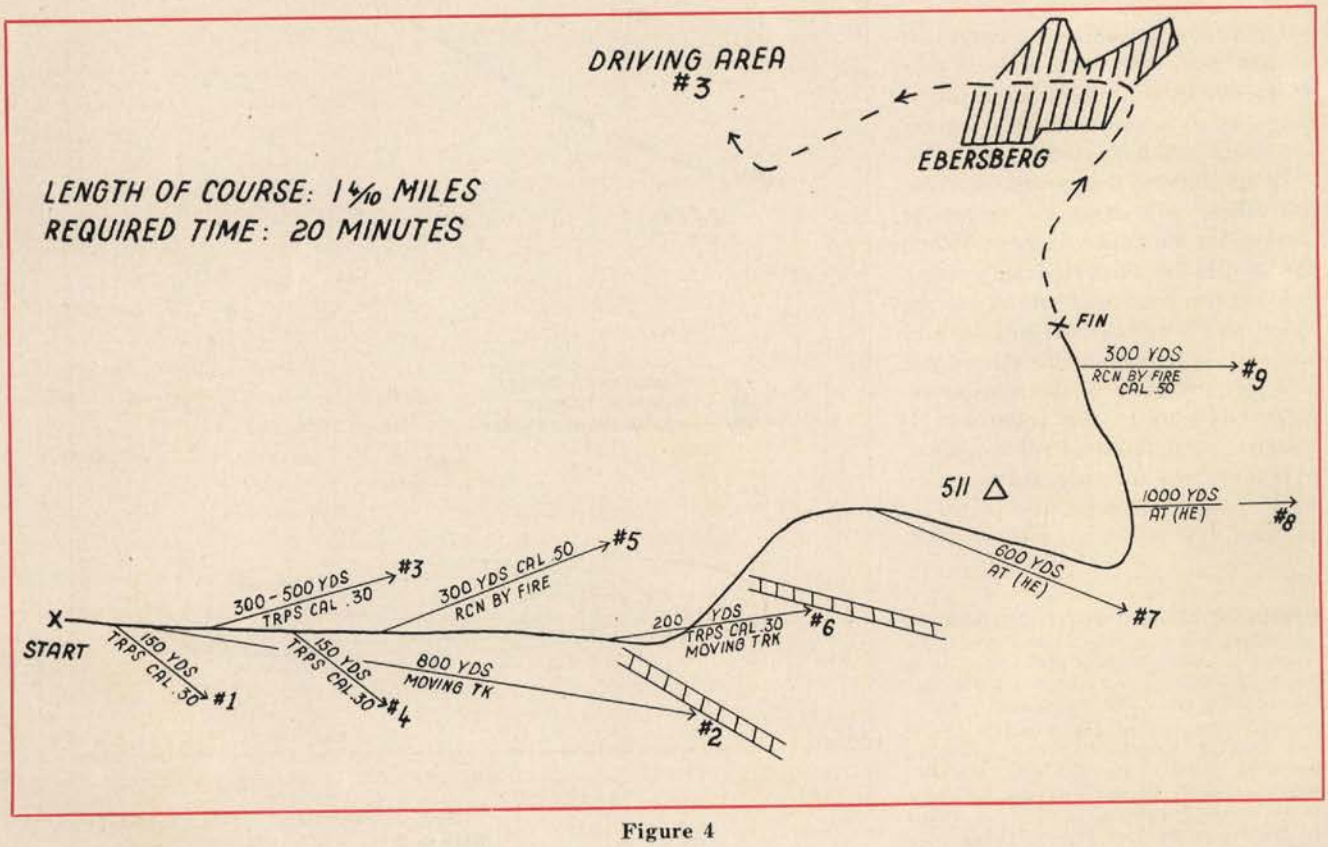


Figure 4

RECOMMENDED CHANGES FOR TANK GUNNERY QUALIFICATION TABLES

By COLONEL PAUL L. BATES

DURING April-May 1956, Combat Command B, 2d Armored Division, conducted the Seventh Army Tank Gunnery Competition at the Northern Army Group Ranges, Hohne, Germany. Approximately 3000 gunners fired Tables V-VIII on either the M48 or M41 tank and had the experience of engaging targets in platoon size units on two battle runs designed by the British who operate this range.

Close observation of these gunners utilizing one of the finest ranges in the world with nearly new M48 tanks, ammunition in types and quantities prescribed by pertinent regulations and target layouts meeting the exacting conditions necessary for competitive firing has resulted in certain conclusions and recommendations for changes to the present tables.

The careful preparation of school troops consisting of one tank battalion plus three medium companies for the M48 program by firing the sub-caliber Tables I-IV many times provides a firm basis for inclusion of these tables in this article.

All firing was based on change 3 to FM 17-12 dated 10 August 1954 and Seventh Army TC No. 2 which contains The Armor School and CONARC approved recommended changes.

Table I

This table is designed to test the gunner's ability to manipulate the turret controls. Gunners must be able to lay the gun for direction and elevation quickly and accurately in almost all exercises; however, the emphasis here is on speed. It is an excellent table. In the conduct of this table and all others requiring manipulation, it became obvious that for most gunners, turret manipulation has not become a reflex action as it should be. This is indicated by false starts in the wrong direction in manipulation from target to target.

No change is recommended but strong and continuous emphasis in training on preparatory exercises for this table is required.

Table II

The purpose of Table II is to test the gunner's ability to track, fire on, and adjust fire on moving targets prior to firing service ammunition and is preparatory for Table VII.

In FM 17-79, the manual on the M48 tank, it is stated that the primary sight (periscope) should be used with unit battle sight indexed on the computer. Change 3, FM 17-12, calls for use of the telescopic sight.

When properly executed, this is a very excellent exercise; however, as now scored, it is not a valid test in that the gunner, without penalty, can "ambush" the target by laying the gun ahead of the target and firing as the target moves into position on the sights. This is particularly true of the moving chain targets used in indoor ranges. Observation of firing of Table VII at NORTHAG Ranges indicated that many gunners habitually attempt to ambush the target.

One further objection to this table is that the primary sight (periscope) and Cal 30 MG on many tanks cannot be adjusted so that the point of aim and point of bullet impact coincide at 200 ft. In this case the telescope may be used to fire the table so that objection is not serious.

To correct the tendency of gunners to "ambush" the target it is recommended that any shot fired during a pause in tracking be scored as a miss. The instructor using the range finder on the M48 can easily detect ambushing. This involves a matter of instructor judgment, more so on the M41.

Table III

Two Table IIIs were fired by Seventh Army units in 1956.

The purpose of Table III as specified in FMs 17-12 and 17-79, is to test the gunner's ability to fire the coaxial machine gun from a moving tank at stationary targets.

In this exercise the gunner fires 150 rounds of Cal 30 at six groups of targets representing infantry while the tank travels 800 yards. 5 groups of targets are placed alternately to

COLONEL PAUL L. BATES, Armor, graduated from Western Maryland College. During World War II he commanded the 761st Tank Battalion in Europe. Subsequent to the War he attended C&GSC, was assigned EUCOM Headquarters. Returning Stateside he was on civilian component duty. Attending the National War College he was next instructor and later G3 at C&GSC prior to his present assignment as CO, CCB, 2d Armored Division.

right and left and fire is opened on any one group when the tank reaches a point 50 yards away. A sixth Group is placed 200 yards beyond the runway.

This table does not have a counterpart in any service firing and TC No. 2 eliminates it entirely from the qualification tables and recommends it as a prerequisite to Tank Crew Proficiency and Tank-Infantry Combat Courses. Seventh Army has directed that this table be fired at least once annually by tank crew men for training value.

The substitute for this table proposed by The Armor School and approved by CONARC and the one used for qualification purposes in Seventh Army has as its purpose:

1. To test the gunner's ability to zero the Cal 30 MG, using the primary sight;
2. To teach correct sight picture and accuracy of lay;
3. To test the gunner's ability to use the primary method of adjustment (Burst on Target), prior to firing service ammunition.

This Table is preparatory for Tables V and VI.

In this exercise the gunner fires Cal 30 tracer (single shot) at stationary targets on a 200 ft range and is required to accomplish three things:

1. First, zero the coaxial machine gun;
2. Secondly, with his established zero fire at five targets attempting to obtain a first round hit on each;
3. Lastly, he will fire at five targets, the initial round in each case will miss the center of the aiming point by an induced error and the gunner must make the necessary adjustment to obtain a second round hit.

One difficulty with this table is making the point of aim, with the periscope, coincide with the hit at 200 ft. The two lines may be made to coincide if the gun adjusting bolt is removed and the machine gun wedged in place. If the gunner is permitted to use the telescopic sight for this table, then no sub-caliber exercise will include mandatory use of the primary sight.

A second difficulty is that the effectiveness of the "Burst on Target" method of adjustment is almost completely negated by the fact that the bullet holes can be seen in the target and sensing is not required.

Both deficiencies can be overcome by increasing the range at which the table is fired and using tracer ammunition. One solution could be to fire from the 200 yard line on a standard "B" rifle target with an additional bullseye center pasted in each corner. The center bullseye could be the zeroing target. The V ring (12" circle) could be scored as 10 and the remainder of the bullseye (20" circle) as 5. All shots, except the sensing round in the burst on target adjustment should be spotted by pit operators by placing spotters in each bullet hole for positive identification. The natural dispersion of the weapon is such that a smaller target cannot be used satisfactorily. Test firing at 200 yards without wedging reveals that dispersion is a problem. For the M41 the minimum was 4½ inches, maximum 13 inches with an average of 9½ inches. The M48s had a minimum of 9½ inches, maximum of 26½ inches and an average of 16½ inches. By wedging the guns, the testing tanks averaged a little less than 5 inches.

This solution does overcome the deficiencies of the proposed Table III. The boresighting of the main gun should be included in this table and this introduces it for the first time prior to Table V. Correct technique in boresighting is not scored in GPE or any table.

It is recommended that:

1. The current Table III be adopted as a training exercise and fired annually by all units having range facilities but not scored for qualification purposes.
2. The proposed Table III modified as I have just indicated be further tested to develop a standard wedging procedure and adopted as Table III.

Table IV

The purpose of Table IV is to test the ability of the gunner to use the auxiliary fire control equipment when firing indirect or from a range card.

The gunner engages four targets, using the auxiliary fire control instruments. Three rounds are fired at each target according to an order given by the tank commander from predetermined data.

The changes proposed by TC No. 2 concern only the procedure in computing and firing from the necessary data to conform to use of a range card. The changes are minor and are designed to avoid confusion between the reference card now used and the proposed range card. In the actual firing and scoring of the table, the TC does not propose a change.

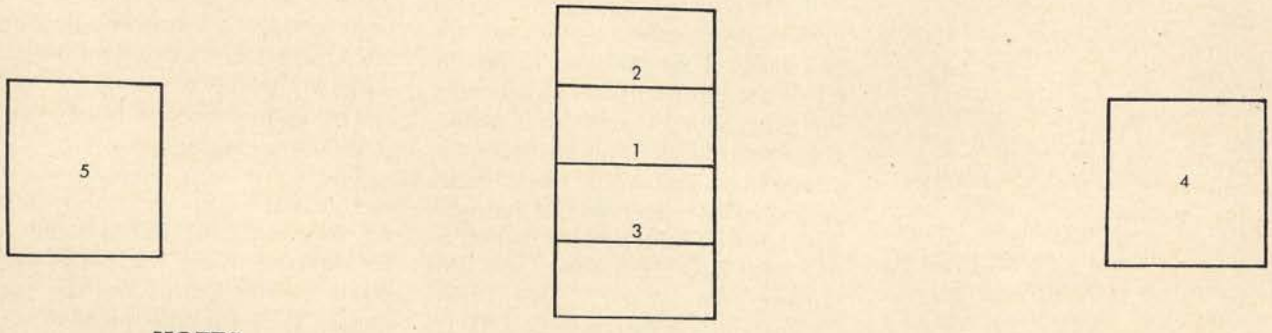
While the present table does test



One of the British Battle runs at NORTHAG. Here tanks move out by platoon, and fire at fixed and moving targets, utilizing AP, HE and MG ammunition.

Recommended Changes—Tank Gunnery Qualification Tables

Table IV—Proposed Target—Scale ¼"=1"



NOTES:

Scoring spaces are 4 inches square.

Scoring space number appears in the center of the scoring space.

Scoring spaces 1 and 2 and 1 and 3 overlap.

Scoring space 1 is initial target designated.

Center of scoring space 1 is 14 inches from the center of scoring spaces 4 and 5.

Figure 1

the gunner in his ability to use the auxiliary fire control equipment when firing indirect or from a range card, it does not test his ability to make a range card or to properly manipulate his gun for area fire. (Instructor makes the card.) This table is preparatory for Table VIII.

In firing Table VIII during the Seventh Army Tank Gunnery Program, it was observed that many gunners did not know how to prepare a complete range card and/or did not know the manipulation procedure for area fire.

The lack of training in preparation of range cards may be overcome by requiring each gunner to prepare his own range card, in which each target is accurately located within plus or minus one mil in elevation and deflection, before he is permitted to continue the exercise. This should be a standardized range card. The examples in FM 17-79 and in FM 17-12 are titled a reference card. TC No. 2 does have an example of a range card and explains its use for both Tables IV and VIII.

After the gunner fires his second shot at each principal target and before the terminal lay of the gun is changed, training and testing in manipulation for area fire may be introduced into this table by requiring the gunner—on command—to perform the correct manipulation procedure and fire one round at each position required for area coverage.

A target suitable for such an exercise is shown in *Figure 1*. Under this further modification of Table IV, the number of shots at the center target would be reduced from three to two. Four manipulation shots would be added for each of the four targets engaged. After firing the two shots at the center target the gunner would be given the command "Area Target, Fire." From the command "Fire," the gunner would be given approximately 60 seconds (75 seconds when using the M1 Quadrant) to elevate one mil, fire, drop 2 mils fire, add one mil, traverse right 10 mils and fire, traverse left 20 mils and fire. This is identical to the manipulation in Table VIII.

Scoring cuts would have to be modified.

To delete "Failure to get third round off in 20 seconds—5 points" and to add "Failure to complete area fire in 30 seconds—5 points" and "Each target missed—2 points."

It is recommended that:

1. Modification to Table IV, as outlined above, be further tested to determine proper timing and revise scoring, then adopted.

2. The TC No. 2 Range Card be adopted.

Seventh Army Tank Gunnery Program

	M48 (2323 Gunners)	M41 (673 Gunners)
Average score TABLE 5	83.83	78.93
Average score TABLE 6	95.73	98.45
Average score TABLE 7	83.25	79.23
Average score TABLE 8	94.64	96.34

Figure 2

Table V

We shall next consider the service firing tables V through VII. The recently concluded Seventh Army Tank Gunnery Program at NORTHAG produced the following average scores. *See Figure* 2. Admitting that we have better tanks, more emphasis on gunnery, better training facilities and especially capable school troops, there can be only one conclusion. Tables VI and VIII are not a real test of the gunner's ability and require revision.

Table V is designed to test the gunner's ability to zero the periscope M20, and the Telescope, using shot ammunition on a stationary panel target at a known range. The gun and sights must be properly zeroed to obtain maximum effectiveness.

The gunner is required to boresight the periscope and the telescope on the zeroing target, which is at a range as near 1,500 as possible.

The target is six feet square with an eight inch bullseye and is intended to provide a well-defined aiming point at a known range.

The gunner fires three rounds to form a shot group, makes appropriate adjustments and fires a check round for score.

He should check after each round and re-lay if necessary as described in FMs 17-12 and 17-79. The gunner, without disturbing the lay of the gun, adjusts the aiming cross of the periscope and the appropriate range line of the telescope to the center of the group.

The gunner re-lays on the aiming point and fires one check round to determine whether he has zeroed correctly.

As modified by training Circular Number 2, Headquarters Seventh Army, dtd 3 January 1956, a fourth round may be fired since in many instances it is difficult to obtain a 3 round shot group on the zeroing target because the initial round may not hit the target, the target may be knocked down, and because of climatic or other conditions which affect the accuracy of the gun.

There is no time limit on this exercise.

This table proved to be one of the most difficult tables fired at NORTHAG Ranges and one of the most disappointing for many gunners as failure to obtain a hit with the check round cost 40 points and resulted in failing to get a passing score.

Some of this difficulty stemmed from the fact that the size of the reticle cross hairs completely obliterate the aiming point at 1500 yards (8 inch bullseye). Frequent adjustments are necessary to estimate the placement of the bullseye in the center of the cross hairs. A larger bullseye, one about 14 inches in diameter, either solid black or alternating quarters of black and white, black crosses or a gridded target should be used. This should be tested to determine the type target that best suits this purpose.

This table as modified by FM 17-79, provides a better basis for scoring and is an excellent testing exercise.

As an aid to rapid scoring, circles coinciding with the diameters described in FM 17-79 should be included on the target; otherwise some device would have to be designed to measure each check round's impact point from the center of the aiming point. At NORTHAG a circle 28 inches in diameter was painted on the panel target.

There is a tendency for gunners, particularly poorly trained ones, to take too much time. It is believed that a time element should be placed in the table. Experience has indicated that from 30 to 45 minutes is normally required.

It is recommended that:

1. The table be scored as described in FM 17-79, Oct 55, for all tanks.

2. A time limit of forty-five minutes be imposed for completion of all adjustments and firing of both practice and record runs. Succeeding orders should not fire until 45 minutes have elapsed to prevent overheating gun tubes with a resulting loss in accuracy in this table where maximum precision in firing is required.

3. The target be modified to include a better aiming point and have lines indicating the scoring areas.

Table VI

This exercise is designed to test the gunner's ability to utilize the primary sighting equipment and the burst-on-target method of adjustment while firing service ammunition at stationary targets.

The gunner fires at four separate targets, two shot and two HE.

The examining officer indicates each of the targets by issuing an initial fire command and lays the gun for direction using the commander's power control handle and the range finder. Time for each problem starts when the command FIRE is announced in the initial fire command.

If the first round is not a target hit, the gunner uses the burst-on-target method of adjustment to fire the subsequent round. If the target is hit on the first round, full credit will be given and the second round is not fired.

Targets used for this exercise, as described in Changes III FM 17-12, are 6x6 foot cloth panels for shot problems and 3x5 foot cloth panels for HE problems. FM 17-79 changes this to require one shot and one HE problem to be fired on each target. The larger targets are used at the greater ranges.

This table, as presently fired, is not a shot and HE adjustment exercise, as directed in change 3 to FMs 17-12 and 17-79, but is an exercise in obtaining first round hits at various ranges. The original purpose of the table, a most important aspect of tank gunnery, is negated by the fact that the tank commander gives the gunner the correct range. In consequence, gunners obtained an exceptionally large number of first round hits and had an overall average score of 95.73

Cuts

Failure to fire first round within 15 seconds	**5**
Deduct one point for each additional second over 15 required to fire first round up to 20 seconds	**5**
Failure to hit target with second round	**15**
Total possible cut on each target	**25**

Figure 3

for M48s and 98.45 for M41s on this table. 13 company sized units maxed this table. In order to make this table a true shot and HE adjustment exercise some means must be found to decrease appreciably, or eliminate, first round hits.

This may be accomplished by having the examining personnel present an error as in the recommended new table III, in elevation and deflection, in the sighting system, thereby causing the gunner to miss the first round and forcing him to employ the burst-on-target method of adjustment. This solution would insure a miss on the first round but does waste expensive ammunition. The scoring would have to be changed so that no cut would be given for a first round miss.

It is recommended that:

1. The above described change be adopted.
2. The target layout in FM 17-79 be approved for all tanks.
3. Scoring be modified as shown in *Figure* 3.

Table VII

The purpose of this exercise is to test the ability of the gunner to deliver effective fire on a moving target.

The exercise is fired from a stationary tank at moving targets, 6x6 foot panels at ranges of 700 to 1500 yards.

A powered target or sled is used. The target is exposed for approximately 300 yards and travels at a constant speed between 8 and 15 miles per hour.

The examining personnel lay the gun for direction for each target while issuing a five-element initial fire command, and index on the range finder the correct range to the target with the computer switch on. Time for each problem starts when the command FIRE is announced in the initial fire command.

The change recommended by Training Circular Number 2, provided for only four moving targets and eight rounds of ammunition to be fired by each gunner, instead of the five targets and ten rounds as required by Changes 3 to the Tank Gunnery Manual. The two rounds of ammunition saved were used for the added two rounds on Table V.

This table as modified by TC No. 2 is an excellent training and testing exercise and should be adopted.

Table VIII

The purpose of this exercise is to test the ability of the gunner to determine prearranged firing data to selected targets and to engage area type targets successfully with HE ammunition under conditions of restricted visibility and to afford night firing practice.

Five 6x6 foot panels are placed in a wide lateral area, at ranges varying between 800 and 3500 yards and at different angles of site. Panels are numbered consecutively from left to right.

Examining personnel accurately compute the following data for each panel:

1. The azimuth indicator reading from an aiming stake or reference point.
2. The quadrant elevation, gun to target (elevation) for range plus angle of site, with the elevation quadrant.

Ten E-type silhouette targets are placed around the panel at which the gunner will fire.

The exercise is conducted as follows:

Part I. The gunner is required to prepare a range card for the area, using the panels as likely targets. The information to be recorded on the range card is shown in *Figure 4.*

Part II. After the range card is prepared, the direct fire sights are covered and the gunner is required to fire on one of the panels using his prearranged firing data. He then simulates firing four more rounds.

The examining officer issues an initial fire command, using the data computed by the gunner, to one of the targets. The gunner sets off the data as announced in the initial fire command and fires only the first round. The gunner will then add one mil in elevation and simulate firing the second round; drop 2 mils and simulate firing the third round; add one mil, traverse right ten mils, and simulate firing the fourth round; traverse left twenty mils and simulate firing the fifth round. He announces ON THE WAY as he simulates firing each round. Time is recorded from the command FIRE.

Table VIII is designed for firing area coverage with the aid of a range card. However, no point cuts are authorized under the present scoring system for failure to mark a reference point. In addition, no cut is authorized for failure to apply the manipulation required for proper area coverage.

It is recommended that:

Table VIII remain unchanged as far as the physical portion of the firing is concerned. However, scoring should be modified to provide cuts for:

1. Failure to include a reference point on the range card.
2. Failure to perform the manipulation required for proper area coverage.

Range Finder

At present, none of the tables or the gunner's preliminary examination include a test on the use of the range finder for the simple reason that these tables train and test only the gunner, not the tank commander. This important, expensive item of equipment which cannot be divorced from the overall tank gunnery proficiency is a separate subject and not within the scope of this subject. Separate treatment of this subject with recommendations appears in the 2d Armored Division After Action Report for the Seventh Army Tank Gunnery Program. It could be made a part of table firing but only by redesign of the tables to train and test a tank commander-gunner team.

Information

1 Aiming stake or reference point.
2 Target number (left or right).
3 Deflection (azimuth indicator reading) from aiming stake.
4 Range to targets in yards.
5 Quadrant for high explosive ammunition.

Figure 4

ARMOR ATTACHMENT
An Art as well as a Science

By COLONEL HARRY L. KINNE, JR.

Our schools and our manuals place an emphasis on the mechanics of attachment while neglecting the major factors of motivation and psychology.

EVER been attached? Ever get the short end of the stick? Wonder why? Or were you one of the lucky ones who were really made a part of the team? Either way, this is for you. The answers to these and many other allied questions lie in an analysis of the problems that are inherently attendant to the attachment of one unit to another. For reasons both apparent and obscure, "attached" and "assigned" are often as different as night is from day. In this age of task force organizations, unwittingly we are the victims of our own system since, in all fairness, we must take it for granted that no one willfully belabors an attached unit. As loosely paraphrased by the American GI, the all too familiar chant of the waif of a war-torn nation, "no poppa, no momma, no 'choom' gum, no flight pay" might well be the battle cry of the average small unit that suddenly and unceremoniously finds itself attached to another and invariably larger organization. Of course many of these major units will outdo themselves to make their attachments feel they are vital, important and, above all, wanted. In World War II, I commanded a separate tank battalion that, at one time or another, was attached to six different division size organizations, and batted .333—two superior, two fair and two poor. This evaluation, by way of explanation, does not refer to combat efficiency as such, but only to the matter of honest to goodness acceptance into the family.

The solution to this situation is twofold: first, adequate technical and professional knowledge at all echelons in order to avoid the normal operational pitfalls, and second, and more important, proper motivation of the attached unit by the parent unit and vice versa. When skillfully accomplished, proper motivation, both up and down, adds a powerful command tool to each commander. This is particularly true if full advantage is taken of every means to see that the troops are geared mentally to the specific attached status—and again I mean the troops of both units.

The remarks that follow are generally applicable to any attachment regardless of branch of service involved. Since my own personal experience, however, has been primarily the attachment of armor-tank and armored infantry-to infantry, my references are necessarily directed along these lines.

Tactics

From a purely tactical point of view, an initial problem area is that of the geographical place of attachment of one unit to another. If either or both of the units are in an assembly area or even in an attack position, the problem is relatively simple. On the other hand, if either is on the move or in contact with the enemy, it can be complex. For planning purposes, we often need a variable time factor yet one that will be geographically definite. Effecting attachment along the axis of advance of the parent unit as it crosses a phase or report line is good practice as, at the specific time and place, the variable time factor ceases to be variable and can be pin pointed. Don't expect to find the attached unit itself at that location, but a liaison officer awaiting further instructions for his unit should suffice and is a valid solution.

Today, with our infantry TOs including organic armor, problems such as road space, the size of bivouac areas and the rates of march of armored units are no longer the surprise that they initially were in World War II. The magnitude of these items once came as a rude shock to the in-

COLONEL HARRY L. KINNE, JR., Armor, graduated from the University of Illinois. He commanded the 781st Tank Battalion in Europe during World War II. Returning Stateside he was an instructor at TAS and later attended The Advance Class. He was assigned to MAAG, China, then GHQ, FEC. He was next assigned as Chief, Equipment Committee, TAC Support Board. He was assigned to Europe where he presently is the CO, 4th Armor Group.

fantry upon receiving its first armor attachment.

Designation of an initial assembly area where an attachment normally becomes a reality must be specific. The attachment order, originating in the senior headquarters involved, should include as a bare minimum, a realistic geographical goose egg for an assembly area. It should be one designated by the unit receiving the attachment and one that fits the local tactical situation. Too often the initial attachment order will make no mention whatsoever of an assembly area, or, at best, will include only a general area. If time is of the essence, this can be a major error. This may sound academic but it is, in reality, an important point. Immediately upon receiving notice of being attached to a new unit, the commander and his staff should depart for the headquarters of the new parent unit. If, before the commander leaves, he knows where his unit will reassemble, he can not only take steps to issue a sound march order prior to his departure, but he can also prepare tentative employment or security plans while enroute to his new home. Once his units are on the road, communications problems multiply. Even the road march is a problem in itself for a unit such as the 4th Armor Group headquarters whose TO includes no reconnaissance element. In evaluating this statement, bear in mind that Headquarters, 4th Armor Group, is in every sense a Seventh Army tactical headquarters and performs the tactical missions normally attributed to both combat command and division headquarters of an armored division. Its responsibilities and scope of activity are not limited or restricted as your past experience with a group headquarters might lead you to believe.

It is axiomatic that the marry-up of an attached unit to a senior unit should be as early as possible to insure adequate coordination. The availability of a little extra time will go a long way in helping an attached unit to preserve its tactical integrity, a state of affairs to be most highly desired. This is a factor often overlooked and is a definite deterrent to maximum combat efficiency.

Coordination to effect a passage of lines is important and requires extensive and often elaborate prior planning. A passage of lines, either in an initial attack or in a counterattack, is a delicate operation at best. If the unit on the position has been on the defensive for some time or if it has been conducting a delaying action, the barrier system may be highly developed and must be successfully breached on a definite plan as to time and place. Failure to implement this operation in a successful manner has often been the source of serious tactical difficulties as well as a major cause of lack of confidence between attached and supported units. Don't, under any circumstances, overlook the noise factor of tank movement. It will undoubtedly draw fire and may tip off the enemy to an impending operation. If secrecy is vital, the plan should provide a means to eliminate the necessity for a passage of lines at any critical point where noise might be disastrous.

Decisions as to tactical formations and groupings as well as the axis of advance are necessary as specific composition of the combat team is even more important now that it once was with the task force concept the rule rather than the exception.

Liaison requirements and function constitute a major attachment problem area as they are all too often unrealistic as to numbers and vague as to function and authority. We are too prone to dismiss a liaison requirement as simply so many bodies with so many quarter-ton vehicles with so many radios. Actually, considerable thought should go into the use, location and scope of operation of liaison officers. The requirement must, in all events, be within the capability of the attached unit. This appears rather obvious, but repeated unfortunate experiences in this respect indicate a vital need for additional and sound appraisal of liaison requirements. Each particular situation calls for individual consideration. The communications required for liaison purposes is often the biggest problem. Even assuming an officer is readily available, the quarter-ton truck and radio is a major item and usually much more difficult to produce.

Another major point to be discussed thoroughly by both commanders is the responsibility that the liaison officer will enjoy. A good liaison officer will reflect the personality, professional knowledge and confidence of his CO and the scope of his authority will vary widely. A commanding officer's instructions to a liaison officer he is furnishing to another unit should be explicit and should be spelled out to the receiving unit as well as to the officer himself. This should be accomplished immediately upon arrival at the new headquarters. If a commanding officer intends to use a liaison officer merely for messenger purposes as a means of assurance that a message will get through, this limitation of authority should be very definitely known to both commanders. And don't forget, if you send a poor or misfit officer simply because his absence from the unit will hurt you least, that is exactly the type of operation and information he will produce. Don't send a boy—it calls for a man!

Logistics

From a logistics point of view, the prime consideration is resupply. It is not as disconcerting a planning problem area today as it was prior to the time we acquired organic armor within the infantry division, but it is vastly more important in terms of quantities and operational dependence thereon. Suffice to say, that a tank battalion with a prescribed load of roughly 17,000 gallons of gasoline and a basic ammunition load of 59 tons bears major consideration when resupply is interpreted in terms of 2½-ton trucks and their turn-around time to an army supply point. Incidentally, the use of army supply points as opposed to divisional supply points is often argued. Insist upon the former. Too close integration of an attached unit's logistic facilities with those of the parent unit will reduce not only its own flexibility but that of the major home agency as well. To be more explicit, upon attachment of a battalion to a division on a corps order, flexibility of future operations at both battalion and at corps levels will be seriously reduced if corps permits the division to absorb completely the battalion's command and logistic structure. A separate battalion has the means to supply itself and it should insist that it be permitted to do so. Once dependent on a particular unit for resupply support, it will encounter major difficulties, time lags and important shortages when once again reattached elsewhere. Such reattach-

ment usually will require, under these circumstances, a major readjustment of supply SOP at a time when the moving unit can ill afford the time and effort to do so. Your major headquarters should keep this in mind and back you up in this respect. It is equally important to their own flexibility to keep you the same way.

Major shortages, particularly if they affect the operational capability of either unit, should come in for close consideration and even closer coordination of effort to eliminate them.

Maintenance

It is axiomatic for an armored man that maintenance of his vehicles is a major requirement for sustained operations. From personal experience in World War II, I learned that if any part of my battalion was performing maintenance and maintenance alone, it was a hot penny in the G3's pocket until he could find a use for it doing something he considered more constructive. It became obvious that maintenance must also be otherwise operational in some specific manner.

I personally solved that problem in World War II, with the complete concurrence of my parent infantry division, by going into an indirect fire position as part of Divarty, a function that permitted performing maintenance at one and the same time. This was a satisfactory solution when equipped with a 75mm tank cannon, but is not so acceptable today. The 90mm flat trajectory weapon we now have leaves much to be desired in this capacity. The point to be made, however, is still valid. If you expect to do justice to your maintenance, give some thought to doing it simultaneously with some other worthwhile activity. This observation is not a reflection on the wisdom of the average infantry division G3. Human nature being what it is, his loyalty was to his own divisional needs and he was out to get the most from the attachment while he had it. Would you do otherwise?

Communications

Communications attachment problems are probably number one in importance. In interbranch use of our family of military radios, frequency allocation plays a significant part in our operations. Infantry radios utilize 170 channels, artillery 120 and armor but 80. *See Figure 1.* A ten-channel

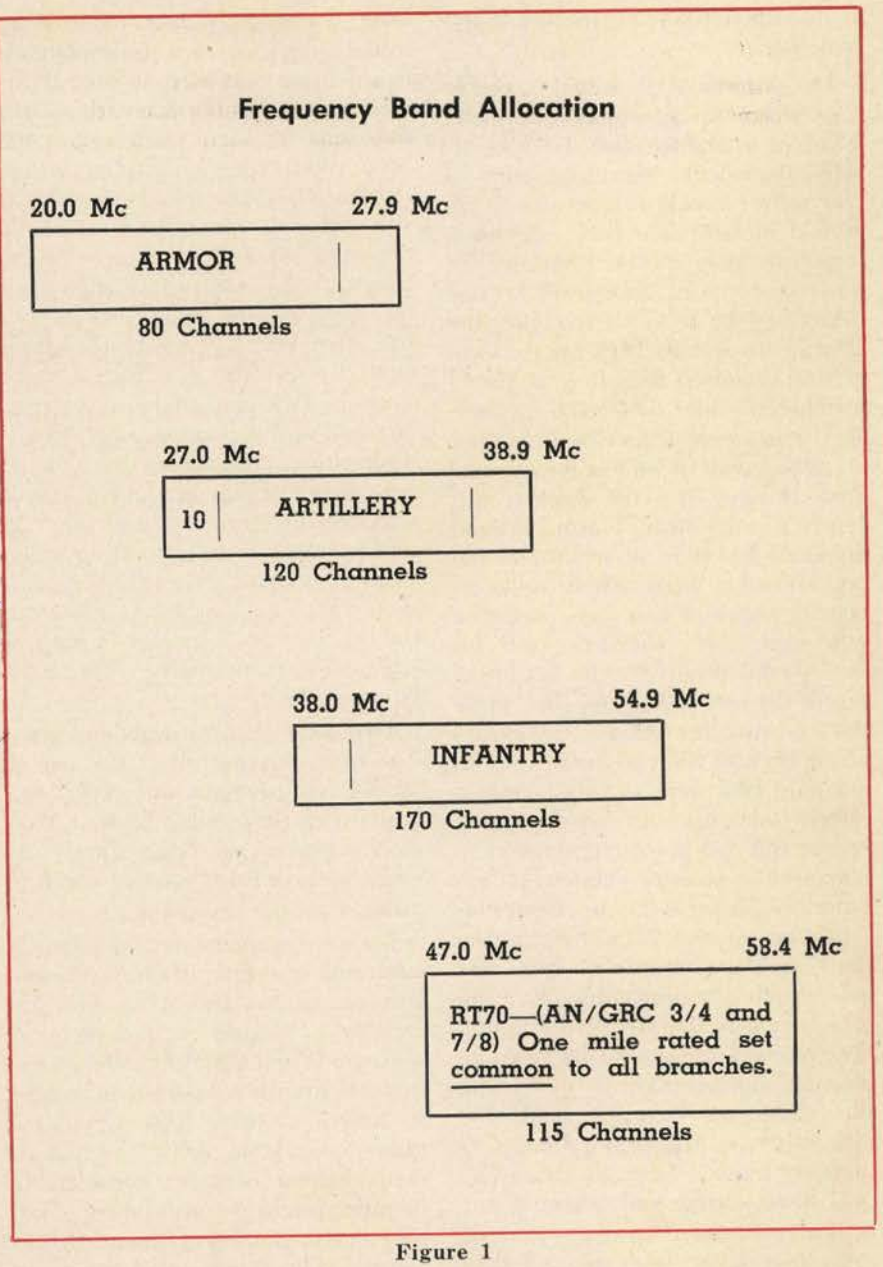


Figure 1

overlap exists within the infantry and the artillery frequencies and the two branches can talk to each other on common channels within that limited range. Another ten-channel overlap is available to artillery and armor. However, there is no common channel overlap for use between infantry and armor. If these two branches wish to establish common user nets, it is usually necessary to implement some sort of expedient to make it possible. Within Seventh Army, these expedients are evidenced in several ways. The radios of the armored divisions, of course, are on the armor frequencies and the infantry divisions on the infantry bands. On the other hand, the 4th Armor Group, exclusively an armor unit, has its group headquarters on the infantry band, its tank battalions on the infantry band and its armored infantry on the armor band. The attachment of the 4th Armor Group as a whole or of any of its attached battalions to a corps or a division, will not, therefore, present the same problem communications-wise as if the attachment is made with divisional elements. To offset this, we have radios on EML within Seventh Army armored divisions and within the 4th Armor Group. The armored divisions have been authorized 16 infantry band radios on EML, with four normally in division headquarters and four in each combat command. The 4th Armor Group, on the other hand, has three armor band radios in group headquarters and four

infantry band radios in each armored infantry battalion. The tank battalions have an EML under consideration for the same purpose. This EML augmentation, however, is not always adequate and a physical exchange of radios between units is usually necessary. The actual number of radios to be exchanged, over and above those on EML, is entirely dependent on the specific task organization to be established. If it is a "fancy dan" affair it may involve a transfer of a considerable number of radios. If it is relatively simple, it can often be satisfied by the EML. Thus the number of radio sets to be exchanged—and I mean man-handled out of one vehicle and into another—can be materially reduced. This is not a ten-minute operation. It may take but ten minutes to remove one set and another ten minutes to put a second set back in, but to be sure that the correct radios are exchanged and are placed in the correct vehicles, it is necessary to set up a closely supervised central control point through which all radios will actually pass from personnel of one unit to another. Sudden moves or changes in task organization after such an exchange obviously should be discouraged. It is often more prudent to plan the task organization but not to implement the actual movement of units and exchange of equipment until as late as is consistent with the tactical situation. Don't forget, if you once exchange equipment it is mandatory that it be returned before you leave. Get it while the getting is good or it may never catch up to you and your communications problems will be legion.

Another communications problem often results from the excessive lineal distance that may exist between the headquarters of the supporting and supported units. The 4th Armor Group, for example, when attached to a corps or to a division, needs but does not have a VHF voice telephone facility. There is usually but little trouble in getting one from corps as corps normally will have a spare. However, when attached to a division, it is a horse of a different color —divisions will not have a spare. EML for the VHF facility is not a ready answer as day to day possession of this equipment also necessitates a personnel augmentation. In this Theater, this is not to be had.

In any event, make sure that one way or another you have adequate communications, that the inherent time delays are known and acceptable and that time and space factors do not come as a surprise when they disrupt your normal communication procedures.

Another communications problem area to be avoided is in the use of call words and call signs. Due care should be exercised not to change those of an attached unit. Difficulty will be experienced by all concerned as you move from parent unit to parent unit if repeatedly you are given new ones. A summary assignment of new call signs by a parent unit will always result in trouble for both the supported as well as the supporting unit. It is common practice for a unit to have its own personal call signs and its Operators will be accustomed to using them. If traffic is heavy or operators need sleep and a call comes in for "Big Ben 6," and the operator has never heard of "Big Ben," it can and usually does cause confusion and delay. The SOI of a senior headquarters, available to all, will indicate the normal call sign of any attachment you will receive. Check it and be prepared to use it. It will be to your advantage.

Attachment Packet

"Attachment packet" is a term given to the means or vehicle by which pertinent data is exchanged between units upon attachment in order to facilitate operations and save time. Material for such attachment packet should be designed to aid both the attached and the supported units. Exchange of material of this type is not a new idea by any means, but the material to be included has never been standardized as to scope and content and, all too often, has been much too incomplete for the purposes intended. The material exchanged, moreover, has almost invariably been a one way proposition—from the attached unit up. It should go both up and down. The attached unit should furnish the parent unit certain basic information and the senior unit, in turn, should provide similar data in return. The material exchanged, however, will not always be identical as to scope and content. This should be SOP and, as stated above, standardized as to basic material. It has been normal in the past to include little, if anything, other than unit SOPs and SOIs. Past practice has been much too limited. Informational items should originate not only from G1, G2, G3, G4 and Communications as a bare minimum, but should include Special Staff data as well. It should be emphasized that an attachment packet is in no sense a substitute for command and staff coordination, but is strictly an augmentation thereto. An exchange of packets will save considerable time, especially if it is available immediately upon the arrival of a supporting commander and his key staff officers. *Figure* 2 indicates items recommended for inclusion within the packet.

Communications-wise, such a packet should definitely indicate frequencies to be used not only for common user nets but for all important nets as well. If Signal Officers of both units can look immediately at a list of frequencies as normally used by each unit, it can be determined at a glance if there will be interference with important nets of either organization. If such information is known early enough, alternate frequencies can be arranged and potential interference avoided before it becomes a problem.

During World War II, the battalion I commanded was fortunate in being the first separate tank battalion to receive a full month's War Department directed special training with an infantry division prior to going overseas. We were well acquainted, therefore, with what the infantry wanted and what generally was expected of us. Later, when overseas and in combat, we called our packet matériel an Infantry/Tank SOP for lack of a better name. It actually was much more than that and included basic doctrine, details of what tanks could expect from infantry, conversely, what infantry could expect from tanks, and similar informational data on operations. It was reproduced by SHAPE, distributed throughout the entire European Theater down to division level and had a pronounced influence on infantry/tank relations at a time when they were sorely strained. The importance of the exchange of packet-type information is that it is distributed as a finished job, the material is complete and in one place, it leaves nothing to memory or

to chance and it is a major time saver. Can you ask for more?

Psychology of Attachment

So far, consideration has been more or less limited to a technical or professional approach to the various attachment problems. While it is true that much can be and is accomplished in these areas, still, the basic problem, the most vital problem and probably the most lucrative means to reduce or eliminate the problems, lie in the fields of psychology and motivation. This, of course, personalizes the problem and is especially pertinent and important to you, to me and to personnel at all echelons.

A little background in this respect will not be amiss. The state of being "attached" has always been saddled with an unfortunate and time-worn stigma. Units, when attached, expected to get the short end of the stick and, nine times out of ten, they got it. When attached to a parent unit, you moved in under a built-in stepchild atmosphere. This subject and its remedies have been a fetish of mine through the years and embrace what I consider the prime attachment problem area. Attachment has been my business. My World War II combat was as CO of the 781st Tank Battalion which was attached to six different infantry divisions, several of them a number of times. The integration treatment we received varied from superior to just plain poor. Currently in Seventh Army, attachment is the day to day business of the 4th Armor Group, my present command. We of the 4th know attachment, we expect attachment and we thrive on attachment. It is our manner of life and an inherent part of all our operations. Yet even today the treatment we receive varies widely.

To go back a bit, many of us must admit, if we are honest, to a certain degree of infantry/armor misunderstanding during World War II. This was at least true in the early stages of our army's active entry into the continental European Theater and applied particularly to the attachment of tank battalions to infantry divisions. While a contributing cause of this situation may well have been a lack of knowledge of or even a failure to appreciate the problems that stem simply by virtue of the state of attachment itself, still the prime cause was a lack of command motivation of the personnel of the attached and the parent units. Admittedly, this situation was also necessitated by the tactical situation itself, but its major cause went deeper than that. Early in World War II there was not only no armor organic to infantry divisions, but neither were there sufficient separate tank battalions for individual attachment to each infantry division. It became necessary, therefore, to attach certain armored division battalions to the various infantry divisions, detaching the former from their parent armored division. Now as far as the armored division battalion was concerned, this violated many aspects of its accepted employment doctrine.

Packet Material
(Recommended Inclosures)

S1 ITEMS	Senior Hqs to Attached Unit	Attached Unit to Senior Hqs
1. Personnel Status Report		X
2. Reports Schedule	X	
3. TO&E		X
4. Roster of Officers		X
S2 ITEMS		
1. EEI	X	X
2. Map requirements		X
S3 ITEMS		
1. Task Organization/Troop List		X
2. Current dispositions	X	X
3. Operational SOP	X	X
4. Statemnt of training status if other than normal		X
5. Special problems	X	X
S4 ITEMS		
1. Major Equipment Status Report		X
2. Administrative SOP	X	X
3. Logistical Report (C1 I, II, III, IV, & V)—Tonnages		X
4. List of critical shortages		X
5. Medical Supplies Report		X
6. Authorization cards		X
7. Special supply procedures and problems	X	X
COMMUNICATIONS ITEMS		
1. SOI	X	X
2. SSI	X	X
3. Radio exchange details	X	X

X indicates the supplying agency.

Figure 2

Armored division personnel had been taught to employ tanks *en masse* and this piecemeal application of detaching individual battalions to infantry divisions was not at all to their liking. Nor was it in keeping with what the field manuals taught. Further, they had been instructed to make deep flanking movements, to exploit enemy rear areas and to bypass hostile strength. They failed to appreciate, accordingly, the new requirement for moving more or less straight down the slot with the slower and less flexible infantry. The armored division battalions also realized that their attachment to the infantry was a temporary, stopgap measure and that in due time they would return to their parent unit, a status they openly expressed as desired at the earliest possible moment.

On the other hand, to a separate tank battalion under a similar set of circumstances, attachment and use in this manner was normal operation. The separate tank battalions, habitually attached to infantry, were conditioned mentally as well as they were equipped operationally to work with the doughboy and to help him with his immediate and very real problems. In other words, the separate tank battalions were prepared to make frontal penetrations if necessary, to go right down the middle and reduce hostile strength as they came to it and, in general, to gear their operations to the speed of the infantry advance. These attachments were at least semi-permanent and in many instances permanent for all practical purposes. As has always been the case, loyalty begot loyalty and, if well taken care of, the separate battalions looked to their infantry division as home. Is there any question as to which battalion was better motivated to do a job for the supported unit?

The point is clear. Motivation is vital and is a major factor in the success of any attachment. To interpret further, the basic analogy, that of an armored division tank battalion versus a separate tank battalion, is unimportant. What is important is that troops, from the commanding officer right down to the last private in the last row, must be motivated to want to do a job for the outfit they look to as home. What is also equally important is that the power to make a unit and its members feel wanted, to make them know that they are being well taken care of and not thrown to the dogs, is readily available to anyone and almost for free. The cost is simply to take the time and effort to enlist the services of psychology in effecting proper motivation of any attachments you may happen to have. If you can induce your attachments to help you in accomplishing your mission in such a manner that all concerned look upon it as a common cause and not one limited to the interests of the parent organization alone, you will have succeeded in the field of motivation.

Today we have taken certain steps to overcome the difficulties experienced in World War II. For one thing, tanks are now organic to infantry divisions. We hear rumors, however, that the "New Look" of our future army may eliminate the armor now organic to infantry, substituting for it non-divisional separate armor units to be pooled at corps level. It is readily apparent that if this should come to pass, the attachment of armor would once again be similar to that of World War II. The problem of command appreciation of this motivation problem thus is a most important psychological and operational factor. Repetition of the mistakes not only of World War II, but mistakes unfortunately still being made today, cannot be condoned.

As to the mechanics of how certain psychological problem areas can be eliminated, a number of factors must be considered. First and foremost, both commanders must insist that common goal motivation be accomplished at all echelons. The attached units must, by all means, take positive steps to seize the initiative and anticipate the needs of the parent unit. This, incidentally, will invariably be to the complete satisfaction of the parent unit G3 as it will save him time and considerable personal effort. Further, the seizing of the initiative by the attached unit guarantees an acceptable solution to the organization that, in the final analysis, will be called upon to implement the plan. On the other hand, the parent unit will also have every reason to believe that the plan will really get a "college try." If a unit develops a plan, it must be assumed it will go all out to make it work. To accomplish this highly desired state of affairs, it is necessary that key personnel of the attached unit be present physically when plans generate. It is imperative that they be at the right place at the right time. This is an important point and one that is easier said than done. A keen appreciation of time and space is necessary, as a commander, for example, cannot be in two places at one and the same time. If you come up belatedly with a brilliant idea after the parent unit has completed preparation of its plans, your effort is not much better than no help at all. You can rest assured it will not become a part of the parent approved plan. On the other hand, when suggested in a timely manner, I have experienced personally but minor differences in having recommendations accepted *in toto* as part of the parent unit's master plan. It follows that the parent unit must, to make this recommendation valid, permit the attached unit to take the initiative. It must not reach the conclusion that the attached unit is attempting to assume prerogatives normally belonging to a parent unit. It must consider and adopt, if feasible, the supporting unit's recommendations. It must include key attached personnel in all planning conferences and briefings. It must cut the attached unit in on all morale quotas and privileges and must make the attached unit feel that it really is an important part of the team. Both the attached and parent units must, and this is vital, pay more than lip service to the other fellow's problems.

Summary

Is successful attachment an art or a science? It is both and the art aspects point purely up to you, your professional abilities, your leadership and your power to motivate your fellow man.

Successful attachment on a continuing basis is not beyond our means but it does require time and, to paraphrase, it takes a bit of doing. Successful attachment can be commonplace if commanders will give the necessary time and effort to make it work. The packet idea is sound but takes active implementation emphasis at command echelons. Proper motivation, both up and down, is the *open sesame* to successful attachment. Adequately implemented, motivation is a powerful command tool that will make psychology work for and not against you. Don't pass it up, it's free.

ARMOR IN EUROPE

This pictorial feature highlights Armor training in Europe. To accomplish one of its missions—helping to maintain the peace by being combat ready—Armor in Europe trains Spring, Summer, Fall and Winter. By being constantly prepared Armor is ready to fight for the rights of free men in a free world.

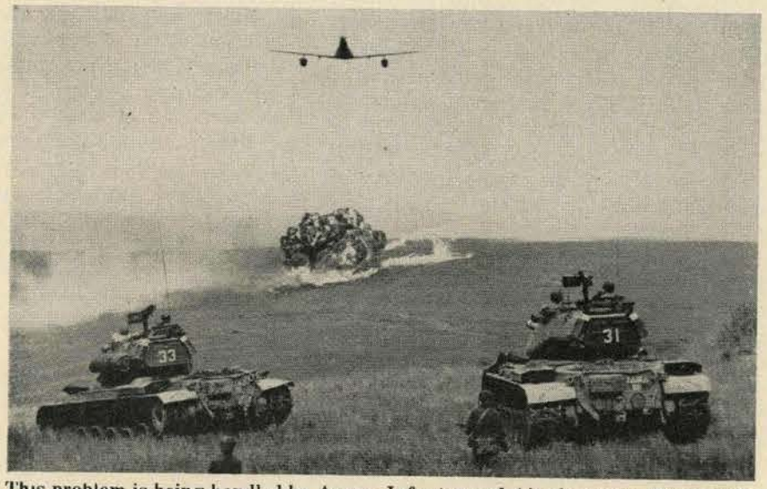


Armor elements of the 7th Army are constantly stressing gunnery proficiency.



Armored infantrymen shown dismounting from an M75 in simulated assault.

All Photos U. S. Army



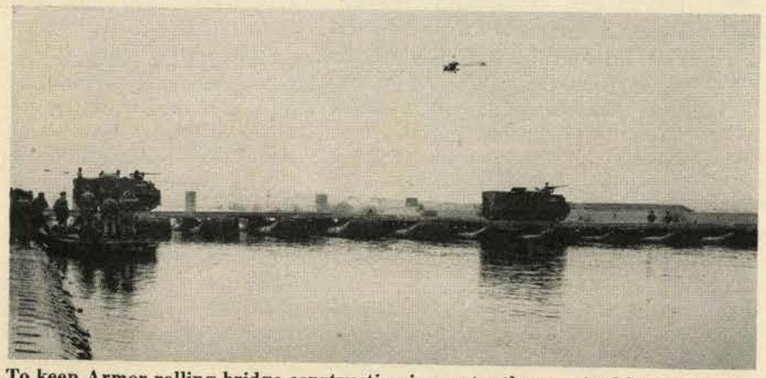
This problem is being handled by Armor, Infantry and Air elements—Teamwork.



Spring through Winter, training continues—snow, mud and cold weather—Armor rolls.



The snow is cold and wet as this tanker scans the horizon for enemy movements.



To keep Armor rolling bridge construction is constantly practiced by Engineers.



Mine fields create problems which Armored Engineers are trained to overcome.

"Important changes in organization and in roles and missions are not easily decided upon or effected." This statement prefaced the recently released Memorandum from the Secretary of Defense clarifying the roles and missions of the various services to improve the effectiveness of operation of the Department of Defense.

Mr. Wilson is to be commended for publicizing this most important document. A decision was due and it can be said that it is "sound business to take stock every so often." The National Security Act of 1947, clarifying the roles and missions of the various services, was reviewed in 1953. At that time modifications were made as deemed necessary.

At the present time, with five areas of interest in which the various services were not entirely in agreement, it is time again to take a second look and modify the 1947 Act accordingly. These areas are: 1. Army use of aircraft; 2. Adequacy of airlift; 3. Air defense; 4. Air Force tactical support; and 5. The Intermediate Range Ballistic Missile (IRBM).

In all these areas of interest, it can be said that since 1953 technical advances have been much faster than the necessary thinking and planning for employment in case the exigency should arise. This is not a condemnation of any Service. Rather, it is a natural evolutionary progression. Although decisions to alter this act are solely the responsibility of our Commander-in-Chief, Mr. Wilson willingly took this burden to resolve these differences. It seems that any business such as National Defense must be periodically reexamined to avoid duplication of effort and waste, and the decisions reached will serve as a guide to the military operating branches for the next 24 months in their budget planning, manpower problems and matériel fields.

Upon release of this Memorandum to the press, news flashes across the country made it appear that the Army was practically disintegrated by these decisions. But let us take a closer look at the decisions reached and how we are affected by them.

Army Use of Aircraft

As stated in our editorial in the last issue, Army Aviation has not been and is not now in competition with the Air Force. Its functions and missions are outlined in Mr. Wilson's directive as we editorially spelled them out in our last issue.

Army Aviation is so organized that the personnel and matériel literally live in the field with the ground forces, The missions they perform are peculiar to the Army's needs. There is no conflict with either the tactical or strategic air. Their missions are limited to performance within the combat zone which is presently defined as extending not more than 100 miles forward from the area of contact and which extends to the rear to a line established by the appropriate field commander, the rearward extension normally being about 100 miles.

Despite specific weight limitations as imposed by the Memorandum, the door is not completely shut. Although fixed wing aircraft are limited to an empty weight of 5,000 pounds and rotary wing aircraft to an empty weight of 20,000 pounds, the Secretary of Defense stated "Specific exemptions to weight limitations for specific aircraft for specific purposes may be granted . . ." In fact, he recently approved the purchase by the Army of five De Havilland DHC4 airplanes, "Twin Otters," for test and evaluation and is giving consideration to another project involving an observation plane in the development stage.

Adequacy of Airlift

The Secretary of Defense stated that at the present time there is adequate airborne lift within the Air Force structure in the light of currently approved strategic concepts. Keeping this point in mind, at the present time, MATS is performing approximately five-hours-per-day-utilization of its present equipment. In an emergency this figure can be considerably increased which will multiply its capability accordingly. In addition to this fleet, the available civilian aircraft certainly must be taken into consideration when determining the maximum airborne lift capability with our present equipment.

Air Defense

Mr. Wilson stated that there are two types of defense to be considered here. However, they cannot be defined with precision. These two types are: area defense and point defense. The Secretary of Defense further stated: "At the same time an arbitrary range limitation must be assigned." Area defense involves the concept of locating defense units to intercept enemy attacks without reference to particular locations. This system requires extensive information agencies such as SAGE. This area defense employs the network system for guidance information. The point system is for the express purpose of defense of specified areas such as cities and vital installations. These type missiles receive their guidance from radars located in the vicinity of the launching sites. It appears logical at this time that their horizontal range limitation should be 100 nautical miles. The Army has been assigned the responsibility of point defense employing the NIKE family of weapons and land-based TALOS. The Air Force has been given the responsibility of area defense employing the BOMARC.

It is well to point out that the 100 nautical miles is a general figure and, should it be desirable to alter, it is believed this change can be accomplished.

Air Force Tactical Support

Assuming the combat zone to have an overall depth of 200 miles, the Army will continue its development of surface-to-surface missiles for close support of Army field operations with the 200 mile range limitation for use against tactical targets. Beyond those limits the Air Force will supply the tactical support. This calls for a reconsideration of the tactical air forces for Army support and Mr. Wilson has requested the Joint Chiefs of Staff to "furnish (him) with their recommendations for specific adjustments as to the number and types of planned Army guided missile and unguided rocket units and with the number of Air Force tactical wings which may be eliminated as a result of these decisions." In other words, as the Army perfects its surface-to-surface missiles there will be a decrease in the requirement for tactical air support.

The Intermediate Range Ballistic Missile

Operational employment of the land-based IRBM system is the sole responsibility of the Air Force; the ship-based IRBM, the Navy. "The Army will not plan at this time for the operational employment of the IRBM or any other missiles with ranges beyond 200 miles." This does not preclude the Army from continuing development on present projects. This was made clear in a statement by Major General J. B. Medaris, the Commander of the Army Ballistic Missile Agency at Redstone Arsenal, Alabama. On the 23d of November and in anticipation of this Memorandum he stated: "any existing developmental missile program will not be affected by any forthcoming decisions on service operational responsibilities." Regarding this 200 mile limit, Mr. Wilson said: "This does not, however, prohibit the Army from making limited feasibility studies in this area." Once again the Army can continue to develop in a field where it has led the way—that of developing the best in the world for use in the defense of our country. Regardless of the operating agency the best weapons system available should be utilized. The Army has produced its equipment for many different using agencies for a good many years.

Summary

This in short sums up the Memorandum which has been discussed around the world by serviceman and civilian alike. What does it add up to? It is a guide for the immediate future with the basic yardstick drawn in miles. This yardstick may become a time factor instead of a space factor. The various services can plot their general courses for the next few years. With the passage of time and steady technological developments we will probably be forced to soon take another look. By that time perhaps many of our concepts of today will have to be restudied and revised, in order to bring us up to date with these new scientific discoveries. Not to accomplish this may lead to disaster. It would be definitely failing in our obligations to our country.

COMBAT LEADERSHIP

By BRIGADIER GENERAL PAUL M. ROBINETT



U. S. Army

Leadership is the very foundation upon which a meritorious military career is built. Therefore, all officers should study it assiduously. A military man of judgment can learn from earlier leaders what to avoid and what to emulate, which in turn should enable him to shape and develop his own qualities for the better.

THE guns are silent on distant battlefields and the United States Army is again subjected to the subtle softening influence of peace. It is difficult for even battle tested men to maintain the martial spirit in such times and harder still for the uninitiated to comprehend the need for strict discipline and hard, realistic training. It is the duty of veteran combat leaders to maintain this spirit for it will be vital to our country if war should come again. Self-indulgence, inertia, or complacency should not deter their efforts. These factors did influence the French Army that emerged from World War I with a splendid group of battle-tested officers. A gradual decline in the martial spirit preceded the terrible French debacle of 1940.

In America we hear a great deal about leadership. It is generally praised. But all leaders are not necessarily good for either the Army or our country—some incontestably have been bad as, for example, treasonable Benedict Arnold. Leadership has, therefore, been presented too often from the favorable point of view only. It is a two sided quality and the reverse side of the coin should not be neglected.

It should also be noted at the very beginning that leadership in the military profession is quite different from leadership in civilian life although the vast mechanization of the fighting services has increasingly narrowed the gap between the two at the service and administrative levels. In the ancient days all military personnel shared the hardships, trials, and dangers of personal combat but this is no longer so. Today only a small part of the armed forces has to fight in direct personal combat, but in the last analysis they are the important ones. Therefore, this article is concerned only with battlefield leadership at the point of contact with the enemy, the type which officers of Infantry and Armor must possess if the safety of our nation is to be secure.

Leadership is the very foundation upon which a meritorious military career is built. Therefore, all officers should study it assiduously. This study should begin with an examination of the general principles of leadership. The biographies and memoirs of past military leaders should then be critically evaluated with a view to determining the reasons for the successes or failures of the individuals concerned. It should be understood, however, that the traits and methods of each leader have been unique to himself and are not entirely suitable for anyone else. Nevertheless, a military man of judgment can learn from earlier leaders what to avoid and what to emulate, which in turn should enable him to shape and develop his own qualities for the better.

Those Americans who have demonstrated battlefield leadership furnish the best examples for study by anyone who aspires to command American troops. Those of you who have experienced battle can best evaluate that leadership; for as Major General Stuart Heintzelman, a highly respected leader in World War I and former commandant of the Command and General Staff School, has said: "Leadership under the stress and strain of battle . . . can be understood and evaluated only by a soldier who has undergone these experiences. Psychologists and the generality of peacetime students of leadership can contribute much of value on this important subject, but this contribution must lack definitive note, which can be furnished only by the experience of soldiers."[1] During the Revolutionary War such leaders as General George Washington, Major Generals Nathanael Greene and Henry Knox, and Brigadier Generals Richard Montgomery, Anthony Wayne, and Daniel Morgan, to mention only a few, established the high standard of leadership that has become the model for the officer corps of the Army. Since then the vast majority of officers have lived and served in accordance with their standard. They have had the gift of human understanding; they have led, not driven, their men; they have put their country's interests above their own; they have lived frugally and have suffered hardships and privations; and they have spent long hours perfecting themselves in their profession without regard to financial advantage.

The study of leadership, however, should not be restricted to the American Army. The advantages to be derived from the study of military leaders of other nations, particularly those of other forms of government, are many. One advantage to be gained from such study will be increased respect for American military leaders. Another advantage will be a better understanding of possible types of opponents who may be encountered in the future. But in the last analysis an officer of the United States Army can profit most by studying our own commanders who have demonstrated marked ability in battle with American troops. It is possible for an American officer to have a thorough knowledge of American troops; but, at the very best, he can have only a superficial knowledge of the troops of foreign armies. Knowledge gained of American military leaders can, therefore, be applied most directly.

No doubt all officers have heard many lectures on leadership by men who have made their mark in the military profession and have read some of the literature dealing with the subject. Rarely, however, do we have the privilege of reading the views of a major on leadership and later of observing him carry out his ideas in war as a field army commander. General George S. Patton,

[1]Manuscript by Col. A. Gibson, Historian, Army War College. January 1944.

BRIGADIER GENERAL PAUL M. ROBINETT, Retired, graduated from the University of Missouri. He entered the Service in 1917. He has attended the American and French Cavalry Schools, C&GSC and the Army War College. He commanded CCB, 1st Armored Division during the early days of World War II. Wounded in combat he returned Stateside and became the Commandant of The Armor School. Since retirement he has been the Chief of the Special Studies Division, Office of the Chief of Military History, D/A. The material in this article is based on a lecture he recently delivered to the Students and Staff and Faculty at The Armor School.

Jr., not only charted the role of a great military leader in an article entitled *Success in War* published in the *Cavalry Journal* of 1931 but later demonstrated the role as an army commander in World War II. Those who knew the general can visualize the warlike gestures he must have made as he drove home the thought: ". . . success is war lies not wholly in knowledge. It lurks invisible in that vitalizing spark, intangible, yet as evident as the lightning—the warrior's soul." Those who worked for General Patton believe that he drew heavily upon the pages of history to reinforce both his knowledge of war and his warrior soul. But without minimizing his outstanding performance, Patton could have done better if he had read a little more carefully American military history and had modeled himself in the pattern of some of the great leaders who preceded him in the Army.

At the Command and General Staff College they once taught the theory of battlefield leadership in what were known as troop leading problems. General A, so familiar to all American military students, was always involved and the students had to describe in great detail his every action and decision. Later some found the training derived from these problems of great benefit to themselves in actual battle, although the exercises were not highly regarded at Fort Leavenworth. One of the students regarded them so lightly that he wrote a postscript to the last troop leading problem in which he said: "Goodbye General A, you vacillating old SOB!" This reflection on the character of General A was not well received by the humorless instructor and the officer's diploma was temporarily denied him.

A close analytical study of American campaigns will show clearly enough that meritorious combat leadership depends upon the physical and mental and moral qualities of the leader. In the remainder of the article these essential qualities of a meritorious combat leader will be probed more deeply.

Physical Qualities for Combat Leadership

Hard campaigning and battle are only for the physically fit. An overage leader or one who lacks health, steady nerves, and energy has no place in it. It is not enough to be merely physically fit. A combat leader should be as hard as nails and as tough as steel. Good eyes and ears, an ability to sleep under almost any conditions, and recuperative powers are of utmost importance. Physical stamina and endurance and physical and nervous energy are also essential attributes. A commanding figure, an imposing presence, a cheerful countenance, a good voice and a winning personality are desirable but not absolutely necessary, for many of the most capable combat leaders have not been blessed with these attributes. Generals Ulysses S. Grant and Philip H. Sheridan, for example, had few of the attractive physical qualities; yet they are among the greatest generals America has produced. Generals Washington, Robert E. Lee and John J. Pershing stand high in these attractive qualities as does General Patton in spite of a high-pitched voice.

Athletic and shooting and driving prowess are highly important attributes for leaders of small units. Higher leaders who have excelled in these things as younger men, have a distinct advantage. Flabbiness and obesity are decided handicaps. Major General William R. Shafter, who weighed more than 300 pounds, had to be carried in a buckboard during the Santiago campaign in Cuba. This was a great disadvantage to him as a leader. Abstemiousness in all things is favorable to good leadership at all levels of command.

A small painting of a lean, bow-legged lieutenant with pistol and sword once adorned the walls of the 1st Cavalry officers' club. Under the picture was the legend, "A young Cavalry lieut should be able to ride and to shoot." The man in the picture was Jonathan M. Wainwright and he excelled at both. A Cavalry officer who could ride expertly and shoot well was universally respected—Skinny Wainwright was loved by his men.

The presence of an individual has a great deal to do with his ability as a leader. His manner of speaking can have great impact. A commander should, therefore, cultivate the art of speaking to his troops individually and collectively as occasion demands. An unfortunate remark, tone of voice, or even look may do much harm. General Pershing once said that Washington and Lee ". . . in times of crisis could go down among [their] troops, talk to them man to man, and inspire them. I think especially of Washington during the dark days of the Revolution, when he held his little army together by the sheer force of his personality."[2]

In whatever he says to his troops the combat leader should be conscious that he is dealing in mass psy-

[2]Gen. John J. Pershing. "The Things We Need Today," *The American Magazine* (December 1932), p. 82.



U. S. Army

General Wainwright



Library of Congress

General Grant

chology and that the American soldier is capable of understanding the tasks demanded of him. He should avoid sarcasm for it is deeply resented. A good sense of humor is a splendid personal quality but it should not be displayed too much. Many of the best commanders have shown scarcely a trace of it. Generals Washington, Lee and Grant, for example, had little if any at all. A leader should strive to animate his troops and build up confidence in them. Therefore, he should never speak in a friendly way of an enemy.. General Patton carried out this practice in all his campaigns.

There was an old axiom in the Army that a leader must be seen and heard by his men and must impress his personality upon them. This involves a certain degree of showmanship, but a leader should create a favorable impression upon his men which is stimulating to morale during operations. Showmanship is especially important in large commands where the leader is a distant figure but it is also important in small units where regulations are designed to insure uniformity. In small outfits superlative skill in technical matters and in man to man relations must take the place of the flamboyancy of Major General J. E. B. Stuart with his plumed hat and gauntlet gloves, Major General George A. Custer with his golden locks, scarlet scarf and flashing saber, Major General George Crook with his frontier garb and riding mule, or General Patton with his starred helmet and bone-handled revolvers. On the other hand General Grant's simplicity and humility were the outward marks that made him more impressive than fine feathers could have done. A three starred shoulder strap on a soldier's blouse was the only tangible mark of his rank.

Mental and Moral Qualities for Combat Leadership

The mental and moral traits essential for meritorious leadership in combat are generally grouped together in the military profession and are referred to as *character*. This is a much broader interpretation of the term than is generally accepted in civilian life. Although the term can be interpreted to be even more inclusive, only the traits of *loyalty, courage, strength of will, self-control, integrity, judgment, professional ability, prudence, imagination, human understanding, sense of justice, sense of responsibility, initiative, ambition and tact,* in the broader meaning of the terms, will be discussed or illustrated in this article.

Loyalty

In the military service loyalty involves fidelity to country and to superiors and subordinates in the hierarchy of command.

Without fidelity to the republican principles of the United States, no one should be entrusted with the command of American troops. Pomp and circumstance and the clever use of flags, music, pledges and slogans

Suggested Reading List for Armor Leadership

General

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are important but cannot take the place of honest belief in our institutions. Deeper than these things is meaningful knowledge of the principles upon which they are based. This knowledge can be obtained only by study and reflection.

The importance of instruction in our own institutions and history is well illustrated in the report of an officer who examined all former prisoners of war on his post who had been held by the Chinese or North Koreans. There he states that all those who successfully resisted the Communist enemy's efforts to break them down "unanimously placed the knowledge of American history uppermost." Unfortunately, American educational institutions and the Army itself have failed fully to recognize this point, but the Army is taking some remedial action. The ROTC and Army Extension Course programs now include a course in American military history.

Many historical examples could be cited to illustrate fidelity to country, the highest of military virtues, but only four will be mentioned. First, there is the case of the young graduate of Yale, Captain Nathan Hale, who volunteered to go behind the enemy's lines to secure essential information for General Washington. Caught in the act, he remained faithful to his trust and went to his death on the gallows with those imperishable words, "I only regret that I have but one life to lose for my country." Second, there is the reverse side of the coin in the treason of Brigadier General Benedict Arnold. He had demonstrated outstanding energy, courage, and ability on several battlefields and enjoyed the trust and confidence of his superiors. But jealousy and insatiable ambition cankered his soul and led him to attempt the blackest treason by surrendering West Point, the key to the Hudson valley. A third, the exemplary conduct of General Washington, may well account for the form of our government and the role the United States has played in history. At the end of the Revolutionary War a greatly reduced and discontented army remained awaiting the conclusion of a satisfactory peace. All around there was chaos and Washington's word alone insured unity. Some even advanced the idea of making him King. He firmly rejected the flattering proposal saying, "Let me conjure you, then, if you have any regard for our Country, concern for yourself or posterity, or respect for me, to banish these thoughts from your mind." A fourth, and last example, can be found in the unflinching bravery and loyalty to principle and trust of General Wainwright and Major General William Dean and others of our own time under the most barbaric treatment.



Library of Congress

The conduct of Gen. Washington may well account for our form of government.

In the American Army loyalty pertains both to superiors in the military hierarchy and to subordinates. It is merely common sense applied for the benefit of any individual. Of the two, however, loyalty to subordinates involves a higher test of character than loyalty to superiors for it may entail self sacrifice. After studying southern leadership for many years Dr. Freeman concluded "that with few exceptions, those officers who have been most mindful of their obligations of loyalty to their subordinates are those men who have received from their subordinates something more than loyalty which conforms to Army Regulations."

In dealing with a superior, one of the temptations or weaknesses to be avoided is flattery. It can be of mutual harm to both parties involved. A commander should be capable of differentiating between flattery and loyalty. On the other hand blindness to inefficiency, ineptness, lack of discipline, or deficiencies in training, etc., oftentimes has been confused with loyalty to subordinates. This sort of loyalty can lead only to the ruin of a commander and to the disadvantage of subordinates.

American military history abounds in examples of loyalty and includes some examples of disloyalty. The disloyalty of Major Generals Charles Lee, Horatio Gates and Thomas Conway to Washington during the Revolutionary War is notorious. The disloyalty of Major General Joseph Hooker to Major General Ambrose E. Burnside during the Civil War is well known. The loyalty of Major General William T. Sherman to General Grant, at the time he was being unjustly treated by Major General Henry W. Halleck, probably saved Grant's military career which had such a profound effect upon the outcome of the Civil War.

The combat leader who encounters superior enemy weapons on the battlefield is confronted with a serious problem involving loyalty to his troops. Because weapons have such a direct impact on tactics and are the symbols of power to soldiers he must quickly attempt to adjust his tactics to the situation while engaged and, at the same time, safeguard the confidence of his troops in themselves and their weapons. Information concerning the enemy's weapons should be passed back promptly and should be welcomed at the rear. But some

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who did report the superiority of German tank and antitank guns during the Tunisian campaign of World War II were thought to be destroying confidence in American weapons. A real enemy superiority was countered with propaganda concerning American superiority which sounded rather hollow to men at the front, who are quick to sense the superiority of their own weapons or the lack of it.

Courage

Physical courage a combat leader must have. It enables him to remain calm and rational and to carry on effectively in battle—the environment of danger and confusion. Men lacking physical courage are apt to lose their heads. Moral courage is also important for combat leaders as it is for all leaders.

The soldier's soul and the soul of the Army from which are derived *élan* and *esprit de corps* and the will to win are best developed by examples of physical courage that inspire the soldiers and make them more courageous, loyal, and dutiful than they could possibly be on their own initiative. The leader then welds these individuals together into a unit, making it capable of the most hazardous and heroic deeds. Leaders capable of playing such a role are not born—they are made and largely by their own efforts. They learn from the records of the past the parts and roles of other leaders but adapt these to their own physical, mental and spiritual capabilities and thus develop their own patterns of leadership.

American history is studded with splendid examples of personal courage by combat leaders on the battlefield. In the Revolutionary War General Montgomery exhibited it at Quebec, General Washington at the Battles of Princeton and Monmouth and many other leaders in that and later wars. It would take volumes to complete the list. The citations for the Medal of Honor include numerous examples from the time of the Civil War that are worthy of close study.

Cowardice is the opposite of courage. It results from uncontrolled fear and produces confusion.

According to Brigadier General Hamilton S. Hawkins, who was present when the 35th Division was repulsed with serious losses during World War I: "The principal job of a combat leader is to bring order out of confusion." His mounted training exercises were designed to test an officer's ability to do just that as well as his physical courage. These exercises proved to be of great value to some who were in the meeting engagements in Tunisia where confusion was compounded by the presence on the same ground of elements of the French, British and American armies without adequate means to communicate with each other.

In World War II, as in the Civil War, the better combat leaders were found at the front where they could influence events and set an example. General Patton was nearly always near the front even as an army commander. Battle casualties among combat leaders during World War II approached those of the Civil War. These wars were quite similar in that they were largely wars of maneuver —the armor of World War II played the role of the cavalry in the earlier struggle but with more decisive effect. One example is that of Colonel Harry A. (Paddy) Flint, an overage cavalryman, who by persistence and chance got the 39th Infantry Regiment in World War II and demonstrated personal courage time after time and by his example infused new spirit into a backward outfit. In a final exploit in Normandy he was killed but his spirit will live in the 39th Infantry as long as it exists. Personal courage reflects the soldier's soul. It is the stuff of which heroes are made and they have made our traditions.

Strength of Will

The combat leader must be capable of prompt decision and have great strength of will and determination or force in order to arrive quickly at a reasoned decision and to insure the execution of that decision in spite of the uncertainty and confusion of battle. The importance of this trait of character shows most clearly when affairs are going badly in a command. Clausewitz has pointed out: "When the strength of individuals begins to flag . . . the resulting mass inertia falls more and more heavily upon the shoulders of the leader. By the fire of his own heart, by the strength of his own determination he must rekindle enthusiasm and reinstill hope in all the others."[3]

General Washington displayed such strength of will and determination in the Battle of Monmouth dur-

[3]Freiherr Hugo von Freytag-Loringhoven. *The Power of Personality in War.* (Harrisburg, 1955). p. 129. Translated by Col. Oliver L. Spaulding.



Library of Congress

General Custer was a better division commander than regimental commander.

ing the Revolutionary War. Having decided upon an offensive operation against Major General Sir Henry Clinton, he placed General Lee's command in the van of his advance on the British. But Lee vacillated, failed to make a personal reconnaissance, accepted rumors and changed his orders repeatedly. His command was soon in utter disorder and retreat. Moving to the front Washington encountered Lee moving to the rear in the midst of this confusion. Using the strongest language of his career, he reprimanded his subordinate, took charge of the troops himself, restored order, and won a defensive action although he had sought an offensive victory. In the final campaigns of the Civil War General Grant displayed great powers of decision and determination and perseverance in the execution of his decisions and brought the war to an end.

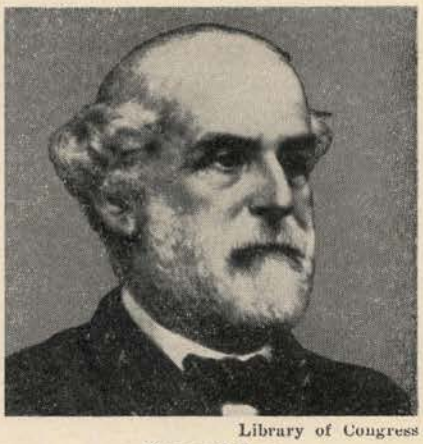
Some men who have successfully demonstrated strength of will and determination in small commands have failed miserably with large commands. General Hooker was such a leader in the Civil War. On the other hand General Custer performed better as a division commander than he did later as a regimental commander in the Battle of the Little Big Horn.

In the Battle of Antietam during the Civil War Major General George B. McClellan, too much impressed by the confusion and by the losses sustained by his command, lacked strength of will and determination essential for a decisive victory and General Lee slipped back across the Potomac without being seriously molested.

Stubbornness is strength of will and determination carried to excess. One of the best examples in American history is that of Civil War General Burnside who pressed the attack on the strongly held Confederate position south of the Rappahannock River during the Battle of Fredericksburg long after all hope of success had vanished.

Self-control

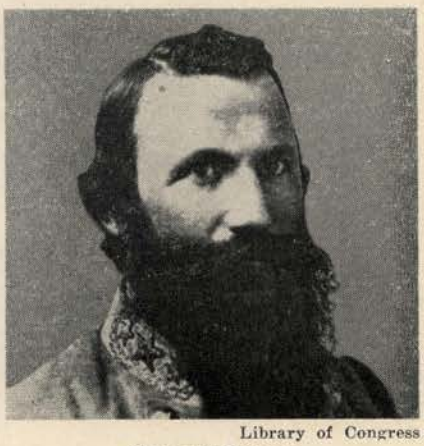
Self-control and calmness in success or adversity are essential traits of character for combat leadership. Some American officers of great potential combat leadership have wasted or negated their talents or ruined their chances by lack of self-control.



Library of Congress
General Lee

Sometimes it has been a failure to control temper or tongue. At other times it has been a failure to control their appetite for women, money or liquor. There are, however, some who lacked self-control, who managed to succeed in battle; but they were merely lucky. If fate had demanded a more thorough test, they might well have been found lacking in the end.

Although possessed of a fiery temper, General Washington brought it under restraint. He eventually gained such complete control of himself that some have even described him as serene. Self-control and calmness were also marked traits of General Lee. General Grant is said to have had a fondness for liquor but it never interfered with his performance in the field. He had self-control and calmness to a marked degree. Washington, Lee, Grant and most of our meritorious leaders have not been addicted to swearing or obscenity. General Patton weakened his leadership by resorting to both.



Library of Congress
General Stuart

Cheerfulness and enthusiasm are closely related to self-control and calmness. These outward marks of an optimist betoken inner forces which a commander can impart to his troops —they are contagious and can stimulate the will to win throughout a command. When coupled with professional knowledge, decisiveness and good judgment these traits are positive advantages; but if based on ignorance, self-deception, or poor judgment they can lead to tragedy. General Stuart was a cheerful combat leader who had a great hold on his troops in the Civil War. Lieutenant Colonel John Todd, 13th Armored Regiment, who died while directing a tank attack in Africa, was always cheerful and inspiring to his men. On the other hand overenthusiasm and self-deception in British naval circles led to very heavy losses in the 6th Armored Infantry Regiment during a direct naval assault on Oran in World War II.

Integrity

Integrity is the basic attribute of character. A man lacking integrity is unworthy of an officer's commission in the United States Army. To some this trait may seem to be hardly worth considering in war where all values seem to disappear. Such is not the case—certainly not in an army devoted to republican principles of government. Some have excused lack of integrity in certain individuals on the ground that they were good fighters. This is but poor extenuation—no valid excuse for such a reprehensible trait as lack of honesty, truthfulness and freedom of corruptive influence or practice. Even a man who had demonstrated ability on the battlefield, such as Major General James Wilkinson, lacking the basic quality of integrity, negated all the good service he had performed by his covetousness while serving as commanding general of the Army. As a young man he had served numerous generals but he seems to have been somewhat closer in his characteristics to Benedict Arnold than to the others.

Another notorious example of lack of integrity is that of Major General Bennett E. Meyers who profited from Air Force purchases which he made

for the United States in World War II.[4] In the case of Meyers General Henry H. Arnold, although duped by the man, excused him, partly at least, on the ground that "he was a go-getter, a driver, he got things done"[5]

It is interesting to note that many men, although lacking integrity, unfortunately have been well blessed with energy, imagination, personality, tact and human understanding—in other words, were leaders. With less leadership ability they might have been merely petty thieves. Many of this leadership type have been smarter than their contemporaries and associates who have not been able to detect their weaknesses before serious damage had been done. General Malin Craig and Brigadier General Guy H. Preston, two of the most discerning men who have ever served in the Army, could quickly detect this false leadership type.

Ordinarily the combat leader will not be concerned with integrity as it applies in the higher levels of command. He will be concerned with the lower types—the thieves and looters who can be controlled only by stern discipline. History records many defeats that can be attributed to these vices. General Grant, for example, suffered a defeat at Camp Belmont, Mo., early in his career when, after an initial success, his men broke formation and began to loot. The Confederate troops counterattacked and drove his command pell-mell back to the boats that had brought them across the Mississippi River. Grant himself barely escaped. On that occasion he learned a lesson he never forgot. Some of General Lee's difficulties in the Maryland campaign of the Civil War have been attributed to the fact that many Confederate soldiers were absent and plundering.

Judgment

A combat leader should be a keen judge of human nature. This judgment is acquired by working with men—actual command—and by study and reflection. Troop duty is, therefore, the most difficult, the most valuable, and the most rewarding service a leader can perform. But the very highest reward is to train and successfully command an outfit in battle.

The truly successful battle leaders have demonstrated a keen understanding of men and they have known subordinates and their capabilities very well. Generals Washington, Grant, Lee, Pershing and many other successful leaders were most excellent judges of men.

In selecting a man for a particular assignment a commander should assure himself that the individual first, has the mental and physical capabilities required to carry out the task entrusted to him and secondly, that the individual has the character and integrity equal to the trust reposed in him. A mistake in the former can be remedied, but an error of judgment in the latter is dangerous.



National Archives

General Craig

For most combat leaders authority to select individuals for position vacancies is rather limited because higher headquarters control many assignments within their commands. They must work with the human material furnished them and shape it into the pattern desired. This is not difficult for men soon think as their leader thinks. There may be occasions, however, when little time is available for the purpose; therefore, one of the most important responsibilities of a combat leader is to size up quickly and correctly the characteristics and capabilities of subordinates. The combat command concept makes this even more important than it has been in the past. The throwing together of tactical units on the battlefield under a leader has certain advantages but sometimes led to disastrous results in World War II. This is well illustrated in the advance on Tunis at the beginning of the Tunisian campaign and later in the defense of Medjez el Bab when the allies were thrown back on the defensive. At the time, a combat command commander allowed greater responsibility to a subordinate of unknown attainments than he was capable of exercising. As a result about 170 vehicles were needlessly lost, most of them to mud.

Professional Ability

Washington has called first-rate ability an essential trait of an officer. Warfare has become increasingly mechanized, scientific, and complex since his time. Therefore, the professional qualifications for first-rate performance as a combat leader are far higher today. From all indications the requirements will be even higher in the future.

It should be observed that professional ability hinges around organization, communications, weapons systems and logistical systems, including maintenance and supply, as applied in maneuver on the terrain under various climatic and weather conditions. It receives its final test in conflict with an enemy. It is here, at the end of the line, that a commander must prove his leadership in the procurement of essential information and in tactics in lower units and strategy in high command positions. Quite obviously a skilled tactician or strategist who is not capable of marshaling his own forces and means and utilizing them in accordance with their characteristics will not accomplish outstanding results. Tactical skill is, therefore, an essential trait of a combat leader. An officer lacking tactical skill should be assigned to a service branch or specialty.

Among other deficiencies General Gates showed a lack of both organizing and tactical ability. He cannot, therefore, be properly credited with the great victory at Saratoga in the Revolutionary War. He can be best understood by studying his failure in the Battle of Camden. While serving as quartermaster and commissary officer in operations in southwest Missouri during the early days of the Civil War, Captain Sheridan (later general) developed a solid under-

[4] "Air Force Strips Medals, Pay from Meyers, Plans Court Martial," *Aviation Week* (December 1, 1947), p. 15.

[5] H. S. Arnold, *Global Mission* (New York, 1949), p. 479.

standing of logistics, staff procedure and communications, which later enabled him to exploit fully his outstanding skill as a tactical commander. During World War II prospective battalion commanders in the 13th Armored Regiment were trained in the service company and in supply assignments and then as battalion executives. Several who were so trained distinguished themselves in battle. Among them was Lieutenant Colonel Henry E. Gardiner, who not only turned in a brilliant performance as a battalion commander but managed to survive having three tanks shot out from under him while leading his outfit in the Tunisian Campaign.

In World War II all senior combat leaders of Armor were working under a terrific handicap. They were catapulted into fairly large commands without having had an opportunity to master the details of their arm. But the tactics of cavalry were so similar and well understood that many could concentrate on the material things that were not so well understood and thus were able to perform successfully in battle. But it is extremely doubtful if any senior commander of Armor in that war was as skilled in communications as he should have been.

Prudence

In addition to the vast range of knowledge which the leader must possess, there remains the basic trait of common sense or prudence, as General Washington preferred to call it, which the leader must have. Prudence implies practical wisdom in estimating and managing affairs. A leader possessing this trait is prepared successfully to apply knowledge in the solution of his problems. All the better American combat leaders have possessed this trait. It has made them exceptionally adaptable in meeting unexpected situations and in overcoming difficulties by improvisation. Washington, himself, is certainly one of the most prudent men the United States has produced. He was a consummate manager of men and affairs.

Imagination

A fertile imagination is highly important to a combat leader in the planning and execution of operations. It enables a commander to understand the influence of the terrain, climate, and weather upon his problems of the moment and of the future. It enables the combat leader to envisage the disposition of his own troops on the ground and what he knows of the enemy's troops as well. He then brings this knowledge to bear in the solution of his tactical and strategical problems.



National Archives

General Sherman

Many examples could be given to illustrate the quality of imagination in American commanders but only five will be mentioned. General Morgan displayed a rare sense of imagination at the battle of Cowpens, during the Revolutionary War, where his clever use of the ground had much to do with the defeat of Colonel Tarleton in an engagement reminiscent of the great Carthaginian victory at Cannae in 216 BC. In a much broader way Washington demonstrated the same order of imagination in the Yorktown campaign that ended the Revolutionary War. Lieutenant General Winfield Scott demonstrated it again in planning the Mexican War and in his direction of operations against the center of Mexican power—Mexico City. At the battle of Chancellorsville and in the final campaign of the Civil War General Lee's imagination was at its best. Fighting with inferior forces he badly defeated the Union Army at Chancellorsville and was finally overcome at Appomattox only by overwhelming odds and the tenacity of General Grant. At the battle of Vicksburg Grant himself displayed imagination of a very high order.



U. S. Army

General Sheridan

The imagination of a combat leader can be developed. Clausewitz has pointed out: ". . . Practice and mental application have much to do with the processes. Applications of this talent also broaden as rank increases."[6]

Like almost all other human traits imagination can also be a dangerous characteristic. Anyone overly endowed with the trait should be careful to bring it in subjection by developing self-control and calmness. Otherwise, he is apt to let his imagination get the best of him with irreparable harm to operations and the ruin of his career. A combat leader at the tactical level must be on his guard against rumors, precursors of disaster, particularly in the area immediately behind the point of contact in battle. General Sherman in his memoirs has said: "I never saw the rear of an army engaged in battle but I feared that some calamity had happened at the front . . . all these signs, however, lessened as I neared the front, and there the contrast was complete. . . ."[7] The experiences of American troops in the first days of the Tunisian campaign of World War II confirmed General Sherman's observation.

Human Understanding

In the words of the Field Service Regulations: "A good commander does not subject his troops to avoidable hardships or danger. He guards against dissipating their combat strength in inconsequential actions or harassing them through faulty administration. He keeps in close touch with all subordinate units by means of personal visits, observations, and reports. It is essential that he know

[6] Freytag-Loringhoven, *op. cit.*, p. 112.

[7] William T. Sherman, *Memoirs of General W. T. Sherman*, vol. II (New York, 1875), p. 407.

from *personal contact* the mental, moral, and physical state of his troops, the conditions with which they are confronted, their accomplishments, their desires, and their needs."[8] If the regulations are carried out American commanders will accomplish what General Dwight D. Eisenhower has described as one of the greatest responsibilities of leadership—the preservation of the individual and collective strength of the soldier.[9]

Throughout the Revolutionary War General Washington consistently sought to ameliorate the hard lot of his troops. He was never very successful but, by the strength of his character and personality, was, nevertheless, able to hold on and win victory. General Lee worked equally hard on behalf of his Confederate troops during the Civil War with only modest success. He was finally surrounded at Appomattox and forced to surrender; but some of his men begged him to send them against the enemy in one last desperate attempt to break the encirclement. Even in this he placed the welfare of his men above what would have been a glorious but tragic gesture.

General McClellan demonstrated limited tactical ability during the Civil War, but his keen regard for the comfort of his troops placed him high in their esteem. He was inclined to pamper his men and therefore had an incorrect understanding of this essential trait of a leader. The welfare of the troops does not mean pampering or striving for popularity. It is the very reverse. Washington, Lee, Grant, Sherman, Sheridan, Pershing and Patton were not seeking cheers from their men. But most of them were awarded cheers by survivors of difficult and dangerous missions.

Sense of justice

A sense of justice in dealing with subordinates is a highly important trait in combat leadership. The men expect their leaders to be fair and understanding and anyone who abuses his authority or humiliates his subordinates will be resented or hated. If a leader lacks a sense of justice the morale of his command will soon be destroyed. On the other hand, adherence to a false sense of justice



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General Wayne

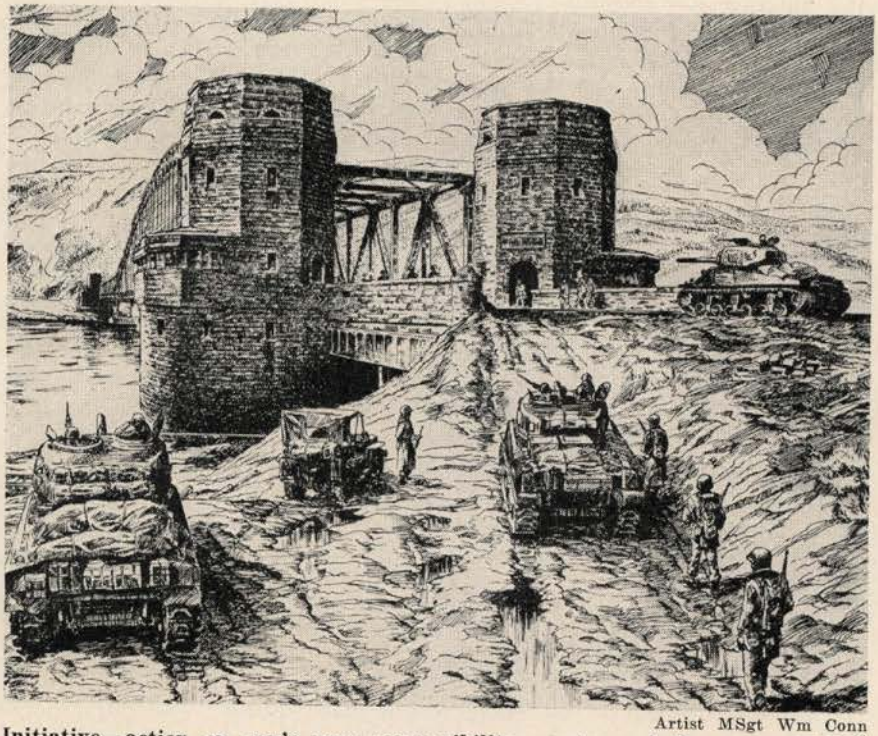
can cause a commander to be too lenient with subordinates. No man is perfect, however, and some of the very best combat leaders have made mistakes occasionally. General Sheridan, believing Major General G. K. Warren dilatory in the final operations of the Civil War in Virginia, relieved him of his command. In doing so he probably acted impulsively under the strain of battle. Warren had rendered important service throughout the War. Major General John Pope relieved and tried Major General Fitz John Porter after the Battle of Second Bull Run. Years later when the evidence of the opposing Confederate commanders was available, Porter was exonerated.

Sense of Responsibility

A meritorious combat leader must have a high sense of responsibility, for he holds in trust not only expensive equipment but the very lives of the troops placed under his command. In the performance of duty he should safeguard both and do everything within his power to insure the execution of missions with the least casualties possible. But, at the same time, he must avoid sentimentality and a false sense of economy when the chips are down and sacrifices in the common cause must be made. All the better American combat leaders of all ranks have had a high sense of responsibility. They have been strict disciplinarians and have insisted upon thorough hard training whenever possible to do so. Major General Anthony Wayne demonstrated a high sense of responsibility throughout his service but never more clearly than in the operations against the Indians that led to their defeat in the Battle of Fallen Timbers in 1794.

Initiative

Initiative or the aptitude of a leader to take appropriate action on his own responsibility to further his mission or seize upon an opportunity to advance the projects of his superiors



Artist MSgt Wm Conn

Initiative—action on one's own responsibility—capture of Remagen Bridge.

[8]FM 100-5, *Field Service Regulations, Operations* (Washington, 1954), pp. 30-31.
[9]Dwight D. Eisenhower, *Crusade in Europe* (New York, 1948), p. 453.

is a highly important trait in combat. Numerous examples could be cited to show the importance of initiative upon the outcome of battles. Benedict Arnold demonstrated it at the Battle of Saratoga even to the point of insubordination to General Gates. A better example is that of Brigadier General William M. Hoge, CC B, 9th Armored Division, who, acting on his own initiative, directed the seizure of the Remagen Bridge in World War II. General Eisenhower has classed this as "one of those highest opportunities which, when quickly and firmly grasped, produce incalculable effect upon future operations."[10] Still another but less spectacular example is Brigadier General Lunsford E. Oliver's initiative in the use of American ponton bridge equipment with British tank landing ships in the Oran operations of the North African campaign which resulted in the early capture of that important port city in World War II.

Ambition

Ambition is another essential trait of character for combat leadership. A combat leader must have ambition to excel and to win. He should be proud but devoid of vanity and should strive for glory without being vainglorious. Essential though ambition is, there are, unfortunately, some who confuse their own personal interests with those of our country. This erroneous ambition is frequently accompanied by jealousy of others. Benedict Arnold was an officer of this type. The very best American combat leaders have been ambitious men, but they have possessed enough self-control to subject their desires to the public interest.

Some men who have made their mark in history have done so on the backs of contemporaries. They have been accorded high rank though never really tested. In studying combat leaders it is therefore advisable to examine carefully those who were engaged for a long time—Washington, Greene, Lee, Grant, for example. These men all tasted both victory and defeat during their careers.

Former Secretary of War Elihu Root once said: "I observe that there are two entirely different theories by which the individual man seeks to get on in the world. One theory leads a man to pull down everybody around him in order to climb up on them to a higher place. The other leads a man to help everybody around him in order that he may go up with them." The best American combat leaders have not climbed to the top by pulling others down but rather by developing subordinates and by pushing them to the front. They have in turn been rewarded by the faithful service of these loyal associates.

Tact

Tact or an acute discernment of what is appropriate to do or say in dealing with others is a trait that is rarely associated with an environment of danger and confusion such as a battlefield. General Lee is said to have been as tactful and courteous in his relations to the humblest courier who came to his headquarters as to his senior corps commanders. Tact certainly has a place in the field and all combat leaders should be aware of its bearing upon their careers.

Americans are generally blunt and forthright to the point of rudeness, and men who live with death all around them are more so than the average. They are occasionally contacted by others from the rear who are somewhat better situated and therefore more relaxed. Tact in dealing with these individuals who come from the seats of authority is self interest.

Successful dealing with allies also requires a high degree of tact. General Washington's undoubted success with the French in the Revolutionary War, so well illustrated in the Yorktown Campaign, can be attributed to the power and greatness of his character and personality, to his perfect understanding of the problem, and to his courtesy and tact. General Pershing's insistence upon an American Army in World War I and his firmness with allies were important factors in the eventual outcome. If other ideas had prevailed small American units would have been fed into French and British commands and friction would inevitably have followed. It is, of course, too much to expect that every commander will have the high qualities of a Washington or the tactful firmness of Pershing, but it is important that all American leaders understand the problem because our country now has alliances with more than 40 other nations.

[10]Eisenhower, *op. cit.*, p. 378.

Summary

In conclusion, it can be said that:

1. Combat leadership includes physical capability but it also includes much more; it is a matter of character—character above everything else. Reduced to their simplest terms the principles of leadership are *Duty, Honor, Country,* as emblazoned on the coat of arms of the United States Military Academy. These principles are the fundamentals upon which leadership training in the Army has been based.

2. The identification of a commander with his men and his regard for their welfare, the accuracy of a commander's analysis of his problem, the correctness of his decision, and the effectiveness of his actions to put that decision into effect—together with the vigor of his supervision of the execution of that decision—constitute the most vital elements of leadership on the battlefield.

3. In the last analysis combat leaders should be judged by results achieved in actual battle. It is in combat alone, where the influence of terrain, climate, weather, and the enemy come into play, that real lessons can be learned concerning the art of combat leadership.

4. Officers of Armor can probably profit most by studying General Washington, who is still the greatest leader the United States has produced, and by studying the great commanders of the mobile arm: Generals Stuart, Forrest, Sheridan, Allenby, Guderian, Rommel and Patton. These men have demonstrated to a remarkable degree the flexibility of mind, dash, decisiveness, energy and drive in execution that are so important in mobile warfare.

ARMOR AND AMPHIBIOUS OPERATIONS

By RICHARD M. OGORKIEWICZ



U. S. Marine Corps

In principle, amphibious operations are centered on the ground component. Naval and air superiority in the area of an amphibious operation are, of course, prerequisites to success. But the ultimate success of the operation depends on the capabilities and performance of the ground component.

AMPHIBIOUS operations have been defined as moves from out of the sea against objectives on hostile shores. Their object is the seizure of these objectives by the ground component of the amphibious force, supported by the naval and air components.

In principle then amphibious operations are centered on their ground component, or landing force. Naval and air superiority in the area of an amphibious operation is, of course, prerequisite to success. But the ultimate success of the whole operation depends upon the capabilities and performance of the ground component.

Considerable and continuing development has been directed toward ensuring the success of the landing force by bringing it into action in the most favorable circumstances and then supporting it in the execution of its mission ashore. It has produced shipping adapted to the special needs of amphibious operations, the technique of coordinating the efforts of the supporting naval and air forces and the methods of logistical support of the beachhead. Thanks to their development during World War II amphibious operations became an accepted and respected form of warfare. This achievement becomes all the more remarkable in view of the position a decade earlier when amphibious operations were still in the primitive stage of landing from open boats, with muffled oars, in the dead of night!

Since the end of World War II the need for still further intensive development has become apparent, to keep the technique of amphibious operations abreast of the latest technological advances and to take into account such new factors as tactical atomic weapons and the increasing capabilities of various forms of air transport.

In contrast to many of these developments, landing forces themselves have changed relatively little. The question therefore inevitably arises whether more drastic changes and a more radical departure from long accepted forms are not needed to ensure a really effective, up-to-date landing force?

Up till now landing forces have largely consisted of infantry or, at least, infantry-type formations. In this they have followed with little change the predominant pattern of all ground forces, in which infantry is still numerically the strongest arm.

The reasons for this state of affairs are many, bound up with questions of logistics, tradition and the unquestionable versatility and usefulness of small infantry units. But this and the numerical preponderance of the infantry cannot be taken as a measure of its overall effectiveness in modern ground warfare or, even less, of its right to be the basic arm in amphibious operations.

To question the importance of the infantry as the principal arm is not to question the importance of the infantry in general. Nor is it to question the importance of the individual soldier on whom, ultimately, everything else depends. What it is, and should be, is to question the ability of the infantry to deploy the maximum of striking power and to use it in the most effective manner. In other words, it is to question the infantry's claim to be the most effective arm in ground warfare—which admittedly it once was.

The bases of the infantry's combat power are light, hand-carried weapons. These are inevitably limited in their power and are bound to remain so, in spite of the progress which has taken place. For that reason they have ceased to be the principal source of striking power, having been gradually ousted from that position by the development of heavier and more powerful, crew-operated weapons, at present generally weapons of between three and six inches in caliber.

The actual process of change-over from the light, individual weapons to the heavy, crew-operated weapons has covered a period of many years. Already at the beginning of the last century, during the Napoleonic wars, field guns—one of the earliest examples of heavy weapons—occupied a



U. S. Marine Corps

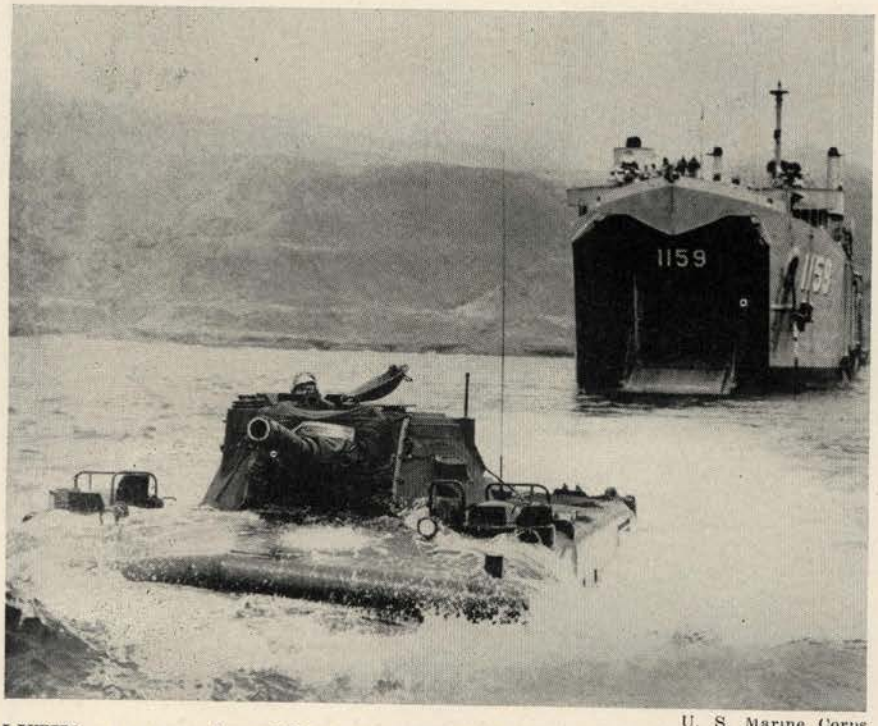
LVTH6, Landing Vehicle, Tracked, Howitzer, Model 6, 105mm howitzer, on land.

RICHARD M. OGORKIEWICZ, a frequent contributor to the pages of *ARMOR* Magazine, is employed as Development Engineer, Humber Ltd., Rootes (Automotive) Group, England.

position of considerable importance. By the time of the Civil War the importance of artillery increased still further and its power was fully demonstrated in World War I. At the same time the importance of the rifle, which once dominated the battlefield, dwindled rapidly.

At sea the change-over occurred much earlier. Originally, as on land, naval fighting was based on individual weapons. But with the development of guns a rapid change began. Already in the 16th century the English fleet relied principally on guns —to good effect—against the Spanish Armada. At the beginning of the 19th century rifle bullets still took their toll in naval battles, as they did at Trafalgar, but soon afterwards individual weapons ceased to be of any importance at sea.

Conditions on land are, of course, different from those at sea but the general trends in armament are not unrelated. That the development on land has lagged so much behind the use of guns at sea was due very largely to the delay in solving the problem of mobility of heavy weapons on land. At sea the problem was solved from the start by the ship, for all types of weapons—guns, rifles and others—alike. On land a towed gun could not but remain a clumsy support weapon and a solution to the problem of its mobility did not appear until the introduction of the automotive combat vehicles. It was with considerable justification that the first of these, the British tanks of 1916, were called "landships" for they introduced on land that combination of effective firepower and maneuver which the warship has demonstrated at sea.



U. S. Marine Corps

LVTH6, an armored amphibian assault vehicle, in water after leaving an LST.

Automotive combat vehicles have taken several forms, in various types of tanks and self-propelled guns, and their employment has been clouded by numerous theories and concepts. Basically, however, all this equipment represents the same thing: a means of increasing the effectiveness of heavy weapons by virtue of the mobility of the automotive vehicle. With the introduction of it the gun and other types of heavy weapons became a much more direct, versatile and effective source of firepower, instead of being merely slow and clumsy support weapons. In fact, tanks and self-propelled guns came to represent the optimum combination of firepower and mobility and, as such, potentially the basic means of ground warfare.

With their appearance ground forces should logically have been reorganized onto their basis. So far, however, only a minor portion has been so affected and organized into mechanized or armored formations, formations of all arms, including the infantry, but built around tanks and other self-propelled heavy weapons.

The still limited progress in this field can not be ascribed to any one single factor but rather a number of influences ranging from a general reluctance to depart from traditional methods through temporary technical or logistical difficulties. Some of it has been undoubtedly due to exaggerated claims made at times for tanks which only increased the resistance to their wider application. Some of it has been due to a misplaced emphasis on armor protection and mistaken conclusions drawn from the periodic appearance of improved armor piercing weapons.

So far as the last point is concerned, tanks have been no more invulnerable than warships and the appearance of one more or one less antitank weapon can not affect their value as the optimum combination of firepower and mobility on the ground. Unfortunately, the general characteristics of the tank are often overlooked. Instead of being regarded as a general means of increasing the effectiveness of weapons it is far too often viewed only in terms of limited and special applications: either as an auxiliary to the infantry or consigned to the limited roles of the cavalry.

In the infantry role it is commonly visualized as a slow and ponderous machine which is to crush all before it, acting as a sort of combination shield and steam roller, and is inevitably consigned to the scrap heap every time some new antitank weapon appears. In the cavalry role the tank is seen as a fast but not very powerful machine for motoring around on the fringes of battle and "exploiting" after the harder and more decisive task of winning the battle

at hand has been accomplished.

Without doubt, tanks have been useful at times used in small packets as auxiliaries to the infantry and in the limited cavalry roles. But to confine them to these roles is to ignore the wider and much more important capabilities of tanks. These and the versatility of mechanized forces in general have been fully demonstrated in World War II, where German and then Allied armored forces achieved results out of all proportion to their number.

Since then nothing has happened which would reduce the value of mechanized forces—and that includes all the new antitank weapons—though, naturally, changes will occur to keep pace with the changing conditions and forms of armament. Some recent developments, such as the V.T. fuse and tactical atomic weapons, have, in fact, increased still further the value of mechanized forces relative to that of the much slower and generally more vulnerable nonmechanized troops.

To be sure, there are still some difficulties to a widespread mechanization of all ground forces, such as the limitations of the existing types of equipment. But there is little doubt that mechanized or armored forces, by virtue of their superior firepower and mobility, represent the greatest potential in ground warfare and that a maximum of such forces in the military organization is desirable.

If mechanized forces are, thus, desirable for normal land operations they are even more desirable for amphibious ones. Difficulties to their use may seem no less but the scope and the need are much greater.

First and foremost comes the need to achieve maximum effectiveness within the limits invariably imposed on the size of the landing force. Shipping and shipping space are always at a premium and their availability is likely to be further restricted by threats of atomic attack. The maximum of striking power will have to be deployed with a given size force—which can not be achieved with an infantry type force with its relatively low striking power to manpower and equipment ratio.

Secondly, not only must the striking power of the landing force be a maximum but its tempo of action should also be of the highest order. One of the cardinal principles of all amphibious operations is that the task ashore be finished with the greatest possible speed. This again can not be achieved by an infantry force as well as by a mechanized one for while an infantry force could move up rapidly to the battlefield by air, for instance, once landed and engaged with the enemy it would be relatively immobile. The mobility of mechanized forces is all the more essential as the potential power of the enemy to retaliate increases and as the need for dispersed movement becomes imperative.

Much has already been done to bring mechanization of the ground component into amphibious operations, due largely to the pioneering efforts of the U. S. Marine Corps. These have produced the tracked landing vehicle, or LVT, and the mechanization of the shore approach phase which revolutionized landing technique in the closing stages of World War II. The mechanized amphibious assaults up to the shores of Pacific islands in that conflict are to amphibious warfare what the first tank attacks on the Western Front in World War I were to land warfare: Saipan, Palau and Iwo Jima are rightly to be ranked with Cambrai, Arras and Soissons. The 1944 Normandy landings must also be remembered for there, for the first time, some of the leading assault waves consisted solely of tanks.

Revolutionary as the amphibious methods and means of World War II were, it would be no more reasonable to regard them suitable for the needs of future operations than it would have been to consider the lumbering tanks of the First World War for the lightning armored drives of the Second. What are now wanted are further and far reaching developments, both in equipment and organization, to modernize and increase still further the capabilities of landing forces.

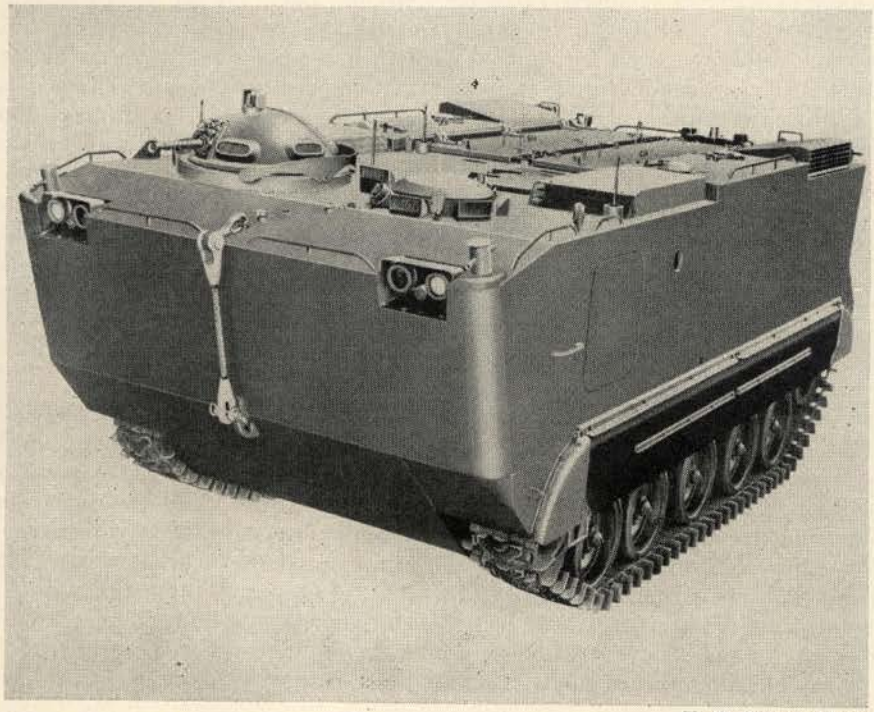
First, equipment: amphibious combat vehicles which would be capable



U. S. Marine Corps

LVTP5, Landing Vehicle, Tracked, Personnel, here going through the surf.

of rapid deployment offshore and of swiftly crossing the beaches and then of an even more rapid drive inland. Such equipment would not only increase the overall tempo of the whole operation but would eliminate for good the passive, transportation character of the ship to shore movement and the vulnerable debarkation on the shore line. Mounted in their vehicles the troops would be able to make use of their weapons both in water and on land and would be afforded a good measure of protection not only by the armor of the vehicles but by their speed and the high degree of controlled dispersion possible.



U. S. Marine Corps

LVTPX2, now known as the LVTP6, a personnel carrier, is not in production.

Changes in organization are equally necessary, along the lines dictated by the general trends in the employment of ground forces toward greater self-sufficiency of small units and their ability to form battle groups based on self-propelled heavy weapons. In keeping with these the organization of landing units should be reconstructed on the basis of self-propelled heavy weapons. Thus the basic unit should no longer be the rifle squad but the heavy weapons team mounted in their vehicle which would provide the main source of firepower. And given this as the main basis of striking power the troops would no longer assault with their bodies and light portable weapons but with the fire of the heavy weapons.

Rifle squads would not vanish, of course, from the landing forces. They should, however, be greatly reduced in number and should no longer be expected to act as the basic element in a fire fight—which the heavy weapon teams can accomplish more efficiently. Instead, they would supplement and support the heavy weapon teams with their lighter, short range weapons. They would also provide scouts and observers, ferret out enemy personnel and help clear the way over obstacles in conjunction with combat engineers or pioneers. Like the heavy weapon crews, rifle and engineer squads should move into action in amphibious vehicles, dismounting when necessary to perform the task allotted to them. They would, in a way, be the *marines* to the fleet of amphibious combat vehicles.

Proceeding along those lines, a picture of a new mechanized landing force can be built. The basic elements would consist of the heavy weapon teams in the shape of tanks, assault guns or other self-propelled heavy weapons chiefly employing direct destructive fire. Supporting and supplementing them would be the indispensable rifle elements and the ever more important combat engineer units. Also in support would be other heavy weapons, mainly for indirect fire, of the amphibious artillery: automatic rocket launchers, which alone —short of the use of tactical atomic weapons—can provide the volume of fire required to neutralize rapidly a target area, and possibly a small number of s.p. heavy howitzers and mortars, all mounted in amphibious vehicles.

Objections may be raised to the mechanization of the landing forces on the grounds of the difficulty of operating a large number of amphibious combat vehicles. But, in fact, there are already hundreds of vehicles organic to landing forces. As far as shipping is concerned, therefore, mechanization of the landing forces would call for a change in type rather than any increase in total requirements. Indeed with proper integration of all equipment, maximum stress on versatility and the elimination of all desirable but not essential impedimenta the total shipping requirements could be very much smaller than those of any conventional, infantry-type landing force of comparable power.

As for the change in emphasis to the heavy weapon teams, this is in many ways but a logical extension of the principle of the fire teams, which has played already such an important part in the landing units of the U. S. Marine Corps. Only now the teams would be provided with even more powerful and effective weapons and by being mounted in vehicles would possess vastly superior mobility and a measure of protection at all times.

From another point of view, the reorganization on the basis of heavy weapon teams is but a recognition

and extension of the increasing tendencies—evidenced very clearly during World War II—to use self-propelled heavy weapons as the basic source of firepower and build various combat teams and battle groups around them.

What precise form the organization and equipment would take can only emerge after a period of development and practical tests. So far as the former is concerned, the vital need for flexibility will demand that the smaller components be as nearly self-sufficient as possible, a demand further strengthened by the conditions of a future battlefield. Already in the closing stages of World War II the German Army, fighting in face of enemy air superiority, found that the largest units which could be effectively used were battalions and at times even only company battle groups. The recent experiments in reorganizing U. S. infantry divisions on the basis of self-contained battalions give still further emphasis to the importance of lower echelons. Battalions, therefore, will have to be largely self-contained and possess their own basic heavy weapon units, their own rifle component and supporting elements. This principle may even extend partly to companies or platoons.

Many of the details of the organization clearly depend on the equipment which can be developed. Without question the problem of suitable equipment presents the most serious difficulties to the mechanization of landing forces.

To apply the equipment of the only current type of mechanized formations—the armored divisions—would not be easy. Nor necessarily would it be the best approach in view of the differences in the background. At any rate, something different from the hitherto standard type of medium tank, the backbone of the present armored divisions, would be most desirable. The latter, for all its power, is heavy and complicated and presents considerable difficulties as regards transportation and flotation.

The LVT type of vehicle presents no problem in this last respect but it too suffers from serious disadvantages, chiefly on account of its large silhouette on land which is a severe handicap in any move inland.

What is required is a relatively light, simple and robust vehicle with powerful armament which could be used for a maximum number of roles. Some attempts in this direction have already been made, with varying degrees of success, mainly in the shape of self-propelled guns. More recently the potentialities of recoilless gun armed combat vehicles have attracted a good deal of attention and this type, which offers the possibility of combining powerful armament with vehicular lightness, could at least provide a partial solution.

Considerable reduction in weight of the basic vehicle would help many problems, not least that of flotation. It could lead either to a smaller silhouette LVT type or, perhaps even more desirable, a relatively small vehicle with detachable floats which could be jettisoned on land giving a more efficient land vehicle than an LVT can ever be.

Any substantial reduction in weight and overall dimensions would also help toward the solution of the problem of air transport. If the basic type of combat vehicle could be carried by air, then air transport could, in appropriate circumstances, be considered as a real alternative to movement by sea.

At the moment, however, the problem of the air lift of heavy equipment on any scale has still to be solved, although there are several models of land planes and flying boats capable of carrying armored vehicles. Until this problem is effectively solved the usefulness of air transport is bound to be limited; and this applies, of course, to all forms of air transport, including helicopters.

The potentialities of the latter have attracted a great deal of attention since the end of World War II, particularly for the ship to shore phase of an amphibious attack. Their ability to dispense with special landing fields and to take off from the decks of relatively small ships certainly commends them for this role. Unfortunately, helicopters are also limited in several respects, the principal limitations at the moment being their lift capacity: at present confined to small units of lightly armed infantry.

These limitations may well be overcome by future development. But even when they are, helicopters will still remain a means of transportation to and from the battlefield and not of mobility in battle like combat vehicles. Helicopters cannot, therefore, be regarded as an alternative to the latter, as is sometimes implied; they are more like vastly superior trucks or landing craft.

But even if helicopters cannot be considered as an alternative to combat vehicles and even if they cannot, for the time being, transport the latter, they still have a very important role open to them. They can well take over the duties of close logistical support—the role for which the LVT was originally intended. By flying supplies straight from ships to units in the line they could reduce considerably the amount of handling and the administrative and supply tail of the landing forces. A tail which is very vulnerable to hostile reaction and which is a particular drag on highly mobile, mechanized units. Numerous advantages would result from the elimination of the large and vulnerable transport and supply echelons, the most important being a much greater degree of freedom for the mechanized combat elements and greater opportunities for exploiting the cross country mobility of the amphibious combat vehicles in the drive inland.

Helicopters will, no doubt, also continue to be used for landing small units to seize limited, vital points, to execute surprise raids, and so on, in a similar way to that in which parachute troops have been used in the past, in support of the main landings. But, however useful such contributions might be, the landing force itself must consist of more powerful elements than helicopter borne raiders or commandos.

Whether viewed in the perspective of the evolution of ground and naval forces or in the light of recent developments, the conventional infantry basis can no longer be considered adequate if landing forces are to meet the demands likely to be placed on them and the conditions of future battlefields. Only by changing from that basis to one of mechanized heavy weapons will the individual elements of the landing forces represent the maximum in effectiveness. Only in this way can the armored spearheads of any hostile counter-landing force be met on an equal footing and only in this way can the bulk of hostile ground forces be met on a basis of qualitative superiority.



U. S. Army

THE GERMAN USE OF ARMOR IN POLAND

By MAJOR ROBERT M. KENNEDY

THE German Panzer force in March 1939 was still in the process of organization, as was the rest of the Reich's new Wehrmacht. Doctrine for the employment of tank units was still being formulated, and the bulk of the tanks in service were known to be too light for combat operations. Despite these weaknesses, Adolf Hitler in that month decided to settle his territorial differences with Poland by war. The German Fuehrer was encouraged by his recent bloodless conquests in Austria and Czechoslovakia. Poland would now be forced to relinquish former German territory that the Poles had gained by the Versailles Treaty in 1919.

On 25 March Hitler summoned *Generaloberst* (General) Wilhelm Keitel, chief of his Armed Forces staff, and *Generaloberst* Walther von Brauchitsch, his Army chief, and directed them to prepare for a surprise attack on Poland. According to the postwar statements of a number of senior Wehrmacht officers, the German leader may have convinced himself that he could achieve the return of Danzig and the Polish Corridor simply by threatening military action if his demands were not met. At worst, the campaign, if it must be fought, would be brief, and neither Britain nor France would come to the aid of the Poles.

The German Panzer force at the time consisted of five Panzer divisions and two separate Panzer brigades.

MAJOR ROBERT M. KENNEDY, Infantry, received his BA degree from Siena College, Albany, New York. The material for this article was collected while Major Kennedy was engaged in writing Department of the Army Pamphlet 20-255, *The German Campaign in Poland (1939)* on a recent two-year tour with the Office of the Chief of Military History, D/A. He is presently assigned to G2 Section, KMAG.

The Panzer divisions, numbered one through five, each had a tank brigade with some 324 tanks of Mark I through Mark IV types. The separate brigades, the 4th and 6th, the latter stationed at the Panzer training center, had a somewhat smaller number of tanks but each brigade could be quickly converted to form the tank striking force for a Panzer division. In addition to these Panzer units, the "light" divisions were also equipped with tanks. These divisions, numbered one through four, were an intermediate step in the formation of Panzer divisions. The 1st Light Division had an organic tank regiment, while the 2d, 3d and 4th Light Divisions had tank battalions. When matériel sufficient to provide each with a tank brigade became available, the light divisions would be converted to Panzer divisions in the series six through nine. Plans had also been made to form the 10th Panzer Division in the Protectorate of Bohemia and Moravia, carved out of former Czechoslovak territory.

The Mark I tank was little more than a six-ton tankette, carrying two men and mounting two light machine guns. The German planners were well aware of the lack of armor and firepower in the Mark I, and had scheduled its replacement with heavier types as they were received from the Reich's war plants.

The Mark II was little better. This tank carried a crew of three, weighed 11½ tons, and mounted a 20mm cannon and a light machine gun. Useful for reconnaissance to a certain extent, the Mark II tank was considered too light for employment in the usual tank role as a weapon of great shock power. The Polish Army had few antitank guns, but the several types of antitank rifles with which Polish infantry units were equipped could do considerable damage to both types of light German tanks. The Polish armored force of 200 light tanks of obsolete British and French manufacture and design might also prove a threat to the lighter German tanks.

The Mark III, the third German tank in order of weight and firepower, was a 24½ ton vehicle. The Mark III tank carried a crew of five and was armed with a 37mm gun and machine gun. It was considered capable of carrying out both reconnaissance and combat missions.

The heaviest tank of the period was the Mark IV. It weighed 26 tons and mounted a short-barrelled 75mm gun. The Mark IV tank carried a crew of five, and its heavy-caliber gun with short barrel provided a highly flexible weapon for the support of attacking infantry.

The Army's attack plan provided for the commitment of all Panzer units except the 6th Panzer Brigade. The Panzer and light divisions would follow the infantry divisions into concentration areas in the vicinity of the Polish frontier, and be prepared to attack from nearby assembly areas at any time after 20 August.



U. S. Army

The Mark II had a crew of three, weight 11½ tons, mounted a 20mm cannon.

The Wehrmacht planned to destroy the Polish Army by simultaneous drives launched from German territory bordering Poland on the North and West. The first force, designated Army Group North and commanded by *Generaloberst* Fedor von Bock, was to drive southward on Warsaw from East Prussia with its Third Army. Meanwhile, Army Group North's Fourth Army would attack from Northeastern Germany, cut the Polish Corridor at its base, and link East Prussia with the Reich proper. The second force, designated Army Group South and commanded by *Generaloberst* Gerd von Rundstedt, would drive on Warsaw from Southeastern Germany with its strong Tenth Army. Rundstedt's Eighth Army would protect Tenth Army's left flank in the attack. Fourteenth Army, with several divisions attacking from assembly areas in the satellite state of Slovakia, would protect Tenth Army's right flank. The junction of the two German army groups at Warsaw would cut off the retreat of the western Polish armies and prevent their escape into the vast wooded and marshy areas East of the Vistula and San Rivers, which bisect Poland in a North-South line.

The 4th Panzer Brigade was allocated to Third Army and the 3d Panzer Division to Fourth Army. On the Army Group South Front, Eighth Army received no armor at all. Tenth Army was assigned the 1st and 4th Panzer and the 1st, 2d and 3d Light Divisions for the drive across the Polish Plain on Warsaw. The Fourteenth Army, to protect the right flank of Tenth Army against attack by strong Polish forces known to be in the Lwow area and Southeastern Poland, was assigned the 2d and 5th Panzer Divisions and the 4th Light Division.

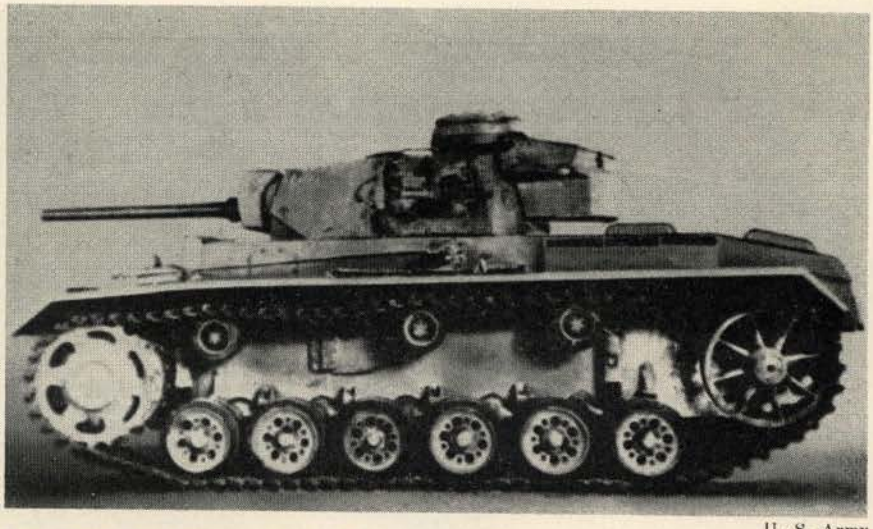
Hitler gave the order to attack on 25 August, with H-hour set for 0400 on 26 August. In accordance with the original German Plan, the reserve divisions (all infantry) began to mobilize immediately. Later the same day, 25 August, Hitler was informed that Britain had given the Poles a written guarantee to support them in the event of a German at-

tack. Hitler immediately rescinded his attack order, though mobilization was ordered to continue. As a result, a number of reserve divisions were also in line by the time Hitler again gave the order to attack on 31 August, with H-hour set for 0445 1 September.

The German ground force arrayed against Poland on 1 September comprised a total of 55 divisions of all types (of the 102 active and reserve divisions that Germany could muster). 30 infantry divisions were deployed along the Reich's western frontier to hold any attack the British and French might make in support of Poland. The remaining 17 German divisions were scattered about in the interior of the Reich. Opposing the 55 German divisions on their frontier, the Poles had only 30 understrength active infantry divisions, several mountain infantry brigades, 11 horse cavalry brigades, a mechanized cavalry brigade and a provisional tank brigade containing most of Poland's modest tank force. Only five reserve divisions could be mobilized by the outbreak of hostilities, and these had only a small proportion of their authorized armament and transportation.

The German Panzer force underwent several changes in the course of August and during Hitler's period of indecision immediately preceding the attack. A provisional Panzer division, called Kempf after its commander, was formed from the Panzer force dispatched to East Prussia. The 10th Panzer Division completed its organization and was sent to Fourth Army, bringing to seven the number of Panzer divisions disposed to attack Poland.

The total number of tanks available in the seven Panzer and four light divisions and a few separate tank units was 3,195 of all types. Of these, 1,445 were obsolescent Mark I tanks; 1,223 were Mark II tanks; 98 were Mark III tanks; 211 were Mark IV tanks; and 215 were command tanks of all four standard types. Since virtually all German Panzer forces were deployed to participate in the attack on Poland, practically all of the total of 3,195 tanks were in the East. This tank force was also scattered in a huge semi-circle from East Prussia to Slovakia, on a front of almost 1,000 miles.



U. S. Army

The Mark III had a crew of five, weight 24½ tons, mounted a 37mm gun.

The scope of this study does not permit a detailed discussion of the Polish Campaign proper. The reader is certainly aware that the campaign was a brief one for the Wehrmacht, which managed to annihilate the major part of the Polish Army West of Warsaw and the Vistula, and was engaged in destroying those Polish forces that escaped East of the river when the Red Army moved into Poland to complete the destruction of the Polish State and settle Stalin's old score with the Poles. To understand fully the part played by the German Panzer force in the defeat of the Polish Army, however, it will be necessary to outline the major operations in which the Reich's tank units were engaged.

Panzer Division Kempf, as the heaviest striking force of Third Army, spearheaded Army Group North's drive on Warsaw and assisted materially in the encirclement of the Polish capital. The 3d Panzer Division, under control of Fourth Army's XIX Corps, cut the Polish Corridor at its base and was shifted to East Prussia with the rest of the Corps by Von Bock to effect a deep drive east of the Vistula and San Rivers and capture Brzesc (Brest-Litovsk). The 10th Panzer Division was also shifted to East Prussia to join the 3d Panzer Division in the drive against Brzesc, which was directed by *General der Panzertruppen* (Lieutenant General) Heinz Guderian, XIX Corps commander. Guderian's drive was opposed at first by the Army High Command, which was determined to keep its forces as far to the West as possible in the event it became necessary to shift troops to meet a French and British attack on Western Germany. Finally permitted at the request of Von Bock, the drive on Brzesc later formed a potent argument for the use of tanks in mass to strike deep into the enemy rear.

Tenth Army's 1st and 4th Panzer Divisions and 1st, 2d and 3d Light Divisions set the pace for the drive on Warsaw from the West. The two Panzer and three light divisions of Tenth Army played a major part in encircling and destroying a full third of the Polish ground force West of Warsaw, and annihilated another Polish force of 60,000 at Radom, South of the capital. Elements of the 4th Panzer Division actually reached the suburbs of the Polish capital on 8 September, but were forced to withdraw in the face of heavy artillery fire from the city's defenses. The speed of the Tenth Army drive made obvious the potentialities of tank units moving across open country. The lack of success of the 4th Panzer Division in the initial attack on Warsaw also made it obvious that fast-moving armored units should be followed closely by infantry. The Panzer units would isolate heavily populated or fortified areas, which would then be captured or reduced by infantry and artillery arriving in the wake of the tanks.

Fourteenth Army's 2d Panzer and 4th Light Divisions drove North to the Vistula from Slovakia, while the 5th Panzer Division assisted in the



U. S. Army

The Mark IV, heaviest tank of the period, crew of five, weight 26 tons, mounted a short-barrelled 75mm gun.

capture of the industrial area about Cracow. Both Panzer divisions and the light division moved Eastward to the San River and beyond to prevent a concentration of Polish forces East of the Vistula-San River line.

The intervention of the Soviet Union on 17 September would render academic any discussion of the eventual success the German Panzer force might have achieved in completing the destruction of the Polish ground forces. Several decisive actions were fought by the German tank units as they withdrew Westward toward the demarcation line agreed upon with the Russians, including a major engagement at Kock, East of Warsaw, on 6 October, when the last organized Polish resistance on any significant scale on the German front was crushed.

The German Panzer force was widely dispersed at the outset of operations and at the time of the Red Army's intervention in the fighting. Except for the Tenth Army, no plan was made for the committment of Panzer units in mass to take advantage of their tremendous shock power. The XIX Corps drive Southeastward to Brzesc was permitted with reluctance by the Army High Command, and Colonel General Von Bock's judgment was seriously questioned before his thesis proved its validity.

Despite numerous news and propaganda reports to the contrary, the German campaign in Poland in 1939 was not planned as a "blitzkrieg" operation. The doctrine of fast-moving mobile warfare had not been accepted completely by many senior officers of the Army High Command. Rather, the German planners still adhered to the principle of the broad front, with Panzer units supporting attacking infantry or making local penetrations that might be exploited by infantry units following the tanks. The success of the Panzer force in Poland, however, supported the case of the proponents of fast-moving armored drives on distant objectives, with ample infantry support, to encircle major enemy forces, strike decisive blows deep in the enemy rear, and isolate important population, transportation, or communication centers.

The Wehrmacht studied the campaign and the after-action reports of division, corps, and other commanders carefully. The adoption of a new concept of Panzer operations by the German Army might be considered to begin at this point. A group of new commanders also came to the fore; these were the leaders of the Panzer force, most prominent of them Guderian, who was to become Army Chief of Staff by the end of the war.

Another argument to support the doctrine of fast-moving Panzer operations was the exceptionally light loss involved in the campaign in Poland. A total of 89 Mark I, 83 Mark II, 26 Mark III and 19 Mark IV tanks were reported destroyed. Guderian's corps lost only four percent of its personnel in a 200-mile drive into the interior of Poland, into an area held by numerically superior forces where the corps also had to commit armored infantry to reduce the fortifications of Brzesc in an assault operation. The losses inflicted on the Poles were staggering and a large proportion of the 694,000 prisoners of war belonged to Polish units by-passed by German Panzer columns and rounded up by infantry units following the tanks.

These factors were considered carefully and the new doctrine of Panzer operations was put to use in the planning for the campaign against France, which opened with the attack on the Low Countries and the offensive against France the following May. Here the lessons learned in Poland were to be put to the crucial test of battle, and the German Panzer force was to defeat decisively a strong enemy equipped with a numerically superior tank force but unable to utilize that tank force properly.

FROM THESE PAGES

65 Years Ago

The importance of shock action of cavalry has of late years been much underrated, and attempts have been made, with more or less success, to lead up to the idea that the charge with the saber is a thing of the past, and that in coming wars cavalry will have to depend for its success on fire action, and not as heretofore on the charge, to produce its effects in battle.

If we admit this to be true the troopers of the future will be nothing more nor less than mounted infantry, no matter what other name they may be given. This is the logical conclusion of abandoning the saber as the principal weapon for cavalry, or making it secondary to the carbine or the revolver; for it is but reasonable to suppose that when possible, arms will be used under those circumstances in which the greatest effect can be derived from them, and as the most ardent advocate of fire action for cavalry will scarce claim that they can be used with anything like the same precision and effect on horseback as on foot, it follows that to use them to the best advantage the men will have to be dismounted; consequently the troops which depend on their fire action will have to fight on foot.

But is this a statement of the case, and has the day for the shock action of cavalry passed away? If so, it would be best to relegate the saber to the arsenals, and the charge to the pages of historians or novelists; but before so doing it would be well to examine the histories of the last three great wars and determine from the examples they furnish whether the advocates of making cavalry a fire force instead of a charging force have made out their case.

SECOND LIEUTENANT J. Y. MASON BLUNT

The Shock Action of Cavalry

50 Years Ago

As far as could be learned the attack on one position was similar to that made on every other. The Japanese would cross the Shuishih Valley, taking advantage of all cover and establishing themselves in some dead space near the foot of the hill, on which the fort to be attacked was placed, would dig their first parallel, this generally at night. Thanks to the shape of the ground this parallel was often very close. The first one in the attack on the Sungshushan was about 600 meters from the fort. From this they would break out single, alternately right and left hand saps. The next parallel would be established at some convenient distance, and so on. Whenever a Russian trench occupied a military crest, the Japanese would sap to it, take it by assault and convert it into a parallel. From a convenient parallel they would mine to the ditch defenses and either blow them up or drive the Russians out. Up to this point a number of assaults have been made and as a rule failed. This stage of the siege marks another point at which an assault is generally made and generally fails.

The ditch defenses having been destroyed or captured, and the ditches being dry there is no trouble about crossing the ditch and mining under the scarp. As a rule the part of the fort in front of the cavalier is blown up, and after one or more assaults the Japanese succeed in occupying all of the fort except the cavalier, on which the Russians make a final stand and from which they are finally driven.

SECOND LIEUTENANT HENRY J. REILLY

Port Arthur

25 Years Ago

Let us, instead, consider the tank as essentially a means of moving firepower quickly to any spot, if also of bringing it closer to the target than can be risked by weapons which are handled by unprotected crews. For this is its fundamental value, and would remain, even if an omnipotent armor-piercing weapon was invented. An old-style unit cannot, as a rule, be expected to make more than one attack in a day's battle, and, once committed, cannot be shifted to a different sector. Thus it is practically limited to what one may call "one-point" use of its firepower. In contrast, a tank unit is capable of a "several-point" use of its firepower, without special strain or risk. The utility of a tank formation, such as a brigade, has a similar proportion in comparison with an old-style formation. And this sense of proportion ought, therefore, to govern an estimate of their respective economic values for military purposes.

The tank as a "fire-mover" gives a fresh meaning to Napoleon's acute dictum that force is mass multiplied by velocity. This is the true way to calculate force.

We must also remember that material effect is multiplied by moral effect. The fact that the tank can bring its fire so quickly to a spot, and from an unexpected direction, morally multiplies the value of its fire—even apart from any panic which its ugly appearance may cause. Hence the real force innate in tanks is the product of mass, velocity and surprise. They give a commander the chance of fulfilling in a way hitherto unconceived Forrest's famous yet simple recipe for success, that of "gittin thar fustest with the mostest"—fire and fear.

CAPTAIN B. H. LIDDELL HART

Contrasts of 1931—Mobility or Stagnation

10 Years Ago

Plans for military reorganization—those concerning merger of our armed forces and other alternatives—have uniformly for their goal greater effectiveness of, greater protection by, and a maximum of strength, economy, and coordination in our military forces. All of which are essential for the preservation of national security.

Of these virtues, the latter—coordination—is the most immediately important. We learned much about it in the late war, have preserved it somewhat currently, but have a long way to go before reaching perfect coordination.

So, in striving for such perfection, those on whose shoulders fall the tasks of planning our military organization of the future should pause long in consideration of any element of our present military set-up labelled obsolete or ineffectual in view of modern futuristic warfare before casting such an element aside. Such planners must remember that no matter what type of warfare may occur in the future, it is and will remain simple logic that it will be costly to our national security to do away with completely any unit or force of the present which might be of value later on.

A unit may seem obsolete in the present or immediately apparent scheme of things, but its organization and tradition will always be an asset to our nation in times of emergency. Weapons and organizations never become completely obsolete; they develop and/or support newer implements of warfare.

LEONARD J. GRASSMAN

Combat Futurama

NEWS NOTES

A New Lightweight Flame Thrower

A one-shot, lightweight flame thrower has been designed by the Aerojet-General Corporation of Azusa, California, under a development contract with the Chemical Warfare Laboratories. The final stages of development are now being made by the Army Chemical Corps.

The unit, developed for use in close-range combat situations such as were encountered during World War II and the fighting in Korea, weighs 26½ pounds when combat loaded as compared with the 72 pound weight of the multiple-shot model. Due to its lighter weight and compact size, it can be "jumped" with a paratrooper as part of his equipment.

The new type of flame thrower is considered to be particularly useful for reduction of bunkers and other emplaced positions where high explosives are not effective. When equipped with a remote-firing device, it has been found to be ideal for use in defensive situations such as flank emplacement. It may also be adapted for use as a booby trap.

Either thickened or unthickened fuel may be used with the new flame thrower. Fuel capacity is two gallons, as compared with four and a half gallons for the multiple-shot type. Compact and comfortable to carry, the weapon may be fired from any position with ease. It is rugged, waterproof and safe to use.

Second Contract for Mechanical Mules

A contract for approximately $1,400,000 has been awarded to Willys Motors Corporation, Toledo, Ohio, for the Army's new gasoline driven Mechanical Mule, the Department of the Army announced recently.

The Mule, a four-cylinder version of its four-footed namesake, is the first all new lightweight tactical vehicle to be added to the military procurement program since the development of the popular jeep early in World War II. It is the first military vehicle to carry a load greater than its own weight.

The 750 pound Mule, which looks like a table top with wheels, will carry a 1,000 pound payload.

The contract is the second production award on the vehicle. The first Mules were ordered into production in June under a contract to Willys for approximately three and a half million dollars.

Army's New Field Artillery Unit

Helicopters will replace the time-honored Army mule when the Army's last animal tactical unit is inactivated at Fort Carson, Colorado, this winter, the Department of the Army announced recently.

When the 4th Field Artillery Battalion (Pack), which was organized almost half a century ago, becomes a part of Army history, its designation will be moved to Fort Sill, Oklahoma, where it will become the experimental 4th Airphibious Field Artillery Firing Unit.

Personnel of the 4th Pack, organized in 1907, will remain at Fort Carson. Approximately 125 horses and mules are now used by the battalion.

The new airphibious unit was developed by the Continental Army Command, with headquarters at Fort Monroe, Virginia. For experimental purposes, it will be equipped with various artillery weapons, including howitzers and rocket launchers, transportable by helicopter. The unit will test and evaluate the effectiveness of tactics, develop techniques of employment in combat, and study the adequacy of personnel and equipment allocations.

For experimental purposes, the 4th Airphibious Field Artillery Firing Unit will be assigned to The Artillery and Guided Missile Center at Fort Sill.

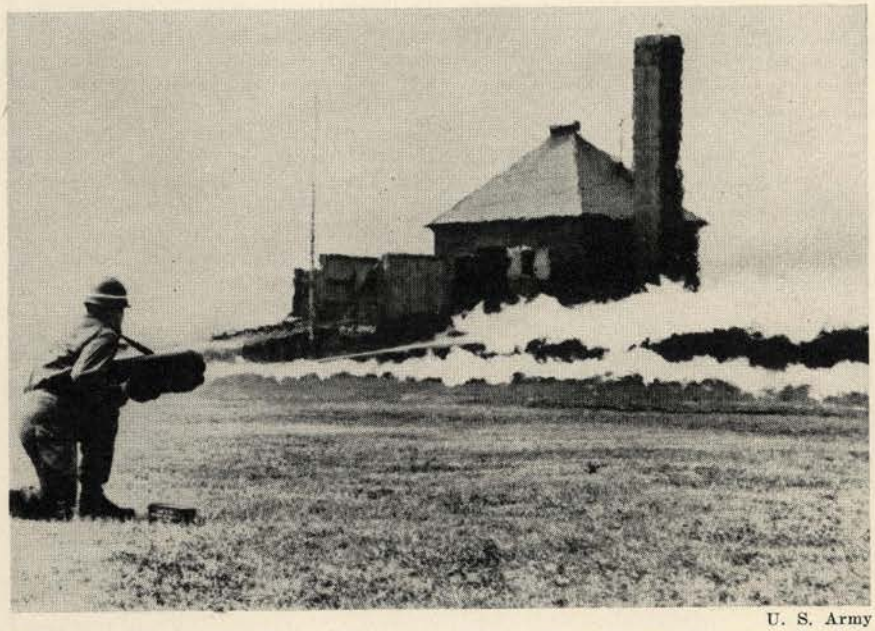
In devising the new organization, the Continental Army Command envisioned that its capabilities would include rapid aerial mobility and rapid emplacement, including an observation system, communication net and limited ground mobility. Aircraft whose rate of flight is 70 to 100 miles per hours will be used.

All members of the new unit will be volunteers. Officers must be both artillerymen and Army aviators qualified to operate helicopters.

Organization of the airphibious unit, to be commanded by a lieutenant colonel, will include 224 officers and enlisted men. Its equipment will include eight reconnaissance, ten utility, twelve one-and-a-half-ton, and eight three-ton helicopters.

In combat operations, tactical employment of the 4th Airphibious is expected to be similar to that of the standard motorized artillery unit. However, speed and flexibility of operations through the use of helicopters will be superior to similar units using ground transport means.

This unit is expected to be particularly suited for use in special operations in the mountains, arctic and jungle, and might also be used for artillery support of aerial reconnaissance units. It could normally occupy positions which would not be readily occupied, or may be inaccessible to, units with ground transport, including areas surrounded by the enemy. It would also be able to evacuate isolated positions with minimum interference from enemy action. Rapidity of movement reduces the possibility of enemy detection and speed of flight reduces time exposed to enemy observation or enemy fire during movements.



U. S. Army

This rugged one-shot flame thrower weighs only 26½ pounds when loaded.

Continental Army Command officers anticipate that the airphibious unit could move 650 miles in a day's flight. It is expected that an outfit of this sort could communicate and operate over land where roads and airfields are not available, or over water where water transport cannot be provided. As a super-mobile artillery firing unit, the airphibious organization could provide support fire in normal operations as well as for airborne, armored and other types of combat units in situations where mobility might be essential.

California Firm Gets Contract for Tracked Landing Vehicles

Food Machinery and Chemical Corporation, Riverside, California, has obtained a contract for the construction of 14 landing vehicles tracked-recovery (LVTR-1), in the amount of $1,630,-930, including the estimated cost of centrally procured material, the Navy announced recently.

The LVTR-1 is a tracked, amphibious landing vehicle used for recovery and maintenance of disabled landing vehicles. Each is equipped with a 7,-000-pound capacity crane; a 40,000-pound capacity winch; and welding and other equipment. Their approximate dimensions are: weight, 41 tons; length, 32 feet; width, 11½ feet; and height, 10½ feet.

This procurement is being made for the U. S. Marine Corps.

Scientists Study Ways to Improve Tank Warfare

With the aid of targets that "fire" back at tanks, a team of scientists at Fort Stewart, Ga., is studying ways to improve night tank combat. The three-man team is from Johns Hopkins University's Operations Research Office, which is under permanent contract to the Army's Office of Research and Development. The mission of the team is to find out the night fighting capabilities of armor units, under varying conditions.

With the aid of men from Fort Stewart's 710th Tank Battalion, the scientists have erected wall-like targets, about six feet square. Directly in front of the targets are placed powder charges which are set off by remote control to simulate tank guns firing at the "friendly" forces.

When the shots go off, actual tankers, who are undergoing regularly scheduled field problems at the time, attempt to destroy the targets in the shortest possible time. Utilizing an electronic "operations recorder" the scientists, back at their observation post, are able to note each simulated enemy shot, tank movement, tank shot, target hit, and the length of time from one of these phases to another.

Army Engineers Develop Armored Kit for Dozers

Protection against small arms fire and shell fragments may be afforded tractor operators in forward combat areas of any future wars through use of an armored kit developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Virginia.

The protective armor kit, which can be mounted in the field by maintenance personnel, has been specifically designed for use on standard D7 and D8 Caterpillar tractors. Both the engine and operator are protected by armor plate, fabricated to Ordnance standards.

Visibility for the operator is provided through standard Army Ordnance laminated glass vision blocks. Three vision blocks are provided for vision to the front, one in each door for side vision, and one in the rear for backing. The cab has two doors, one on each side, which can be locked in one of three positions—open, slightly open, or closed. Two cooling fans are installed in the cab to provide ventilation for the operator. There also is provision for a radio for communication purposes when the unit is isolated.

While designed primarily for protection of the operator and tractor in wartime in clearing obstacles and road blocks usually covered by small arms fire, the armor kit is also being considered for such peacetime uses as ammunition dump or oil well fire-fighting and other hazardous work where the operator's life would be endangered.

Weight of the armored tractor is approximately 49,000 pounds, but maintenance is only slightly more difficult than on a standard tractor except for major overhauls.

In the interest of economy, the armored tractors may replace the tank dozers in some tasks since the armored crawler tractor can be purchased for approximately one-fifth of the cost of a tank dozer.

Army Ram Jet Helicopters Delivered for Testing at Fort Rucker

Department of the Army recently announced the first deliveries of the Army's YH32 Ram Jet helicopter to the Army Aviation Test Board, Fort Rucker, Alabama.

The YH32 is a two-place, two-blade single main rotor helicopter, powered by two Ram Jet engines developing approximately 40 pounds of thrust each. The engines weigh 12 pounds each, have no moving parts, and are CAA certified.

Flight controls consist of a conventional cyclic stick control, collective pitch lever and directional control pedals. The latter control the pitch of the single-blade, counter-balanced tail rotor.

The main rotor assembly is driven by a Ram Jet engine mounted on the tip of each of the two main rotor blades which are connected to the rotor hub.

The tail rotor and accessories are driven from the power take-off of the main rotor column.

Air frame construction is basically a welded tube frame on which an accessory mounting beam is attached to provide fittings and brackets for mounting the fiberglass cloth tail boom structure, fiberglass enclosure, fairing and plexiglass forward windshield.

Alighting gear consists of aluminum alloy tubular skids connected to spring steel tubular cross members.

High fuel consumption of Ram Jet engines limits the YH32 to short range operation. Flight endurance without refueling is approximately one-half hour.

The value of the YH32 rests in its use as a test vehicle for proving new design concepts.



U. S. Army

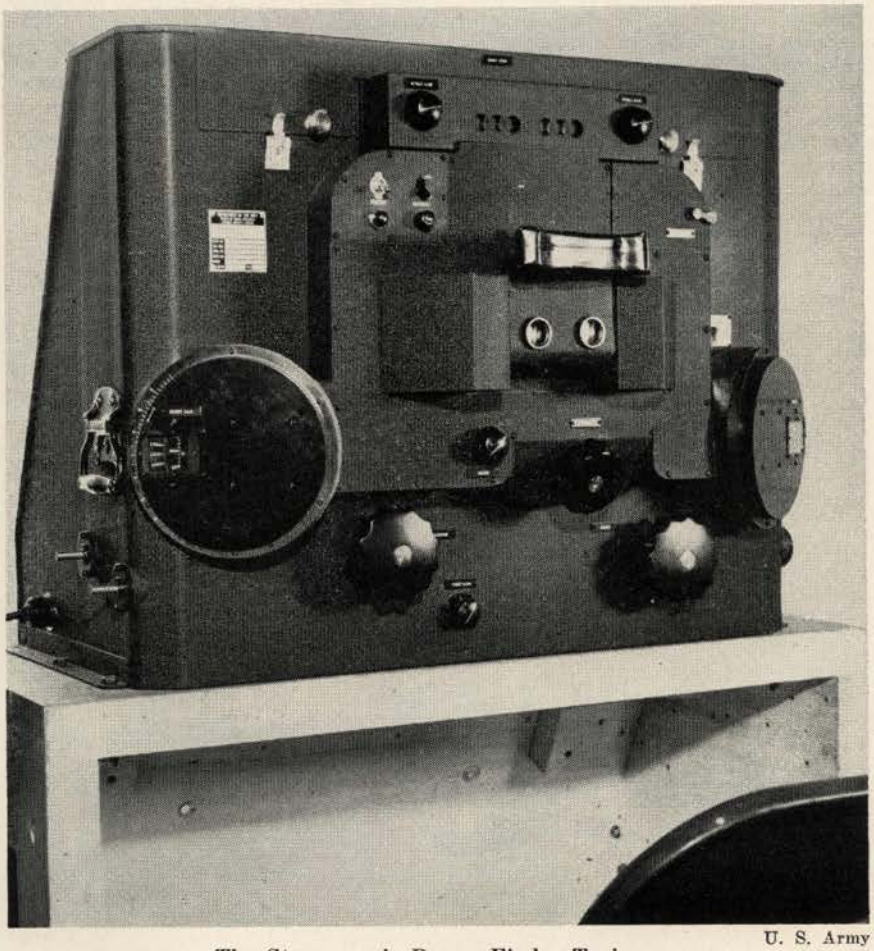
The Army's YH32 Ram Jet helicopter undergoing field evaluation tests.

news from THE ARMOR SCHOOL

Stereoscopic Range Finder Training

General

The main objective of all tank gunnery instruction is directed toward obtaining a fast first-round kill. The greatest deterrent to a rapid first-round kill in the past has been determination of the correct range to the target. That we now have the key to accurate range finder training is of prime importance to enable the tank crew to meet the desired standard of determining the correct range within five seconds. This goal, high as it is, can be achieved by the simultaneous development of speed and accuracy through constant and continuous ranging practice.



U. S. Army

The Stereoscopic Range Finder Trainer.

Training of the Range Finder Operator

The first step in training an operator is to determine his initial internal correction system (ICS) setting. To accomplish this, the operator must practice ranging until his range spread is not more than 200 yards. (Spread is the difference between highest and lowest readings.) Next set up a well defined target at 1500 yards and set 1500 yards on the range scale, then have the operator rotate the ICS knob until the lower vertical bar appears to be at the same range as the target and record the ICS scale reading. This process must be repeated for at least ten readings. The average of these ICS readings is the initial ICS setting for that range finder and operator. The operator now practices ranging on target with his initial setting set into the instrument. He should now be ranging closer to the target and reducing his spread.

Corrected ICS

After the operator has reduced his spread to a maximum of 100 yards, he is ready for the second step, the determination of a corrected ICS setting. To determine the corrected ICS setting, take a representative block of rangings made on targets at 1500 yards from the operator's ranging sheets. Determine the difference between the known range (1500 yards) and the average range readings; this is called range bias. If the average range reading is short of the target range, the range bias is minus and ICS units must be added to the initial ICS setting. For a plus bias

(when his range is beyond the target), the operator subtracts ICS units from his setting.

Example:

An operator using the M13 range finder has an initial ICS setting of 20. A representative block of rangings made on a 1500-yard target is obtained. The records show the following block of figures:

1440
1450
1460
1440
1460
1450
1460
1440
1440
1460

10)14500(1450 = average range reading.

The difference between average range reading (1450 yards) and the known range (1500 yards) is 50 yards, and is known as a minus range bias.

Using the ICS correction chart for 1500 yards, go down the left hand column to 50, then look across to the right hand column to the type of range finder being used and find the number of ICS units which must be added or subtracted from the operator's initial ICS setting of 20. In this case, the range bias is 50 minus; therefore, 8 ICS units must be added to the setting of 20, giving the operator a corrected ICS of 28.

ICS CORRECTION CHART

Yards Error	*ICS Units*	
Plus or Minus	*M12*	*M13*
10	1	2
20	2	3
30	3	5
40	4	6
50	5	8

FINAL ICS SETTING

The most ideal range for determining ICS settings is 1500 yards; however, the same setting does not hold true at all ranges; for example, if an operator has refined his setting to the point when he is making correct rangings at 1500 yards, he should be over-ranging by about 50 yards on a 2000 yard target. In order to counteract this error, a *final* ICS setting can be established by subtracting 4 ICS

THE ARMOR SCHOOL HONOR GRADUATES

The following students received top scholastic honors of their classes (listed in order of rank in the class):

Associate Armor Officer Advanced Course Class Nr. 3

Capt. William L. Yost, 1242d SU NY ARES ADGRU, New York, NY; 1st Lt. William W. Fulmer, 749th Tk Bn, Ill Mil Dist, Chicago, Ill; 1st Lt. Alton H. Harvey Jr., Hq 3d Bn, 108th Armd Cav Regt, MISS NG, Summit, Miss.

Associate Armor Officer Advanced Course Nr. 1

Capt. James F. Battin II, Hq, Hq & Svc Co, 111th Recon Bn, Calif NG, Inglewood, Calif; Capt. Earl W. Hicks, State Hq Hq Det, Tenn NG, Nashville, Tenn; Lt. Col. Nelson A. Meredith, Hq 243d Tk Bn, Ky NG, Bowling Green, Ky.

Associate Armor Company Officer Course Class Nr. 3

1st Lt. Edward J. Hendirckx, 3d Inf Div, Ft Benning, Ga.; Capt. Carl W. Ayers, OS Repl Sta, 1264th SU Pers Cen, Ft Dix, NJ; Capt. Gilbert L. Winders Jr., Hq 30th Recon Co, NC NG, Sanford, NC.

Armor Officer Basic Course Class Nr. 10

1st Lt. Norman E. Ward, Jr., 2d Armd Cav Regt, Ft George G. Meade, Md.; 2d Lt. Macon M. Pettyjohn, Jr., 11th Armd Cav Regt, Ft. Knox, Ky; 2d Lt. John M. Crowe, Jr., 4th Armd Div, Ft Hood, Texas; 2d Lt. Donald C. Lindquist, Military Stakes Winner.

Armor Officer Basic Course Class Nr. 1

2d Lt. William S. DeCamp, 5th Inf Div, Ft Ord, Calif; 2d Lt. Gary D. Vance, OS Repl Sta, Pers Cen (1264) Ft Dix, NJ; 2d Lt. Dan L. Drury, 1st Armd Div, Ft Polk, La.

Armor Advanced NCO Class Course Nr. 1

Sfc Henry E. Harris, 710th Tk Bn, Ft Stewart, Ga.; M/Sgt Robert E. Spencer, 37th Tk Bn, 4th Armd Div, Ft Hood, Texas; Sgt James C. Ligon, 710th Tk Bn, Ft Stewart, Ga.

Armor Communications Officer Course Class Nr. 1

1st Lt. Francis E. Cutler, 1st Armd Div, Ft Polk, La.; 1st Lt. Andrew P. Lokie, Co B, 1st Bn, 11th Armd Cav, Ft Knox, Ky.; 1st Lt. Robert J. Washer, OS Repl Sta (1264) Ft Dix, NJ.

Armor Track Vehicle Maintenance Course Class Nr. 2

Pvt. Herbert H. Sizemore, 51th Armd Inf Bn, 4th Armd Div, Ft Hood, Texas; Sp 3 Michael R. Shippen, 35th Tk Bn, 4th AD Ft Hood, Texas; Pvt. Lawrence P. Pfeifer, 109 Tk Co, Ft Sill, Okla.

Armor Track Vehicle Maintenance Course Class Nr. 3

SFC Allen A. Baese, Co H, 163 ACR, Montana NG, Miles City, Montana; Pvt. Walter N. Garbers, B Batry, 276th Armd FA BN, Ft Knox, Ky; Pvt. Terry J. Cotter, 5th Repl Co, Ft Ord, Calif.

Armor Track Vehicle Maintenance Course Class Nr. 4

SFC John D. Larsen, Hq Co 2d Bn, 116th Armd Cav, Idaho NG, Pocatello, Idaho; SFC Vern L. Clopton, H Co 1st Bn, 116th Armd Cav, Idaho NG, Payette, Idaho; Pvt. Larry L. Leonard, 13th Tk Bn, 1st Armd Div, Ft Polk, La.

Armor Track Vehicle Maintenance Course Class Nr. 5

M/Sgt Richard A. Guinn, H&S Co, 113th Tk Bn, New Jersey NG, Dover, NJ; M/Sgt Fred Iaia, HQ & HQ SVC Co, 111th Recon Bn, Calif NG, Inglewood, Calif.; SFC Charley Treat, Co B 700th Ord Bn, Okla NG, Norman, Oklahoma.

Armor Radio Maintenance Course Class Nr. 1

Sp3 Charles L. Gallup, Hq Co 2d Bn, 163d ACR, Montana NG, Boleman, Mont.; Sp3 John H. Killebrew, Co A, 154th AIB, Florida NG, Delano, Fla.; PFC David R. Robinson, H&S Co, 856th Tk Bn, Ft Knox, Ky.

Armor Radio Maintenance Course Class Nr. 2

Pvt. John A. Mitchener, 4th RCT, Ft Devens, Mass.; SFC Malcolm Smith, Co B, 131st Tk Bn (120mm Gun), Ala NG, Geneva, Ala.; Pvt. Hubert L. Arwood, 1st Armd Div, Ft Polk, La.

Armor Turret Maintenance Course Class Nr. 1

Pvt. Sidney E. Drake, Co C, 30th Tk Bn, Ft Knox, Ky; Sp2 Joseph R. Toomey, Hq & Svc Co, 126th Tk Bn, Mass NG, Ft Devens, Mass.; SFC Lilford S. Pierce, H&S Co, 113th Tk Bn, Dover, NJ.

units from his corrected setting for 1500 yards.

When an operator has obtained his *final ICS setting*, he is ready for testing. The number of rangings required to achieve this degree of proficiency varies with the ability of the individual. Some operators will attain this status after a few hundred rangings; however, 1200 to 1800 rangings with a stereo range finder before an accurate test of his ability can be made.

Tank Information You Can Use

The M41A1 Tank

To determine the latest authorized allowance of equipment, spare parts and tools for M41A1 tanks, secure a copy of the current ORD 7 SNL G251 dated June 1956. Each M41A1 tank should have one of the new manuals in it.

The M47 Tank

The current issue of ORD 7 SNL G262 for the M47 tank is dated June 1956.

The M48 Tank

Changes 1 and 2 to ORD 7 SNL G254 for the M48 type tanks have been issued. These changes considerably alter the authorized allowances of equipment, parts and tools for M48 tanks.

All Tanks

Technical Bulletin (TB) ORD 340, dated 26 March 1947, and Technical Bulletin (TB) ORD 469 dated 15 September 1952, specify the methods to be used when cleaning and servicing tank guns and bore evacuators.

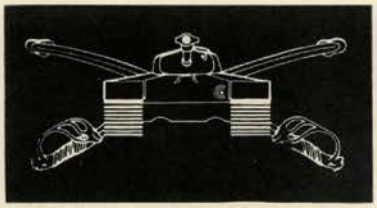
When tank guns are not fired for long periods of time, it is necessary to exercise, periodically, the recoil mechanisms to prevent damage to the mechanism when the gun is fired. Technical Bulletin (TB) Ordnance 303, dated April 1955, prescribes the frequency of, and the methods to be used when, exercising recoil systems.

KEY PERSONNEL CHANGES

Colonel W. E. Chandler was assigned as Director, Command & Staff Department, and Colonel A. L. West assumed duties as Deputy Director, Command & Staff Department.

Lieutenant Colonel Levin L. Lee has assumed his new duties as Chief, Monitoring and Doctrine Section, Command & Staff Department. Colonel Lee was formerly the Executive Officer, Command & Staff Department.

Lieutenant Colonel David B. Savage has been assigned and assumed duties as Executive, Command & Staff, and Major Charles J. Truman assumed duties as Operations Officer, Command & Staff.

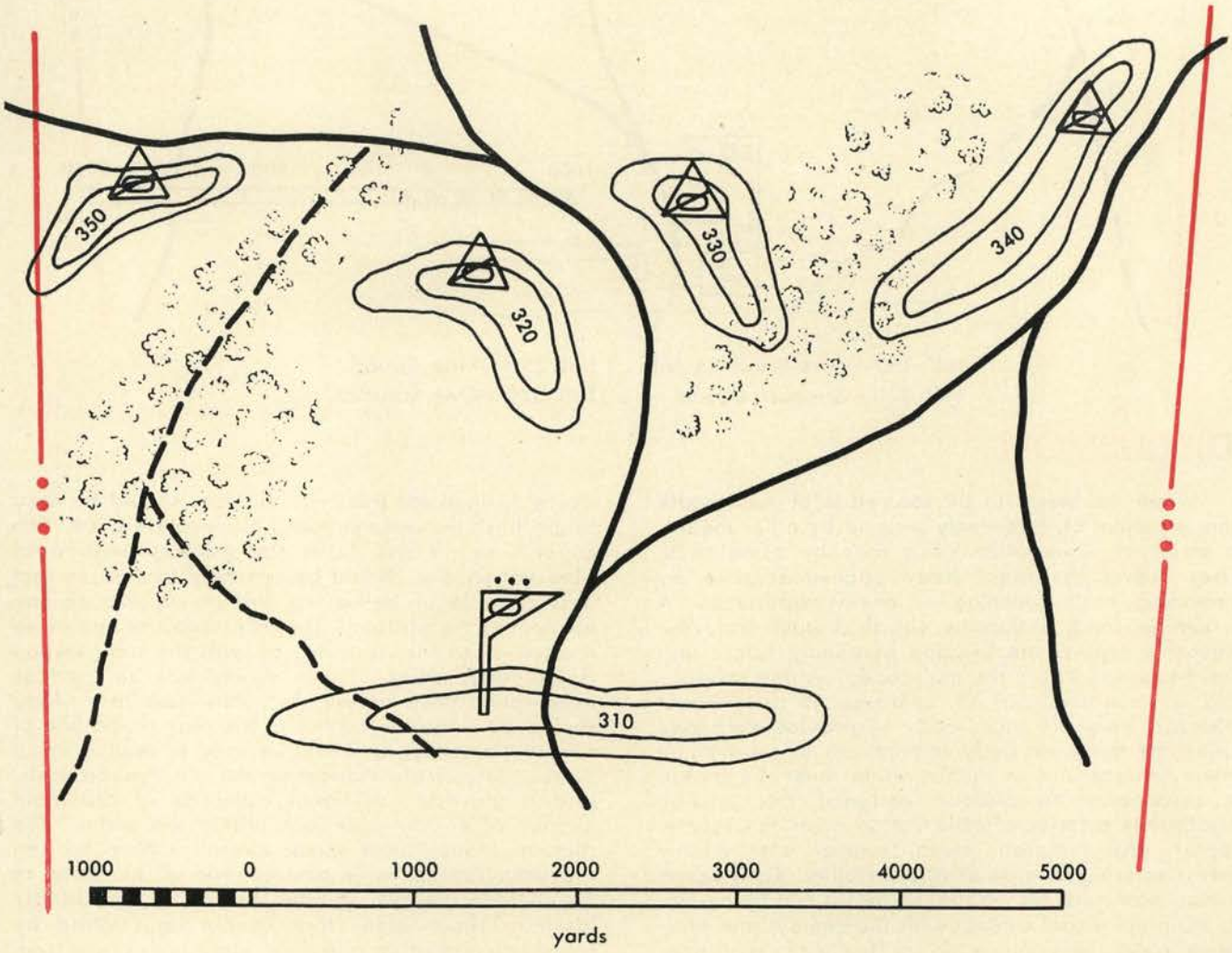


HOW WOULD YOU DO IT?

AN ARMOR SCHOOL PRESENTATION

SITUATION

You are a reconnaissance platoon leader. You have been assigned a mission of screening within your assigned sector (see sketch). You know that in performing this mission you must observe, report, and maintain visual contact with any enemy force that enters your area of responsibility. In order to accomplish this mission, you must ensure that the entire sector is covered by observation posts with overlapping fields of observation. As a result of your map study and personal reconnaissance, you decide to establish four observation posts and to locate your platoon command post in the vicinity of Hill 310 (see sketch).



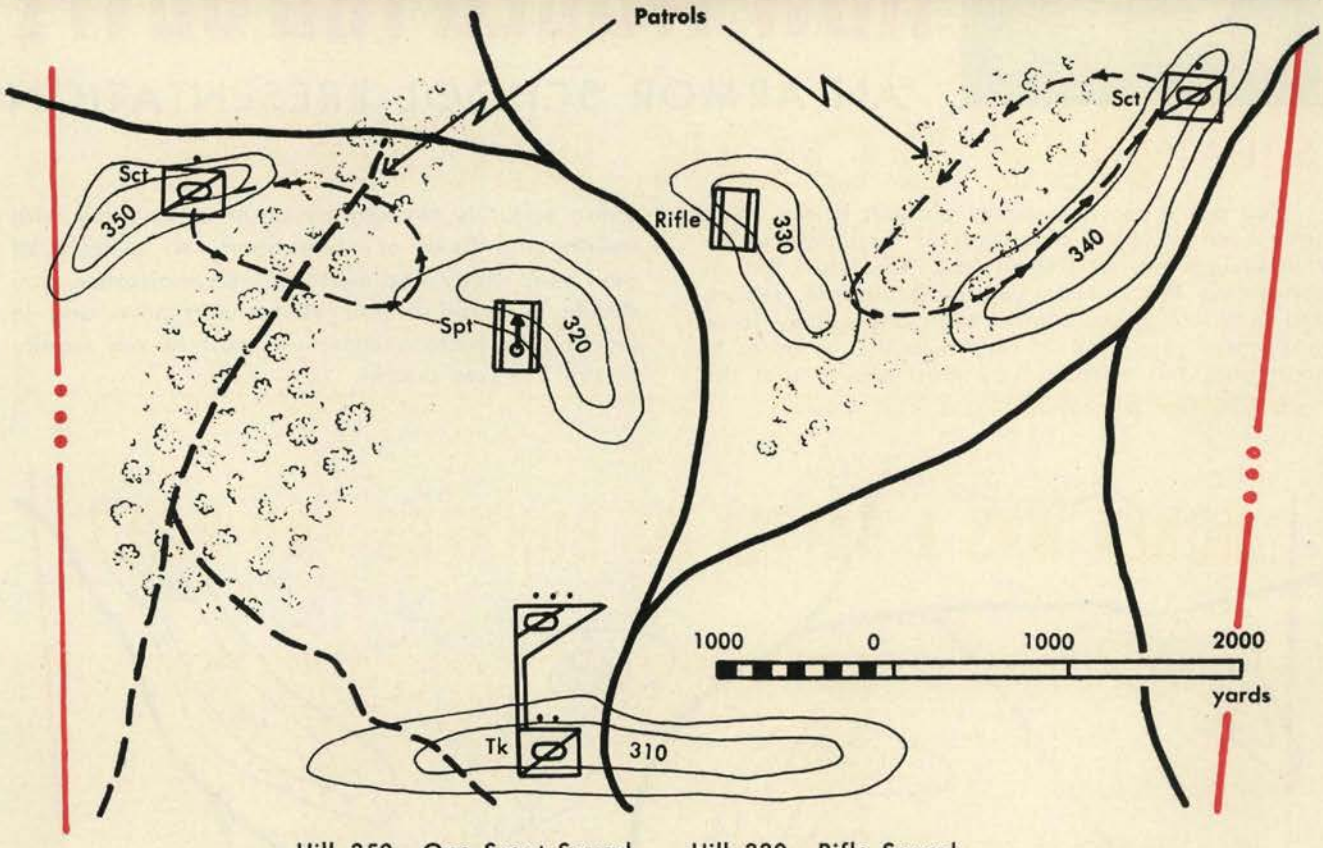
PROBLEM

How will you organize your platoon to establish and operate the observation posts?

AUTHOR: CAPT J W NIELSEN

ILLUSTRATED BY PVT R T C ALVERSON

SOLUTION



Hill 350—One Scout Squad
Hill 320—Support Squad
Hill 330—Rifle Squad
Hill 340—One Scout Squad

DISCUSSION

When the sector to be secured is of such width that it cannot be effectively secured by other means, a series of observation posts may be established. They secure the main body against surprise by providing early warning of enemy approach. A screening force maintains visual contact and continuously reports the location of enemy forces that constitute a threat to the main body. A unit conducting a screening mission operates at a sufficient distance from the main body to provide time and space for the main body commander to react to an enemy threat and to maneuver to meet the threat. A reconnaissance platoon assigned this mission establishes a series of observation posts to observe, report, and maintain visual contact with enemy forces entering its area of responsibility. Each observation post must be mobile, so that it can maneuver to maintain visual contact with the enemy, and must have radio communication to facilitate reporting. The platoon will not actively engage large enemy formations, but will call for and adjust available supporting fires. The platoon may report and destroy small enemy patrols, or may let such patrols penetrate the screen if directed to do so by higher headquarters.

In this situation, the scout section, which is specifically trained for this type mission, should be used to establish the most exposed observation posts. The support squad will have the primary mission of observation, but should be centrally located so that it is capable of delivering fire in support of any element of the platoon. The rifle squad should be so located as to facilitate its use with the tank section if the need arises. Tanks should not be used as observation posts unless absolutely necessary. They should be centrally located in the rear of the line of observation posts, and will be used to destroy small patrols, to assist in extricating the observation posts, and to provide additional coverage of the main avenue of enemy approach within the sector. The platoon leader must place himself where he can maintain contact with and control all elements of the platoon. In this situation he should be centrally located. Those areas that cannot be covered by observation must be patrolled; mounted patrols from the scout section or dismounted patrols from the scout section and rifle squad should be used for this purpose. Area surveillance by Army aircraft organic to the reconnaissance battalion and the armored cavalry regiment should be requested to extend observation and to provide early warning of enemy approach.

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U. S. Army

Feature Reviews Exclusive with ***ARMOR***



U. S. Army

THE AUTHOR

S. L. A. Marshall was the Chief Historian, European Theater of Operations during World War II. He is employed as the Military Editor for the Detroit *News*. During the hostilities in Korea he was Infantry Operations Analyst for the Eighth Army. He is the author of *Bastogne, Men Against Fire, The River and the Gauntlet,* and is famous for his analytical studies of combat.

PORK CHOP HILL: The American Fighting Man in Action, Korea, Spring, 1953—By S. L. A. Marshall. Published by William Morrow & Co., Inc., New York, $5.00.

Reviewed by

MAJOR RUSSELL A. GUGELER

AS the very antithesis of moderation, war comes only after the failure of moderation in the councils and endeavors of men. The very essence of war is violence and since violence is immoderate, the concept of waging war moderately is ridiculous. In his latest and most vivid book, *Pork Chop Hill,* S. L. A. Marshall describes what happens when an Army is given a mission of fighting a war with moderation—a vaguely defined mission somewhere between victory and defeat. The author does not interrupt his fast moving story to emphasize this point, but the bitter facts make it obvious that if a commander hesitates whether to hold or not to hold a hill—in this case Pork Chop Hill—the infantrymen responsible for carrying out the mission will be stricken with the same debilitating agony of indecision. Military leaders who are directed to engage the same enemy simultaneously on the battlefield and at the conference table are apt to find their soldiers to be relying upon the conference discussions rather than upon their own achievements on the battlefield. There is no intent here to question the principle of fighting to gain a limited objective. But the limits should be defined so precisely that soldiers and commanders in the combat zone are not left to struggle in uncertainty. For men in doubt can scarcely be effective either in planning or fighting a war. The victories go to men of sure intent.

A skillful journalist, a master of effective literary style, and a combat-experienced soldier who understands and respects fighting men, Marshall interweaves his talents to describe the ugly, brutal incidents of combat with detailed realism. Few, if any, authors who have undertaken to tell about combat have been as intimately acquainted with the conditions and combatants as Mr. Marshall is with the events he describes. Because of this, and his technique of retelling the experiences that were told to him, the reader often feels that he is watching the fighting from the trenches. By concentrating on the individual—nearly 300 of them are mentioned by name—the author never gets far enough away from the soldier to see the entire battle. In fact, so many soldiers enter the trenches that even the careful reader is apt to find it difficult to maintain the identity of each. Nevertheless, the story of men in combat, as told by Mr. Marshall, is a fascinating one that any experienced infantryman will recognize for its genuineness.

But then Marshall is an old hand at describing infantrymen in action. During the Pacific Campaigns of World War II he originated the technique of interviewing soldiers immediately after they came out of a combat action. From thousands of little facts and details, often confusing and meaningless by themselves, Marshall pieced together an understandable and often surprising picture of what had occurred. Since the nature of modern war demands dispersion of the participants, the infantryman, isolated in his own world, is often the loneliest of men. As Marshall questioned them, the soldiers were as interested and often as amazed as he or their commanders to learn what had happened to other members of their unit during an engagement. To the great benefit of the U. S. Armed Forces, Marshall carried his technique and skill of asking questions to Europe in 1944 and to Korea in 1951. It is a job he likes, and when he returned to Korea as a newspaper correspondent in the Spring of 1953, it was inevitable that he would soon end up on the reverse slope of a hill talking with a platoon of infantrymen.

By his penetrating examination of squad action, Marshall has learned a great deal about ground fighting,

THE REVIEWER

Major Russell A. Gugeler served in the Pacific during World War II. He was author, with three other writers, of *Okinawa, the Last Battle.* In 1951, he was assigned to Korea to gather information which resulted in the publication of *Combat Actions in Korea,* of which he was the sole author. He is presently en route from the Historical Division, USAREUR to The Artillery School.



Wilhelm Bauer

fundamental facts affecting the success or failure, life or death in combat that no serious-minded soldier can afford to overlook. This applies not only to front-line soldiers. Let signalmen read this book and add up the lives that were lost because the radios would not "cut through" when men desperately needed help or information. (Communication was the first casualty in every action but one.) Let staff officers at all levels read this book and be reminded how easily soldiers can misinterpret indefinite instructions; let them add up the casualties that were a direct result of someone's failure to complete a plan or to transmit information urgently needed by someone else.

During the Spring of 1953, in the Panmunjom apple orchard, the Communists were still haggling with United Nations representatives over the terms of a cease-fire agreement the Communists themselves had suggested nearly two years before. The return of prisoners of war, known as Operation Little Switch, was in full swing at Freedom Village near Panmunjom. During those two years Eighth Army had fought a restricted, almost stationary war, prevented by diplomacy from advancing or withdrawing, from winning or losing.

Across the Peninsula, Eighth Army soldiers spent monotonous days and nights in the tedious task of watching the slopes and the valley between their line and the communist fortifications on the opposite ridges. Eighth Army's front consisted of a line of bunkers that had been built, remodeled and repaired during this period of immobility. Beyond the front lines, Eighth Army had an outer shell of platoon or company strength outposts that crowded up against the enemy's line. Beyond the outposts were listening posts—usually two riflemen with a telephone. After dark these men would take up their lonely posts and spend the night in still silence hoping to detect an enemy attack as it approached, sound the warning, and then duck back to rejoin their outfit and take part in the defense. By these means Eighth Army was prepared to cushion an enemy attack. It was a reversed type of defense in depth.

From the air, the sandbagged roofs and the telltale pattern of trenches between and around the bunkers made this defensive system a conspicuous and continuous target for an air attack. But in the Spring of 1953 American soldiers did not seriously expect an air attack. They expected only limited ground action—patrols and probing, both offensive and defensive. To the soldiers, the Korean war had become a dimmed and dulled on-again, off-again operation scheduled to continue only until the men in the apple orchard could decide on the conditions of the cease-fire agreement. The three days of fighting on Pork Chop Hill were a brief interruption in this normal pattern of warfare.

Pork Chop Hill was one of the outposts. Pork Chop leaned against "that loathsome hill, Old Baldy . . . scabrous after months of battle, a mountain looking like a refuse dump, more cheated by nature than abused by man." Old Baldy was in Chinese hands.

On the evening of 16 April 1953, an evening when "the Korean spring was at its best and the slopes of the battlement were fragrant from the profusion of wild plums and chindolea blossoms," two rifle platoons—76 men from Easy Company, 31st Infantry Regiment, 7th Infantry Division, defended Pork Chop Hill. Counting artillery, medical and engineer attachments, there were 96 men available to the company commander, Lt. Thomas Harrold. It was a pleasant evening, scarcely disturbed by the fact that the intelligence people had warned of an enemy attack that, according to newly captured prisoners, was scheduled for that night. Such warnings were fairly common, more frequent than the attacks.

That evening, during that quiet period of the day when the daylight turns into darkness, Harrold's men were finishing their supper. From the enemy side of the valley came the sound of faint chanting, music "with a mournful, muted quality as if it came from a well." One of the soldiers thought it sounded as if the Chi-

nese were gathering in the tunnels. The lieutenant asked what it meant. "They're prayer singing," said the interpreter. "I can't hear the words but I know the music. They're getting ready to die." Harrold said, "Maybe we ought to be singing, too." If an attack was in the making his men would be on their toes, for he had informed his chief subordinates of the G2 warning. He drew assurance from the fact that his men would not be victims of surprise.

As soon as darkness fell, 20 of Harrold's men slipped down the hill to man the listening posts; another five men left on patrol duty. That left 71 on the hill.

As Harrold later learned when Marshall questioned the men to reconstruct the events of the battle, the warning of an expected attack had not been properly passed on. Of Easy Company's survivors, only three had been warned.

Creeping out of the darkness, the Chinese destroyed the listening posts within the first minutes. Of 20 men, 13 died. Not one succeeded in returning to the company position, or even in getting a call back to warn the others. "Each of these incidents among the outguards was like a play within a play. It ran its course from beginning to end and did not alter or moderate the sequence of events affecting the company."

Some minutes later Chinese soldiers slid "like phantoms" into the trenches atop the hill. At the first grenade explosion, Harrold tried to contact his platoons only to discover all his communication lines broken. Separated from his command, he was reduced to the effectiveness of one soldier with a rifle. His platoons, "each fighting an isolated battle, had neither light nor guide, nor any exact knowledge of what was happening to any other element on the hill." He could only guess that his company was under attack and, on that hunch, fired a flare calling for artillery support.

Three hours later, when both friendly and enemy artillery slackened off, Harrold—playing the situation by ear—suspected that the lack of small-arms fire indicated that his company had been knocked out. Using the artillery observer's radio, he passed this on to battalion. For a guess, it was reasonably accurate; of his original 76 men, 39 were already dead, five were wounded, and most of the others were demoralized. As Marshall points out, this fighting force was whipped before it could make a start. This was the first act of the drama on Pork Chop Hill that became a tragedy of errors, confused with misconceptions and complicated by mistaken identities.

The regimental commander sent two platoons to reinforce Easy Company. But such was the laying and execution of plans to carry out this order that only 16 men followed an able and conscientious lieutenant to the fight. One platoon became lost in the night. The other, a platoon from Love Company, marched in column formation across the valley and up one of the fingers leading to Pork Chop. A hundred yards from the top, seven men were wounded by machine gun fire that the platoon leader attributed to "a nervous but friendly garrison." Believing that their task was the simple one of reinforcing, these men were expecting to find Americans, not Red Chinese, on the hill. They stood for several minutes facing uphill and, with only Chinese listening, they shouted "Cease fire! Cease fire!" After another attempt, and more casualties, the confused lieutenant ordered his men to fall back. When he re-formed his platoon at the bottom of the hill he discovered that somewhere along the approach march he "had lost three-quarters of his force without anyone saying boo."

For the second attempt to stabilize the situation on Pork Chop, two companies, King and Love, were ordered to launch a simultaneous predawn attack from opposite sides of the ridge. Because of its built-in risks, this plan demanded the greatest attention to detail and coordination. And yet, as the two companies marched off on different routes in the darkness, each had its own concept of the task ahead. It was as if the two companies were on separate missions. One of Love Company's platoons had just returned from Pork Chop, its men convinced that the Chinese dominated the hill; but when the other two platoons from the same company were briefed on the mission, they were not given this valuable information. The evidence was there, claims author Marshall. "But if there was due appreciation of it anywhere in



U. S. Army

Roofed with as many as ten layers of logs and dirt, the bunkers were impregnable to anything but a direct artillery hit or accurate toss of a hand grenade.

the command level, it was still not communicated to the riflemen who were expected to redress the balance."

The men from King Company were told that the Chinese occupied the hill and that Love Company was participating in the attack. Unaware, however, that some Americans might still be in possession of a few bunkers, they knew of no restrictions on firing. By contrast, the two Love Company platoons were prepared only for a reinforcing mission. Explained one sergeant, "We were told to assemble for a move to Pork Chop. We were not told we were to make an attack." Nor did anyone warn these men to watch out for King Company coming up on the opposite side.

So, besides having to face the inevitable difficulties that go with any night attack, these men were forced to fight in the darkness of ignorance. In the end, the fact that individual soldiers fought with courage and initiative was of little consequence. Nor was it surprising, under these circumstances, that a King Company sergeant and a survivor from the original Easy Company garrison should meet in one of the trenches, each with his arm raised ready to hurl a grenade at the other. Although bitter with irony, it is still not surprising that after King Company gained the crest, its attack along the ridge top was halted by two enterprising Love Company soldiers who, leveling a machine gun at that portion of the ridge King Company has just captured, fired until their ammunition was exhausted. "King's men tried to signal Love to shut it off, but the fire was too intense to stand against. It died only after Love had been bled into silence. By these stages, all group initiative became lost to the company. . . . The attack carried on only because a number of the more resolute individuals engaged in widely separated and almost unrelated actions."

Although the two companies suffered about 120 casualties—approximately half of their combined strength—in the attack and the fighting that continued into the daylight, these sacrifices did not bring victory. Reinforced Communists held more than half of the trench and bunker system, grinding up additional American forces during the day.

Late in the afternoon the 7th Division public information officer arrived at Pork Chop Hill's command post bunker. With two staff photographers in tow, he had come to take pictures of what he thought had been a successful American action. "Forget the pictures," the King Company commander told him. "I want you to carry a message to Battalion." He wrote out a brief request for assistance if he was to hold on. The PIO hurried down hill with the message.

In briefest form, this is Marshall's story of Pork Chop Hill. From beginning to end it reflects the changing conditions of combat—the tenseness, confusion, fear, humor, despair and fatigue that are part of an infantryman's lot. More than 500 men marched up hill, platoon by platoon, into the grinding mill. But after 16 hours of intermittent fighting, at the time the King Company commander sent back his plea for help, only 25 men were left to defend the hill. Some men had shirked the fight, some were too exhausted to continue, others had been withdrawn under orders, and, by Marshall's figures, more than 70 were dead and at least 180 were wounded.

To hold the hill, the Regiment would need help. This need for reinforcements from outside raised a basic—and amazingly simple—question: "Do you really want to hold Pork Chop?" The question was asked by Regiment of Division headquarters, which passed it on to Corps, then to Eighth Army, and finally to the Far East Command. It is not so much that the question should have been raised at all. It was a valid question that should have been settled before a single grenade fell on the hill. That the question should have been raised during the battle, and that it should pass along the entire chain of command was possible only in this type of war. It is probable that the question was on the minds of the infantrymen while engaged in the fighting, weakening their determination to win and their confidence in their leaders. The lesson we have to learn is that a soldier needs more than the best equipment and thorough training: If he is to win in battle without undue losses, he should never be deprived of the advantage that comes from knowing beyond a doubt that whatever he is doing is necessary.



U. S. Army

Men of the 7th Infantry Division loading wounded aboard an M75 Armored Personnel Carrier at check point behind Hill 200 during defense of Pork Chop Hill.

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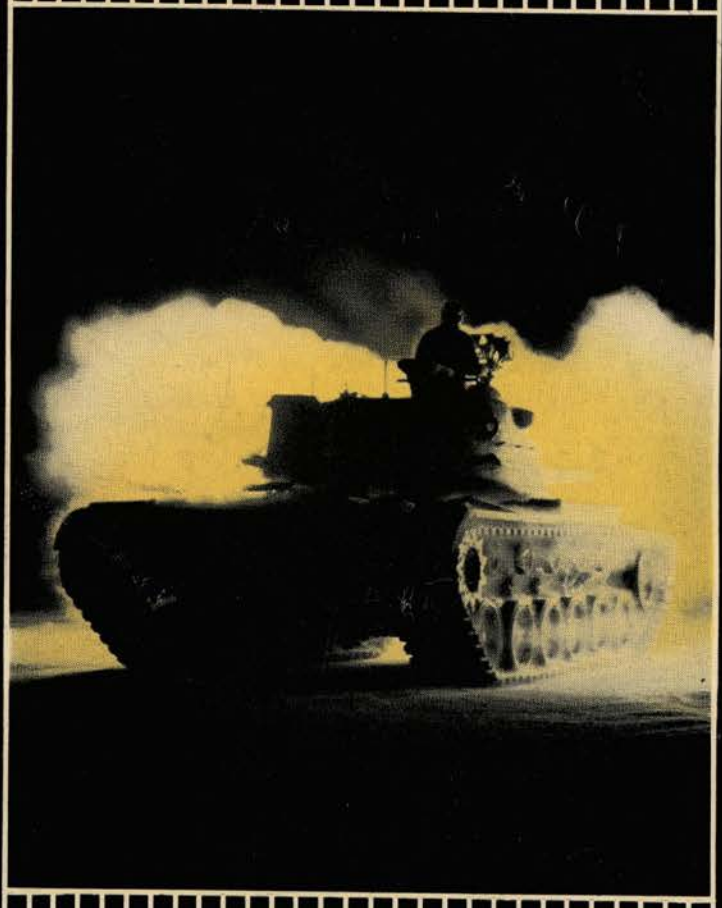
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RESEARCH AIDS NIGHT COMBAT

(See page 6)

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Tentative Agenda for the 68th Annual Meeting

THURSDAY 4 APRIL

0800-0930	Arrival and registration of visitors
0915-0945	Coffee and informal reception
0945-1100	Illustrative exercise, Armored Division in Mobile Defense, Gaffey Hall
1100-1300	Luncheon, Sadowski Field House
1300-1415	Within the Armored Division, Requirement for Protective Dispersion versus The Requirement for Massing to Accomplish Missions, Gaffey Hall
1415-1630	Forum

FRIDAY 5 APRIL

0815-0830	Honors at The U. S. Army Armor Center Headquarters
0830-0845	Assemble in Gaffey Hall for official opening of the conference
0845-0850	Introduction by Commanding General, The U. S. Army Armor Center, of The Commanding General, U. S. Second Army, and response
0850-0855	Welcome to Fort Knox and introduction of President, Armor Association, by Commanding General, The U. S. Army Armor Center
0855-1030	President, Armor Association, opens the meeting, discusses agenda and conducts the business meeting
1030-1045	Coffee, Library, Gaffey Hall
1100-1200	Address by main guest speaker, Sadowski Field House
1200-1330	Luncheon, Country Club
1330-1400	Move to demonstration site
1400-1615	Explanation and demonstration of new and developmental Army equipment
1900-2200	Reception and dinner, Sadowski Field House
2200	Conference conclusion

THE UNIFORM FOR THE CONFERENCE WILL BE PINKS AND GREENS



The United States Armor Association

Continuation of
The United States
Cavalry Association
(Established 1885)

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ARMOR

The Magazine of Mobile Warfare

Continuation of THE CAVALRY JOURNAL

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Volume LXVI MARCH-APRIL, 1957 No. 2

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ARMOR magazine is published under the auspices of the United States Armor Association, and is not an official publication. Contributions appearing herein do not necessarily reflect official thought or indorsement. Articles appearing in this publication represent the personal views of the author and are published to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of military affairs.

Publication and editorial offices: 1757 K Street, N.W., Washington 6, D. C.

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Second-class mail privileges authorized at Washington, D. C., additional entry at Richmond, Va. Terms: Domestic subscriptions, including APO's $4.75 per year. Foreign, including Canada & Pan America, $5.50 per year. All subscriptions payable in advance. Single copies, 85¢.

LETTERS TO THE EDITOR

On ROTC Awards

Dear Sir:

My reference is to the announcements in *ARMOR* Magazine's issues of May-June 1955 and May-June 1956 wherein outstanding Senior 1955 and 1956 cadets are designated by the Armor Association.

The author of the article decries the fact that institutions are giving up the Armor branch instruction and switching to General Military Science courses. He wonders why more institutions are not switching to Armor. (*Ouch—get off my toes*—ED.)

D/A policy is to convert as many institutions from branch training as possible. No institution will initiate branch training henceforth.

It is the opinion of the majority of educators that the GMS program is better for the schools. I think that it produces a better officer for the Army. Four years ago, this Senior unit produced Infantry Officers only. It is now a GMS unit. Last June nine of our graduates went to Armor.

When the Armor Association recognizes the GMS ROTC program for what it is, this unit would like to be the first to apply for the Outstanding Cadet award to be awarded to the top cadet in the class who chooses Armor as a branch, and is otherwise eligible.

LIEUT. COL. ROBERT F. GALER
Claremont Men's College
and Pomona College
Claremont, California

Dear Sir:

Having recently reported for duty here as the only Armor officer among the eight officers stationed at Providence College, Major Sharp's letter concerning ROTC awards and the editorial comment thereon in the July-August issue were most timely. His suggestions appear very sound. We must not neglect means to bring the Armor spirit to GMS cadets who have a choice of branches. In a sense, we Armor officers on duty with GMS units are recruiters and need the maximum support from our Association.

When the entire subject of awards by the Association to the GMS ROTC graduates who chose Armor has been resolved, I would appreciate having the details. In the meantime, can we count on the award of a one-year honorary membership to the top graduate going Armor from Providence College?

Thank you for your consideration of these requests and generally for keeping our branch Association and its fine magazine very much alive.

MAJOR O. W. MARTIN, JR.
Providence College
Providence 8, R. I.

• *If PMS&Ts of GMS institutions will request this office for a suitable award for the top graduate going ARMOR, we will send them a one-year honorary membership and a package of books to be presented to the honored recipients from their respective institutions.* ED.

History and Historians—No Slight Intended

Dear Sir:

Congratulations on the fine review by General James M. Gavin of *Men in Arms* in the November-December issue. But may I suggest that the review did a great injustice by ignoring Lynn Montross' popular volume *War Through the Ages?* General Gavin mentioned several old classics, plus Liddell Hart and Fuller, but implied that no other book in modern times had surveyed the whole history of war. Well, Montross has, and has done it very well.

HARRY C. THOMSON
Chief Historian
Office of the Chief of Ordnance
Washington 25, D. C.

Division Association Supports the Division

Dear Sir:

Enclosed herewith are applications with remittance for memberships in the U. S. Armor Association for:

SFC Charles L. Spencer, 35th Tank Battalion
Pvt Verlin E. Silvis, 22d Armored Field Artillery Battalion
Pvt R. R. Seibert, 553d Armored Infantry Battalion
Pvt Jerry L. McQueen, 197th Armored Field Artillery Battalion

Sgt Spencer has been awarded a membership in the U. S. Armor Association by the Active Division Group, Fourth Armored Division Association, as a reward for receiving the Leadership Trophy while attending the U. S. Army Armor School, Fort Knox, Kentucky.

Privates Verlin, Seibert and McQueen have been awarded memberships for being selected the outstanding Driver trainees upon completion of the Drivers' School conducted by the Fourth Armored Quartermaster Battalion.

BRIG. GEN. ROLAND H. DEL MAR
Assistant Division Commander
4th Armored Division
Fort Hood, Texas

Precision Drill

Dear Sir:

The article "The Army Takes It On The Chin," by First Lieutenant William V. Kennedy in the November-December issue of *ARMOR*, expressed, I am sure, the feelings of an untold number of his less articulate comrades in Armor.

Not long ago I participated in a regimental size review in which a company of French and a company of West German troops participated. There was no question in the minds of any of the observers, to whom I spoke afterward, that the Germans made by far the sharpest, most soldierly, and most impressive appearance of all. The French were well drilled, although not quite up to the German standard, while the Americans made a showing that could hardly have been considered creditable. This comparison of three armies was not made only by American witnesses, but by many German civilians as well. Their loud applause, arising whenever the German troops executed a precision maneuver, did little for the morale of those Americans who heard it. I do not mean to say that the American troops, with their bright scarves and shiny helmets, did not try to make a good appearance; they just did not know how. The spirit of close order drill had died

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Advertising: ARMOR is the professional magazine of the United States Armor Association; a nonprofit, noncommercial educational publication. We DO NOT accept paid advertising. Such advertising as does appear in ARMOR is carefully selected by the Editor and concerns only those items which may be considered an adjunct to a professional career.

Manuscripts: All content of Armor is contributed without pay by those interested in furthering the professional qualification of members of the Armed Services. All manuscripts should be addressed to the Editorial Office, 1757 K Street, N.W., Washington 6, D. C.

Change of Address: All changes of address should be sent to the Editorial Office in time to arrive at least weeks in advance of publication date of each issue, which is the 25th day of the even month of the year: *i.e.*, Dec. 25 for Jan-Feb issue, Feb 25 for the Mar-Apr issue, etc.

Rates: See bottom of contents page.

long before most of them had come in the army. The battalion mass formation found the individual swallowed up in the crowd where it seemed nobody could see him if he made a mistake anyway. Consequently, when the situation behooved the soldier to make a good impression for the sake of his own and his unit's pride, he found himself inadequately drilled and too poorly disciplined for the task.

Prior to adjutant's call, for the same review mentioned above, a visiting British officer was watching one of our battalions form. Once the formation was complete, the senior officer present permitted the troops to "smoke 'em if you've got 'em." Smoking in ranks! Our British ally was scandalized, and what excuse could his embarrassed American escort make?

I could cite other such incidents, but the point of all of them is this: If the Army is going to impress its allies, it must start with the pride and *esprit* of the individual. It must develop that spirit which shows itself on the parade field before the eye of even the most untrained of observers. The things mentioned by Lieutenant Kennedy would go far to build the American soldier in the eyes of the public, his allies and himself. I congratulate him on a fine article and hope that he will continue to write in support of a more glamorous army.

1st Lt. Thomas W. W. Atwood
Company D, 66th Tank Battalion
APO 34, New York, N. Y.

More on Public Relations

Dear Sir:

I was completely spellbound by Lieutenant Kennedy's article.

In 1948 I was a member of the First Cavalry's 302d Mechanized Cavalry Reconnaissance Troop and I remember the blow we felt when this Mechanized Cavalry Reconnaissance Troop became the 16th Reconnaissance Company. Shortly following this, we were robbed of our coveralls, tankers' jackets and finally our crash helmets, which are presently making a reappearance.

One of Armor's chief characteristics is shock action which commands elite personnel, so let's give them the title and clothing which they have more than earned and let all Armor minded men praise a fine officer for a wonderful article: "The Army Takes It On The Chin." The public absorbs what it sees, not what it is told.

Charles E. Ehredt
27th Reconnaissance Battalion
27th Armored Division
Buffalo, N. Y.

● *Please note Major Leach's article on page 54.* Ed.

Integrated Arms at Platoon Level

Dear Sir:

One of the points contained in Mr. Ogorkiewicz' article on armor in amphibious warfare, deserves, I think, following up a little more closely.

To state the case as simply as possible, the greater the range at which a weapon is to be used, the larger and heavier that weapon will be. At the same time its short range efficiency will be less, owing to the increased target presented, and the added difficulty of concealment.

As the smallest target possible is one man and his personal weapon, the man on foot should be supreme at short ranges. He cannot, however, even hope to compete with an automotive weapon in fire production.

Thus, the true answer to modern warfare and its problems must surely be an intimate partnership between the three basic elements: armored vehicles to produce direct fire, vehicles to produce indirect fire when required, and riflemen, whose inconspicuousness, combined with short range antitank capability, will have the old role of destroyers with a battle squadron, 40 years ago.

Since we must have the partnership, would it not be better to have it at a lower level; for example, a platoon consisting of a fire unit equipped with some type of self-propelled weapon, and two small rifle-scout sections? Alternately, a company of two tank platoons, two scout platoons, and a support platoon of S.P. heavy mortars and "Dart" launchers?

The present infantry combination, by which all the heavy fire-producing weapons, such as mortars, machine guns and rocket launchers, are nearly incapable of movement once under fire, is not doing the reputation of the infantry arm any good. Although these weapons can be relied on to provide long range overhead covering fire during an attack, and to do a great deal of damage in defense, they will be the first weapons to be lost in a retreat, and cannot maneuver in an attack to exploit an opportunity with accurate point-blank fire. A tank firing into a bunker from 50 yards will do more good than all the mortars and machine guns in the world, if they are 2000 yards off.

The French are already leading the way in the combination of arms at company level in their new light armor regiments. I think that it might well repay the army with the best equipped armor force in the West, and the largest infantry force, to investigate the idea.

Philip Barker
99 Brentford Road
Kings Heath
Birmingham 14, England

Unit Subscriptions

Dear Sir:

This letter suggests a method of gaining further support for our Association by encouraging unit fund subscriptions to *ARMOR*. This idea is not particularly new, and has been practiced to some degree in the past.

Many individual officers and noncommissioned officers of armored units and of units closely associated with or supporting armor are members of the U. S. Armor Association. As members, they are advancing professionally while supporting the Association which best represents their interests.

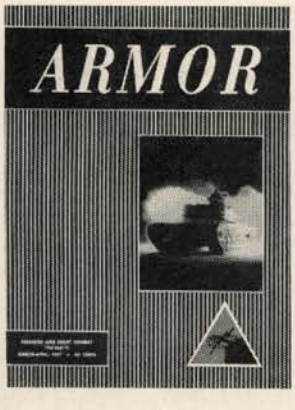
However, the interest in *ARMOR* Magazine and the Newsletter is not limited to officers and noncommissioned officers but extends to men of the lower pay grades, many of whom do not feel they can afford the cost of membership. All members of tank, armored infantry, armored artillery, armored engineer and other combat support and service units associated with armor should have access to *ARMOR* Magazine and the Newsletter.

A subscription to *ARMOR* is an authorized unit fund expenditure.

All companies and batteries of Armored Divisions, Armored Groups, Armored Cavalry Regiments, Tank Battalions and Tank and Reconnaissance Companies should have the magazine and its newsletter available in their day rooms. I recommend that commanders of all echelons endorse this policy.

Major Claude M. Adams
4th Armored Division
Fort Hood, Texas

● *Amen. $4.75 per year or $8.00 for two years.* Ed.



THE COVER

Regular readers of *ARMOR* will notice that we have used a wrap-around cover on this issue. On the front half we have used a U. S. Army photograph of a tank firing a night problem. As for the remainder of the cover—we have strayed a little from our normal design but we like it—hope you do too.

The Annual Report of the Secretary-Treasurer-Editor

To the Members of the United States Armor Association:

Submitted herewith is the report of the Secretary-Treasurer-Editor covering the general affairs of the U. S. Armor Association for the calendar year 1956.

The Association

The year 1956 continued to place emphasis on Armor within the military field. Commensurately the Association continued to prosper. The 67th Annual Meeting was held in the Spring. This was the first year that we were able to meet in the Spring, which was allowed by amending our Constitution at the previous annual meeting. Assembling at The U. S. Army Armor Center, Fort Knox, Kentucky on 26-27 April, the Secretary of the Army, the Honorable Wilber M. Brucker, honored us by delivering the principal address. General Williston B. Palmer, the Army Vice Chief of Staff, was re-elected to the Association's Presidency.

Total receipts for the year were more than $35,000.00 approximating the receipts for the previous year. At the last annual meeting, it was stated that receipts were slightly behind the previous three months period. However, as in the past, the annual meeting served as an impetus for a full year in the mobile field, to include its close associates, the Armor Association and the magazine *ARMOR*. The financial report is shown elsewhere on this page.

Individual membership continued to grow during the year. With the assistance of the secretaries of the various Armored Division Associations, an intensive promotional campaign was instituted during the early Fall. Complete results for this promotion are not yet available but it can be stated that the Association was brought to the attention of more than 15,000 present or former Armor-connected personnel during the year.

Two council meetings were held during the year. The first meeting of the newly elected council was convened at Fort Knox on the 27th of April. A proposal was made to increase the number of members on the Executive Council from 18 to 24. The Secretary was directed to prepare the amendment and hold it in abeyance until the next council meeting. Continuation of awards to ROTC graduates, to West Point graduates choosing Armor as their basic branch, and to OCS graduates commissioned in the mobile arm, was approved by the Executive Council at this time.

The second meeting was held on the 5th of December at Washington, D. C. A program committee was appointed to recommend the place, time and program for holding the 68th Annual Meeting during the first half of 1957. Major General John L. Ryan, Jr., Commanding General, The U. S. Army Armor Center, was appointed chairman of this committee. Other committee members appointed are: Major General L. L. Doan, Armor Section, CONARC; Major General Hamilton H. Howze, Aviation Section, DCS/OPS, Department of the Army; and Brigadier General Creighton W. Abrams, OCSA. A nominating committee, headed by Lieutenant General Willis D. Crittenberger, Retired, was appointed and directed to prepare a proposed slate of nominees to be presented to the membership at the next annual meeting. Other members are: Major General Donald W. McGowan, National Guard Bureau; Brigadier General Harry H. Semmes, USAR; and Brigadier General Frank H. Britton, Armor Branch, Career Management Division, The Adjutant General, D/A. An auditing committee was appointed to examine and audit the books for the calendar year 1956. Brigadier General Willard A. Holbrook, Retired, was appointed chairman of this committee. This committee was also directed to review this annual report of the Secretary-Treasurer-Editor prior to publication. Other committee members are: Brigadier General S. R. Hinds, Retired; Colonel J. D. Alger, DCS/Personnel; and Colonel Howard M. Snyder, Office of the Chief of Staff, D/A.

The Editor was given permission to deviate from the present editorial policy in order to generate publicity advocating a joint meeting of all Armored Division Associations in the Washington area in 1960. (See Reconnoitering, pages 40 and 41.) The Secretary was directed to poll the membership to increase the Executive Council from 18 to 24 members. The purpose of this increase is to allow greater representation by the membership. The council approved the sponsoring of an annual award to the honor graduate from the Armor Officers' Advance Class. This award will commence with the graduation of the present advance class.

The Council Advisory Boards have been particularly active in the Seventh Army in Europe, headed up by Lieutenant General Bruce C. Clarke, Commanding Gen-

FINANCIAL REPORT
of
THE UNITED STATES ARMOR ASSOCIATION
For the Year Ending 31 December 1956
CASH RECEIPTS & EXPENDITURES

Department	*Receipts*	*Expenditures*
ARMOR Magazine	$30,523.05	$19,278.40
Book Department	3,776.43	2,533.83
Income from Investments	468.20	
District of Columbia Sales Tax	2.89	2.99
D. C. Personal Property Tax		41.38
Postage	3.00	2,165.98
Office Supplies	7.44	284.44
Stationery & Printing		2,291.23
Telephone & Telegraph	2.25	399.27
Machinery & Equipment	40.35	114.10
Maintenance & Repairs of Equipment		10.50
Rent		2,420.00
Janitor Service		75.00
Travel Allowance		1,080.00
Travel Expense		8.55
Express Charges		21.77
Executive Council & Editorial Expense		212.18
Fire Insurance	16.45	5.45
Contributions	137.50	100.20
Royalty on Book	75.49	
Drayage		97.85
U. S. Savings Bonds Purchased		3,000.00
Miscellaneous		84.31
SUB-TOTALS	$35,053.05	$34,227.43
Cash Balance (1 January 1956)	3,097.45	
Cash Balance (31 December 1956)		3,923.07
GRAND TOTAL—CASH RECEIPTS & EXPENDITURES	$38,150.50	$38,150.50
NET WORTH—December 31, 1955		$19,008.34
NET WORTH—December 31, 1956		$22,198.49

eral, Seventh Army; and in the Eighth Army, headed up by General I. D. White, Commanding General, Eighth Army. In both Armies, emphasis was placed on supporting the Association by encouraging new members, unit subscriptions, and securing outstanding material for publication in the magazine.

The Association's office was moved immediately after the last annual meeting from 1727 to 1757 K Street, N.W., Washington 6, D. C.

After a two-year period—the Association's Executive Council had recommended some action in early 1955—the returning of the Draper Trophy as an Armor Leadership Award bore fruit. The 2d Armored Division, which had been designated by CONARC to conduct the tank platoon tests for 1957, completed the testing this past December, and the first awards were given prior to the end of the year. (See the Draper Trophy story commencing on page 30.)

The initial issue of membership cards was made during the year. This is a yearly custom now. Membership cards are renewed with payment of membership dues.

The Magazine

Five issues of the magazine contained 64 pages and one issue 72 pages during the year 1956. Groundwork for commencing a Newsletter to be published during the interim months between publication dates of *ARMOR* was laid. The Newsletter is to start during the year 1957. The first letter was published in January. Material from the U. S. Army Armor Center, Armored units, Department of the Army news releases and Armor Association news notes will make up its context. Articles from Armored Division Associations and other items of general interest are more than welcome. The Newsletter is intended for all individual members and U. S. Armed Forces unit subscribers only. The cost is included with membership dues or unit subscription rates which remain at $8.00 for two years or $4.75 for one year.

The editorial policy continued its professional military theme of emphasizing mobile warfare, leadership, training, military history and related subjects.

The Book Department

Book Department receipts for 1956 approximated the receipts of the previous year. In addition to the gratis advertising of books considered worthy of being brought to the attention of our military professional members, book brochures were obtained from various publishers. These brochures were included with billings, membership expiration notices and other first class mail going to our members. These advertising pieces supported our endeavors to bring outstanding professional books to the attention of our readers. Among the best sellers for the year were: *Panzer Battles,* by von Mellenthin; *Portrait of Patton,* by Semmes; *Fatal Decisions,* by six former German Generals; *Military Customs and Traditions,* by Boatner; *Pork Chop Hill,* by Marshall; and *Preparation for Leadership in America,* by Robinett. Three books, released late in the year, which are still selling well, are: *Sound of the Guns,* by Downey; *Men in Arms,* by Preston, Wise and Werner; and *The Red Army,* by Liddell Hart, which is featured in a review in this issue by Lieutenant Colonel Robert B. Rigg. The Eighth Armored Division History, *In Tornado's Wake,* by Captain Leach, was also released late during this past year and is reviewed in this issue by Major General Ernest N. Harmon.

A booklet entitled *Tank Company Commander's Guide,* by Majors John K. Brier and Roy A. Moore, Jr. was taken on by consignment and had a very successful year since its release in the Spring of 1956.

ARMOR binders were a popular item during the past year. Holding a two-year supply of magazines, the constant turnover of this item leads us to believe that the magazine has a permanent worth as a reference source to our members, unit subscribers and enlisted men. It is well to emphasize at this time that books (over $5.00) are sold to our members and unit subscribers at a ten percent discount. We pay the postage when your check accompanies the order. The Association will use every effort to obtain any book you order provided it is printed in the United States.

Summary

This brief report of the Association's activities covering business operations during the calendar year 1956 convinces us that we are operating on a sound financial basis. The fact that we have been able to expand the pages of the magazine commencing with the November-December 1956 issue and, in addition, publish a Newsletter during the interim period without any additional charge to our members or unit subscribers, leads us to believe that the past year has been one of our most remunerative and the immediate future looks most favorable.

With many of our members and unit subscribers moving from station to station, either individually or with Gyroscoping units, we would like to take this opportunity to remind you to keep us informed of your whereabouts. In this way, we can better serve you and keep the magazine and the Newsletter coming your way. The cost of changing an address plate is infinitesimal in comparison with our not knowing where you are located.

The editorial material presented here in the magazine has been outstanding and we hope of great assistance to all our members, regardless of component, of the active establishment or a Reserve organization. The fact remains that this is a tribute to you who submit the written word, not for remuneration, but in order to disseminate professional knowledge to all concerned.

The long-term value of this material, in assisting the military professional, can again be attested to by the number of *ARMOR* binders we have sold during this past year.

It is hoped that each and every member will continue to submit this material for publication. As stated before, this Association is your Association and its value is in direct proportion to the efforts put into it by the members. This office is strictly the focal point for gathering material, ideas, etc., and publishing what we consider the best. Short news blurbs of general interest will be most welcome for the Newsletter.

Owing to various members' recommendations, we established the program of issuing membership cards. The Newsletter idea was the result of suggestions of a number of subscribers. Recommendations and constructive criticism are always welcome.



U. S. Army

RESEARCH AIDS NIGHT COMBAT

We need not dwell on the importance of night combat, or on why it should be studied. World War II and Korea, plus the current training emphasis on night operations, attest to its significance on the battlefield.

By ANDREW J. ECKLES, III, and LT. COL. WALLACE L. CLEMENT

WHEN your tank fires at its enemy counterpart at 2100 hours, range 800, with the target area illuminated by flares, what are your chances of a hit? Are they the same as they would be at 1000 hours at the same range on a bright clear day?

Armor Group of the Operations Research Office (ORO) is presently engaged in conducting a field experiment, Project ARNO (Armor in Night Operations), at Fort Stewart, Georgia, to attempt to shed some light quantitatively on questions like this.

We need not dwell on the importance of night combat, or on why it should be studied. World War II and Korea, plus the current training emphasis on night operations attest to its significance on the battlefield. And certainly, in the future, a marked advantage will accrue to the side which fights effectively around the clock.

To do this, however—to fight at night—we should know something about effectiveness of night versus daytime operations. The field experiment being conducted at Fort Stewart is merely the first step of the many that must be taken before definitive answers can be obtained relative to night combat.

A glance at *Figure 1* should illus-

MR. ANDREW J. ECKLES, III, received his Masters degree from the University of Louisville. Engaged in research work on Armor problems since 1952, he is currently study leader of Project ARNO and is a member of The Armor Group, ORO.

LIEUTENANT COLONEL WALLACE L. CLEMENT, Armor, a 1940 USMA graduate, served in Europe during World War II. After the War he served in The Armor School and with Armor in combat in Korea. He is the military advisor to ORO.

trate why the experiment is being conducted. The hit probability of a hypothetical tank gun as portrayed in firing tables is illustrated by curve A. The curve, of course, would be based on experimental data obtained on a firing range under daylight and otherwise normal conditions. The shaded area B is again hypothetical, and indicates an area in which a curve derived from nighttime firing conditions, and with some type of illumination, is probably contained. We intuitively would expect that we are less accurate at night, firing with battlefield illumination. The fact of the matter is that no data exist which would establish this curve—which would tell us how effective our tank gun is under varying light conditions.

The experiment is being conducted then to try to establish some of these curves and to indicate a method which can be used by others for collection of operational data. Since knowledge of weapon effectiveness under all conditions is the ultimate aim, more field experiments of this type will be required.

There are a variety of methods which are capable of giving us information (more or less accurate) concerning the nighttime capabilities of our weapons systems. (A weapons system, of course, includes the human element, and the conditions of use, as well as the hardware itself.) We can "game" or "play-out" on paper the expected performances using the manufacturer's specifications; we can use "guesstimates," *i.e.*, the judgments and opinions of persons who have undergone or experienced similar situations; we can conduct "laboratory-type" studies with selected crews, "ideal" conditions, and so forth (in order not to "bias" our results, either for or against the equipment being tested). However, the only accurate and valid manner of obtaining estimates of the performance characteristics of our weapons systems is to conduct actual measurements on the equipment performances under the situations in which it is most likely to be used in actual combat. The process of making such measurements under simulated "realistic" conditions is called field experimentation.

Now we might ask the question, "Just what is it about a field experiment which makes its results of more value (by being more accurate and more realistic) than either guesstimate, gaming, or laboratory-type tests?" Certainly it is the most difficult and expensive method of determining performance characteristics, but it possesses several characteristics which are lacking in the other techniques.

All experiments, of course, enable us to collect more meaningful data than opinion or experience because in an experiment known factors which might affect or bias the results are either controlled or allowed for by such methods as randomization, etc. This means that the resulting information is not dependent upon the prejudices of a particular person or group, but rather is an "objective" measure of performance.

A field experiment goes even further in an approach to realistic results since we measure the performance of our weapons systems under conditions which approach as closely as possible those in which that weapons system will be used in combat. This means, for example, that we do not use "expert" crews, but rather the type of crew which will use that equipment in combat. We do not set up "ideal" conditions, rather we try to simulate a realistic combat situation, including if possible, such intangible factors as "stress," "motivation," etc.

This then, is how ORO and Fort Stewart are jointly trying to measure the relative effectiveness of several types of equipment for night combat. And the results of these tests should provide us with the most accurate and valid measures of our night fighting capabilities presently available.

Normally, the conduct of a field experiment such as Project ARNO is a costly and difficult procedure. However, by establishing a close, mutually cooperative working relationship between ORO field research teams and the training officers at Fort Stewart, we are presently conducting field experiments in night fighting at relatively negligible cost, and with greatly enhanced training programs.

Prior to the conduct of Project ARNO, Fort Stewart was conducting, as part of its regularly scheduled advanced training program, a problem which involved a tank platoon in a night attack, using live ammunition. This problem was called

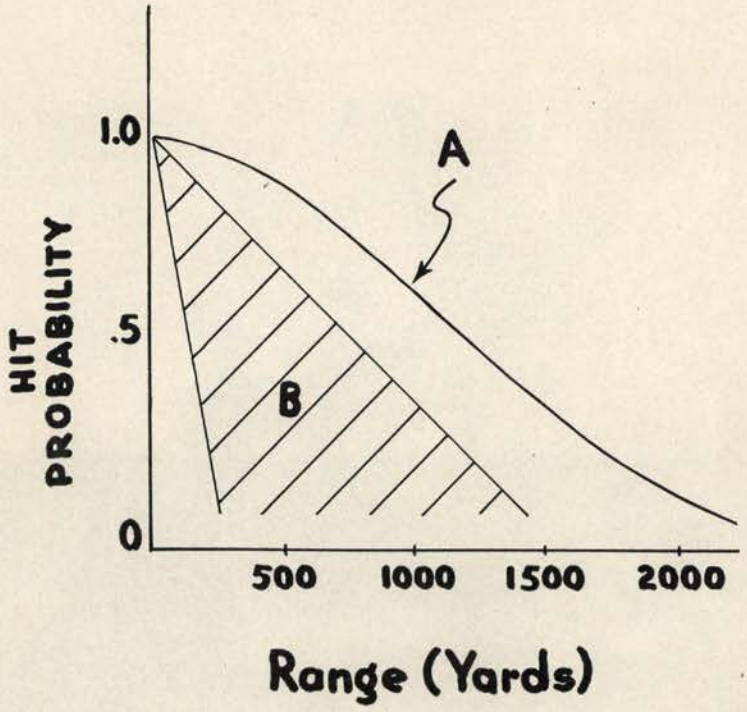


Figure 1.



U. S. Army

Platoon leader being assigned mission of taking an objective by night attack.

the T-2 exercise. Essentially this was a free-play exercise in which the platoon leader was assigned the mission of taking his objective by a night attack, when the objective was defended by enemy tanks and infantry. In this attack he was supported by a 60-inch searchlight. The enemy tanks were represented by the standard 6x6 panel targets, and the enemy infantry by the standard Type E targets. The attacking platoon would be notified by radio that they were under enemy fire at an appropriate time during their advance, and they would then undertake to fire upon the targets until all of their ammunition was expended.



U. S. Army

Shown here is a target designed and supplied by ORO to simulate enemy tanks.

It was the normal conduct of this T-2 exercise and the close cooperation by the officers and men of the 17th Armor Group and the 710th Tank Battalion which made it possible for the ORO field team to design and conduct the present research project in night fighting. On the part of Fort Stewart, they have permitted the use of their training program, with the necessary modification, to change the T-2 exercise into a veritable "laboratory-in-the-field." This has, of course, required additional effort from both the officers and supporting personnel, and a willingness to put up with the needs and desires of the scientists. But in return for these additional burdens, the scientists from ORO have added realism and meaningfulness to the training program.

For example, the Electronics Laboratory at ORO has designed and supplied a new type target to simulate the enemy tanks. These targets, rather than being simple, passive panels, initiate the engagement by simulating opening fire upon the attacking platoon. The targets then continue to "fire" upon the platoon being tested until they are hit by an AP round (small arms fire and small fragment hits have no effect). When finally hit by an AP round, the newly developed ORO targets stop firing, and burst into flames to simulate a burning enemy tank.

Throughout this rather realistic engagement, a team of scientists from ORO is busily collecting and recording appropriate data which will provide a measure of the platoon's effectiveness in night combat.

Over a period of several months, by testing a number of units equipped with a variety of night fighting equipment—such as tank mounted fighting lights, infra-red equipment, pyrotechnics, etc.—this joint ORO-Fort Stewart project will not only better prepare these units for night combat, but also provide us with the answers to a number of questions about our present capabilities for night operations. Questions such as the relative fire effectiveness of armored platoons when equipped with various types of equipment, hit probabilities, and rates of fire of our tanks under various

types of illumination, etc., will be at least partially answered by the first phases of Project ARNO.

But perhaps one of the most far reaching effects of Project ARNO will be that it demonstrates the feasibility of a closer cooperation between Army training programs and field research teams.

Of course, one of the primary objectives of ORO is to gather and analyze research data to better equip our Army in the future. In the ARNO experiment, not only is this data being gathered but more realistic and effective training is being equipped, as is attested to in Colonel O'Brien's article, which follows in this issue. And this technique of "SYMBION," developed and used in project ARNO, accomplishes both the ORO research and the Army training objective with a minimum of expense.

The type of research effort described above is part of the job of the Operations Research Office, The Johns Hopkins University. The Office, headed by Dr. Ellis A. Johnson, operates under contract with Department of the Army under general supervision of the Chief of Research and Development, Lieutenant General James M. Gavin.

Operations research has been defined in various ways, but a commonly accepted description is "the scientific analysis of problems involving any form of action in order to make that action more efficient." Using the scientific method, then, ORO undertakes studies of "military problems . . . of interest to the Army in order to provide responsible commanders and staff agencies with a basis for action to improve military operations." (AR 15-480)

Armor Group, a part of the Tactics Division of ORO, is conducting the experiment as a major part of its current work program.

In doing this type of work, close contact is maintained with CONARC, The U. S. Army Armor School and other interested agencies. This insures that timely results are made available to those primarily concerned during the course of the work—even prior to actual writeup of a final report. In addition, this close liaison insures a lateral flow of information at the working level, so necessary to successful conduct of research.



U. S. Army

ORO scientists collect data to measure effectiveness of platoon in night combat.

To summarize then, the joint ORO-Fort Stewart work effort on night fighting is designed to measure effectiveness of armor under varying conditions of illumination. A field experiment has been designed to measure results under realistic and economical conditions. Realism has been enhanced by use of special targets. Economy has been achieved by using an existing training program with modifications, insuring that both the training mission and the research mission can be accomplished.



U. S. Army

ORO scientists conduct continuing studies under various types of illumination.

The ORO at Fort Stewart

By COLONEL ROBERT E. O'BRIEN, JR.

WE of Fort Stewart are so enthusiastic about the work of the ORO in night firing techniques that we would like to add a few words of our own about the ORO Project ARNO.

First, it might be well to brief our readers regarding the armor training activities conducted here. Fort Stewart is the home of The United States Army Antiaircraft Artillery and Tank Training Center. Armor training was undertaken at this center in the spring of 1954, when it was realized that much of the 280,000 acres of this huge reservation was trafficable to tanks, and that the reservation could easily accommodate tank and AAA ranges without even interfering with each other. Since that time, United States Third Army has sent its armor units to Fort Stewart to fire tank gunnery qualification courses and to undergo a program of combat tactical firing exercises. Most tankers will agree that such exercises, combining tactics and combat firing, represent the ultimate in unit training short of combat. The training value is further enhanced by the fact that normally infantry and artillery are available for each tank battalion, permitting the all-important combined arms training. In addition to Third Army units, the Second Army has sent the tank elements of the 2d and 3d Armored Cavalry Regiments and the First Army has sent the tank company of the 4th RCT to train here.

At present the tactical program consists of the following six exercises:

1. Tank Platoon in Advance Guard
2. Tank Platoon in the Attack (Day)
3. Tank Platoon in the Attack (Night)
4. Tank Platoon Test
5. Tank Company in the Attack
6. Tank Company Test

The United States Army Antiaircraft Artillery and Tank Training Center is commanded by Brigadier General Paul R. Weyrauch, who believes that the Center offers bright opportunities for increased armor training activities, by reason of its favorable terrain and weather characteristics.

To return to the ORO, there is no doubt but that training here has benefited from their testing activities in connection with Project ARNO. Should anyone harbor the idea that the ORO is an ivory tower outfit engaged solely in an intellectual study of the military science, he would be surprised and no doubt pleased to see the ORO as we see them, working on the ranges alongside the tankers in a common effort to improve armor training. He would see a handful of men armed with the technical skill to set up a remarkably ingenious system of electronically controlled targets which can perform all sorts of effects to enhance realism. He would find a refreshing enthusiasm which infects all those who work with them.

It is this realism as provided by the ORO targets which has done so much to add to the training value of the night attack exercises. The ORO controller, as shown in the accompanying photograph, can take friendly tanks under fire with a gun flash at the tactically appropriate time, which starts the problem out in a realistic manner. He can then cause the target to burst into flames when hit, which of course completes the picture. All the while he records exactly which tank hit which target, and at what moment. When these results are brought out at the critique, the platoon taking the exercise has learned just how well they have performed and what they should do to improve their performance. The result is a first class, professional exercise.

The authors of the preceding article have twice made reference to the small amount of expense involved in the ORO project. It is true that the expense has been small as far as the ORO activities are concerned, but the exercises themselves are not inexpensive. We know that all armor training is expensive, and that Armor is an expensive arm, when considered in the absolute, without reference to its effectiveness. Costs for fuel, ammunition, tank maintenance and troop support are large for each problem. Such costs, of course, would occur with or without the ORO project, so it is an economy when the ORO can benefit from our normal training activities. It is significant, however, that the relatively small amount of costs incurred in the ARNO project have greatly increased the returns to the costs otherwise involved in the training program. Consequently, the money and effort expended by the ORO have been well rewarded.

COLONEL ROBERT E. O'BRIEN, JR., Armor, graduated from USMA in 1936. During World War II he served in Europe, commanding the 38th Cavalry Reconnaissance Squadron. Subsequent to the War he was assigned to AGF and the Department of the Army. After attending C&GSC he was the military attaché to Rumania. Returning Stateside he was assigned to The U. S. Army Armor Center, prior to his present assignment as G3, Fort Stewart, Georgia.



The French SS10 missile has a minimum range of 450 yards and a maximum range of 1650 yards, speed about 180 mph.

DANGEROUS BIRDS

By MAJOR CHARLES M. JONES, JR.

THE list of weapons which have been used to combat tanks is an impressive one. It includes so many—which individually work so well—that you can understand why we hear repeatedly that the day of the tank is over. Now the tank has a new personal enemy, the antitank guided missile, and again it is suggested that this may "drive the tank from the battlefield."

What are these birds, these antitank missiles? What can they do? Are they indeed "the answer" to the tank?

First—just what is the antitank missile? In simplest terms, it is a rocket, carrying a warhead, with fins or wings to keep it up and steer it. It has some sort of mechanism aboard that moves the fins in accord with commands from an operator guiding it into the target. More complicated versions are theoretically possible, but we will confine our discussion to this type of missile in this article.

It may be surprising to learn that the Germans had such a weapon 12 years ago, that in March 1945, they

PHOTO CREDIT

Pictures of the SS10 are French Army photos and were obtained through the courtesy of the French Military Mission, from its representative in Washington, D. C.

MAJOR CHARLES M. JONES, JR., Armor, a 1943 USMA graduate, served in Europe during World War II in the 2d Armored Division. Subsequent to the War he attended C&GSC and The Armor School. Receiving his Master's degree from Johns Hopkins University, he instructed at the Guided Missiles School, Fort Bliss, Texas. After a G3, D/A assignment, he went to his present position as Armor Advisor to the U.S. Military Mission, Colombia.

reportedly tested 100 with satisfactory results.[1] The war ended before they could be used in battle, although they had been placed in production. The German version had four wings with no tail fins. It carried a shaped charge as a warhead, and was propelled by a liquid rocket rather than the solid powder rocket we are accustomed to in the Bazooka.

To steer their missile, the Germans first tried a radio system, such as used by model aircraft fans every Sunday all over the U.S. to control their small planes. They finally settled on sending the signals by wire; wire laid by the missile as it flew. Note that the wire was not dragged by the missile, it flew off tightly wrapped bobbins in streamlined shells on two wingtips and settled to the ground. It was very light, very fine piano wire, hard to see once down. Wire was carried in various models for ranges reported from 1600 to 3800 yards.

In operation, the missile took off from a launcher that could be in defilade several hundred yards away from the soldier who was to steer it. At a speed of 420 to 525 feet per second (290-360 mph.) it flew towards the target. A tracer burned in its tail since apparently the rocket flames were not bright enough for control at long range. If the missile climbed above or moved to one side of the operator-target line, signals were sent to steer it back on course. And when it arrived at the end of the run, the seven-inch shaped charge could penetrate plenty of armor.

A description of the flight of such a wire-controlled missile was published some years ago:[2] "Through the telescope he (the operator) could observe the target and keep it centered on the cross hairs of the sight. The missile, fired approximately in the direction of the target, would appear initially in the field of view of the telescope and would be kept there by the gunner. By keeping the tail flare of the missile accurately on the intersection of the cross hairs in the sight, he would get a direct hit on the target."

The French Army in 1946 started development of their own antitank missile. The result, the SS10, was used in maneuvers in 1954 and is very similar to the earlier German models.

Combining data from two sources,[3] we obtain a picture of the French missile with a minimum range of 450 yards, a maximum range of 1660 yards and a speed of 250 feet per second (about 180 mph). It weighs about 33 pounds, less than the 44 reported as maximum in a German model. The wing span is under three feet, the length 30 inches and diameter about 4 inches. The warhead weighs 11 pounds and it takes 18 seconds to reach maximum range. The container used for transportation also serves as the launcher.

The French considered employing the SS10 at company level, with one or two jeeps for transportation. Batteries of six launchers were to be used. The French investigated the possibility of firings from vehicles or even helicopters. This latter is not too fantastic, as the Germans claimed successful flights with a six-foot wire-controlled missile designed for use from one aircraft against another. Carrying a 34 pound warhead, this missile had a range of from 2,000 to 3,000 yards.[4] The French are reported[5] to be testing their own aircraft for missile work, the *Potez* 75, a machine "which must be considered as an army missile launcher that flies." The crew consists of the pilot and the missile controller. While there is no positive indication, the missile carried could well be the SS10 or an improved model.

This brings commonly known development down to the U. S. entrant in the field, the Dart. The announced length is five feet; published photographs show four wings and four tail fins. No information is as yet available on the guidance system; hence we will confine our discussion to the wire-controlled type as used by the French and German Armies.

There are certain difficulties inherent when using this type of guidance. According to one source,[6] the operator has several dangers to watch. First, if he is at all sloppy in his control, or slow to react, the missile may hit the ground. Second, the fine wire may break, which again means a lost missile. This evidently is rare, since as noted earlier there is little or no tension on the wire. It settles to the ground and lies there. Over a deep ravine problems might arise, but tanks won't be attacking in such country. Third, the operator needs some time to get the missile on course and if tanks get in close, he has no such time. Here the attacking tanks must be covered by other weapons.

These troubles, however, will be gladly borne by one likely to face a tank attack, since he does gain a long range weapon of great destructive power. It has been stated that two or three weeks of operator training on



This view shows the French SS10 antitank missile fired from ground level.

the SS10 give an ability to obtain hits with 90 to 100 percent of missiles fired on the range. No electronic interference with the guidance is possible, unlike the situation presented if radio control is used. In mass production the weapon would be fairly reasonable in cost, though certainly more expensive than an unguided rocket or shell.

Now that we know a bit about the history of the antitank missile, and something about what it is, let us consider the important problem. Does this weapon mean the end of the tank on the battlefield? Or, on the other extreme, will it result in no modification at all in current tactical employment of tanks?



The French are testing the possibility of launching the SS10 from aircraft.

There are many weapons that can destroy tanks; in this the missile is not unique. But it does have one big inherent advantage over its chief rivals, the high velocity gun and the recoilless rifle. It has a significantly greater accurate range. The Germans worked at ranges up to almost 4,000 yards, a lot farther than the accepted effective range in antitank work for guns. Another advantage is the relative ease with which an operator can be concealed compared with a tank or recoilless gun, particularly when these weapons are firing.

To determine what this means to an attacking tank unit, we will make the assumptions listed below. You are free to challenge or change these in coming to your own conclusions.

1. The missile range and velocity are the maximum reported during German experiments, 3,800 yards and 525 feet per second. Velocity is constant.

2. All missiles function, there are no misfires or failures in flight.

3. The operators are well-trained, they hit 100 percent of the time.

4. An operator needs ten seconds to locate a new target, lay on it and fire.

5. Attacking tanks move at 15 mph until they are 1500 yards from the defender, then drop to 10 mph.

6. Terrain is open and flat, the operator always sees the attacking tanks.

7. Missiles are launched 200 yards behind the operator, who is on the front line.

8. Missiles are used until the tanks reach the 1000 yard line, where other weapons take over the defense.

With these assumptions, one missile operator can destroy about 19 tanks if he has the ammunition. If we allot two operators per front line company, or four per battalion, the attacking force will lose 76 tanks. Very impressive—four men will eliminate a battalion of attacking tanks before they arrive within a thousand yards.

But is this so? Let's make similar assumptions about the tanks that are supporting the defending infantry. Let one platoon be attached to the infantry, let it open fire at 1000 yards. Assume that the gunners need two rounds to destroy a tank, that it takes ten seconds to locate a target, lay on it and fire, and five seconds to get off the second round.

With our platoon of tanks, we can destroy about 60 enemy tanks, another battalion.

The limitations to the approach are obvious, a platoon could never destroy a battalion. The enemy shoots back, even tanks in hull defilade will be hit and destroyed. At times the enemy tanks are hidden by dust, smoke, terrain or obstacles. Smoke and dust raised by bursting artillery shells cover the defenders' position. Gunners are excited or scared, their percentage of hits drops off and more time is used in locating targets. Two tanks shoot at the same tank, or a knocked-out tank is hit again. All these factors cut down the effectiveness of the defense.

In like manner the effectiveness of the theoretical missile defense must be reduced. The operator, one of many rather than one of a few specialists, has a percentage of hits of 90 percent rather than 100 percent on the range. Under enemy artillery, mortar, tank and machine gun fire he drops to 75 percent hits of those tanks he tracks all the way. The smoke, dust, bushes, depressions or ravines between him and the target cause him to lose track of 25 percent of the tanks he picks. He must at all times be able to pick up his missile, track it or find a new target. Assume therefore that one of the four operators with the battalion is a casualty early in the fight, or that a control system is destroyed.

We will assume that there has been sufficient time to uncrate, assemble and check out enough missiles to knock out the 76 tanks. They are 200 yards back, out of sight. But not out of artillery or mortar range, and rela-

tively open since they must have space to take off. So, knock out ten percent with the heavy concentrations that will accompany the tank attack, concentrations so located as to cover all likely launching areas since the enemy knows we have these weapons.

And do all the missiles work? We have tried to treat them with care but they have been carried around in trucks, emplaced, not used and repacked in some cases. They are simple, but so are field phones or 90mm rounds and these do not always work. So, let us assume that three percent of the missiles fail—either they do not take off or they fail in flight.

Applying all of these reductions, the loss in tanks is still an impressive 29. Almost two companies gone before arriving at 1000 yards.

There are however two factors not yet considered. First, the terrain in Europe, the most likely theater for large scale tank operations, is rolling, cluttered with woods, villages and other obstacles. Positions with 4000 yard fields of fire are not to be found in every county. Next, the antitank missile is not a small article; remember the five-foot length of the Dart. Supply will be a problem—our gunners may not have 15 or 20 missiles at their launcher sites when or where they need them.

Nevertheless, the antitank missile is a serious threat that requires countermeasures. A loss of about 40% of the tank strength of a battalion to one weapon in one attack could not be accepted as a normal occurrence. What can be done?

First, advance by bounds from covered position to covered position when within missile range but still out of effective gun range. Even using the highest reported velocity for the missile as we have done, it still requires up to 20 seconds for the flight. If the operator loses the target at 15 seconds, the missile is lost. And the cover can be trees, bushes, or sheds. With a high velocity gun, a tank hiding behind a flimsy shelter can still be destroyed. But if a winged missile hits the same structure, it will not hurt the tank on the other side.

Second, move at high speeds when making the bounds. The less time exposed, the less chance of a hit. High angular velocities will increase the tracking problem for an operator on the flank.

Third, use smoke liberally when a missile attack is probable. The operator must see the target for extended periods to hit it. Night attacks are indicated.

Fourth, in planning the attack, use a line of departure near effective gun range that can be reached by covered routes. This, of course, is not new, but in the future it will be necessary to be more conscious of the shelter afforded from long range fire by the terrain, woods or villages in both the attack or exploitation.

Fifth, artillery and mortar concentrations should be placed on possible missile launching sites. In fast-moving situations there will be little time to dig-in either missiles or wires leading from the observer to the launcher. And even in well-prepared defenses, there still must be a large opening to allow the missile to take off. TAC air and Army air should also spot and attack missiles or operators.

Sixth, the provision of removable shields or skirts to protect tanks during attack would again be worth study. They need not cover the entire tank nor be extremely heavy. A metal or plastic screen of sufficient strength to detonate the shaped charge at a safe distance or to damage the comparatively frail missile wings or airframe would be sufficient. These would certainly be unhandy and require work to attach. If they cut losses by a significant percentage, they would be worth the effort.

Thus, with the intelligent use of terrain and movement, together with "countermissile" fire, it would appear that losses today could be reduced to an acceptable figure. Tanks will never be invulnerable, but then there is no perfect antitank weapon. Missiles, however, are dangerous and cannot be disregarded.

We have based this article on missile characteristics dating back ten years. Who knows what ranges or guidance systems will be used against tanks ten years from now.

Start thinking!



U. S. Army

The XSSM-A-23 Dart is the U. S. entrant in the antitank missile field.

[1]Montfort, M. N., "Antitank Guided Missiles," *Revue Militaire Suisse,* as translated by Lt. Col. P. Salvador E. in *Ejercito,* July 1956 (Madrid, Spain), P72.

[2]*Combat Forces Journal,* May 1951, page 38, "Little David—The Giant Killer" by Colonel Mobility.

[3]*Military Review,* Fort Leavenworth, October 1956, page 72 and data from reference 1 above first appeared in a study published in *L'Armée—La Nation,* Belgium, July 1955, by Lt. Col. Perret-Gentil.

[4]Data from reference (2) above.

[5]From a digest in the *Military Review,* October 1956, of an article by Captain M. S. Grewal in the *Military Digest* (India), October 1955.

[6]Montfort, op. cit.

The preceding article and this one are companion pieces on a common subject. The conclusions reached by the authors, although in slight variance, serve to emphasize the need to study the problem. However, it is still a truism that the best defense against a tank is another tank.

GUIDED MISSILE TANKS

By RICHARD M. OGORKIEWICZ

IT is a safe bet that the recent appearance of the Dart antitank guided missile will be taken by some as a sign that the days of the tank are numbered. If so, it will certainly not be the first time that the introduction of a new antitank weapon has been accompanied by gloomy forecasts about the tank's future. The 37mm antitank guns of the '30s, the "eighty-eight" of World War II, the bazooka and the recoilless rifles have all, in their time, been interpreted as spelling the doom of the tank.

Each time, however, the dismal prophets have been confounded and tanks, instead of disappearing, have gone on to score new successes. This is not surprising for the prophecies were based upon an overemphasis on armor protection and the erroneous conclusion that because armor could be penetrated by some new antitank weapon the tank was doomed.

More careful analysis would have shown, however, that tanks have never been invulnerable and that their basic characteristic is not armor protection but their ability to act as a mobile source of firepower. The latter is hardly affected by the appearance of one more or one less antitank weapon and the gloomy prophecies likely to be based on the ability of antitank guided missiles to penetrate armor need not unduly worry us.

We should, however, take further advantage of past experience and be prepared not only to counter any arguments against the tank based on the introduction of antitank guided missiles but to adopt a more positive course of action. To do this calls for a careful appraisal of the situation and constructive suggestions for the employment of guided missiles to improve still further the effectiveness of armored units. These conclusions should help to formulate future policy concerning armor and guided missiles and to avoid a lot of mental confusion, such as that which manifested itself on the introduction of recoilless guns.

The Missile

The first requirement in the assessment of guided missiles and armor is to be quite clear about the antitank guided missiles which have appeared so far. Basically they are rockets with shaped charge warheads which can be controlled in flight to achieve a very high degree of accuracy.

This combination of shaped charge with the high degree of accuracy at range, made possible by controlling and adjusting the flight path of the missile, is the significant feature of the antitank guided missile. Hitherto the two have been largely incompatible since, with an unguided missile, accuracy at any range requires high velocity which is neither desirable from the point of view of the shaped charge nor easy to achieve with most of the weapons with which the shaped charge is used. Thus, although the shaped charge antitank missile was most attractive from many points of view, its use has had to be limited to relatively short ranges. As a further consequence of this, high velocity guns relying on the kinetic energy of their projectiles for armor piercing performance continued to be used for medium and short ranges, in spite of their disadvantage of relatively heavy weight.

Now, however, the introduction of the guided missile extends considerably the possible application of shaped charge missiles and offers the possibility of a relatively light weight long range antitank weapon. The missile itself must still be fairly heavy to carry the necessary load of high explosive over the requisite distance but its launching equipment can be of the simplest and lightest form.

Information released about the French S.S.10 antitank guided missile and the U. S. Dart might clarify still further ideas concerning this type of weapon. The S.S.10 is a slow spinning shaped charge rocket controlled by electrical impulses sent through a single thin wire which is payed out by the rocket in flight. A visual command-post guidance system is used and the extreme range is about 1,600 yards. The shaped charge warhead contains 11 pounds of explosive and the total weight of the rocket is 33 pounds; the body of the rocket is about 30 inches long and the span over the cruciform type fins is approximately 37 inches.

The Dart, or XSSM-A-23, to give it its official designation, is a similar but larger wire controlled rocket. It has a body about 8 inches in diameter, is five feet long overall and has a wing span of three feet. As on the S.S.10, a visual command-post guidance system is used but the range is over 2,000 yards.

Both the Dart and the S.S.10 represent, of course, only some of the first attempts at antitank guided missiles. At the same time, however,

RICHARD M. OGORKIEWICZ, a frequent contributor to the pages of *ARMOR* Magazine, is employed as Development Engineer, Humber Ltd., Rootes (Automotive) Group, England.

there are already more than ten years of development behind this type of weapon.

Development of this type of short range, ground-to-ground guided missile actually started in 1944, in Germany, which seized the lead in the guided missile field during World War II. So much so that the Western Powers have so far produced few, if any, new ideas and nearly all current developments are based on earlier German projects. One of the latter was the X7, a slow-spinning wire-controlled antitank rocket which was about to go into production when Germany surrendered in May 1945.

Wire control was originally devised for the X4 air-to-air missile and it is of interest to note that wire control was also applied to the little Goliath remote controlled expendable tracked demolition carrier. Goliath and the B.IV radio controlled demolition carrier were frequently guided from either a Tiger heavy tank or a *sturmgeschutz,* or assault gun, and these two might, therefore, be regarded as the first guided weapon armored vehicles.

The surrender of Germany put a temporary stop to the development of the antitank guided missile of the X7 type. In 1946, however, the French took it up and during the last three or four years unveiled the S.S.-10 and several other short range ground-to-ground guided missiles, such as the S.S.11 and the *Entac.* The latter, incidentally, stands for *Engin Tactique Anti-Chars,* or tactical antitank weapon, just as the S.S. stands for *Sol-à-Sol,* or ground-to-ground.

More recently the development of the short range ground-to-ground antitank guided missile has been taken up in the United States, and in October 1956, the Dart, developed by the Aerophysics Development Corporation, was demonstrated at the Aberdeen Proving Ground. At the demonstration the missile launcher, sighting gear and associated equipment were mounted in an M59 Armored Personnel Carrier which thus became the first guided missile armored vehicle to be shown anywhere in the world.

With all the emphasis and all the resources which are being devoted currently to the guided missile field, further development is bound to be rapid and the antitank guided missile will, no doubt, establish itself quickly.



U. S. Army

The XSSM-A-23 Dart, ground-to-ground antitank missile fired from an M59 APC.

The Tank

With the antitank guided missile becoming an established fact the next question is that of its likely impact on future tank development, and Armor in general.

The ability of the antitank guided missile to penetrate the heaviest armor will certainly not render the tank obsolete. That much should be already clear. It would be idle to pretend, however, that the antitank guided missile will not demand a revision of some of the ideas about tank design.

For one thing, it will obviously rule out any ideas about a heavy type of tank based chiefly on armor protection. This type, best exemplified by the British infantry tanks of World War II, is already largely dead and there can be few regrets over it. It only fostered the delusion of invulnerability and centered an undue amount of attention on the passive attribute of protection to the detriment of both firepower and mobility.

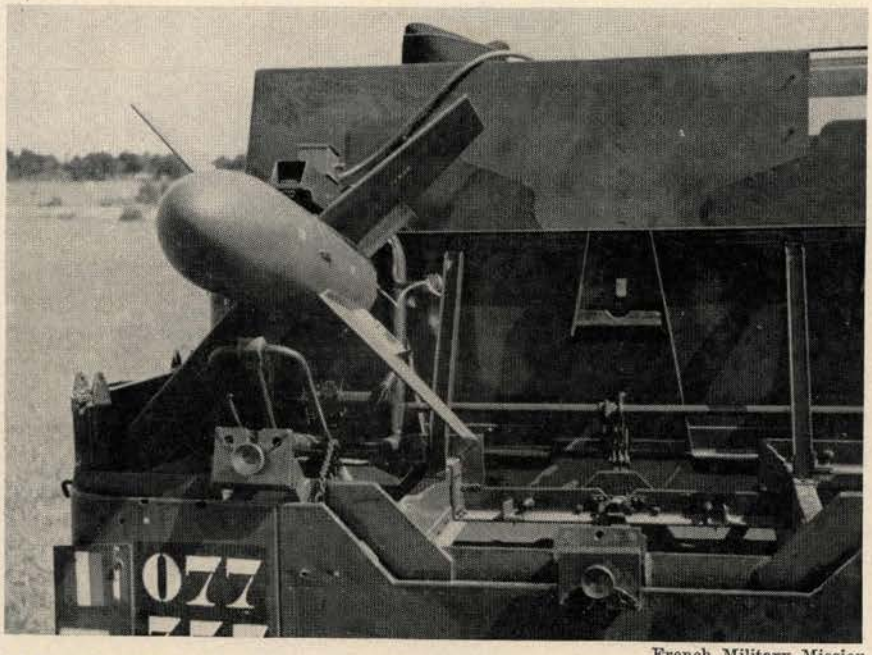
The more general impact of the antitank guided missile is best considered in the light of the fundamental characteristics of the tank. Looked upon in this way, the tank is essentially a combination of the firepower of heavy crew-operated weapons and the mobility of the automotive tracked vehicle; its basic function is to provide medium range mobile firepower.

As far as the great majority of battlefield targets is concerned the latter function is fulfilled adequately by heavy machine guns and high explosive firing weapons of about three to five inches caliber. Consequently, of course, the medium velocity 75mm gun was widely regarded for many years as the optimum tank armament.

However, in addition to the general battlefield requirement there has always been the more specialized one of combating hostile tanks and this gradually forced a considerable increase in gun-power. As a result we now have all the high velocity tank guns of up to 120mm caliber, or more, and vehicles of 40, 50 or even 60 tons.

The development of powerful tanks of this type solved the immediate combat problems but their use has imposed heavy penalties on armored units. The increased weight of tanks has had a very adverse effect on the mobility of armored units and raised all sorts of serious difficulties with regard to such things as bridging facilities, transportation by ship and, more recently, by air; fuel supply demands have risen sharply and so have the general logistical support requirements.

Yet, in spite of all these difficulties resulting from the increased weight of tanks, weight has had to be largely



French Military Mission

A French SS10 antitank missile shown mounted on a truck in firing position.

accepted for fear of compromising the ability of tanks to hold their own against hostile Armor. In general, combat capabilities have been largely proportional to weight and there seemed no way out of the dilemma.

Tank-Missile Combination

The appearance of the antitank guided missile, as a powerful and lightweight antitank weapon, offers however a definite possibility of changing the situation and reducing considerably the weight of tanks.

The initial change is most likely to come from the impact of the antitank guided missile on the heavy gun tanks, of the Stalin, Conqueror and T43 type. The principal role of these tanks in recent years has been that of combating hostile tanks, or, in other words, that of a "tank killer." This role required powerful, long-range guns and consequently heavy vehicles. But now, given a suitable type of guided missile, the same role could be performed by a much lighter vehicle. And as there is already no point in having heavy armor, such a guided missile antitank tank could be light on both the score of armament and armor protection.

By the same token, armor protection of the basic medium gun tanks could be reduced, lowering their weight and consequently increasing their mobility and general usefulness. This, however, would be only the first step in the process. The introduction of guided missile tanks could be further exploited by re-arming the basic type of tank, which today is the medium gun tank, with a lighter weight type of gun. This could be either a recoilless gun, a throttled (high-and-low pressure) gun, or a rocket gun of the type being developed for aircraft. Any one of these would satisfy the general requirement for a high explosive weapon and, at the same time, provide acceptable antitank performance at moderate ranges.

To cover the long-range antitank requirement in such a case would necessitate combining a certain number of guided missile tanks with the light gun tanks, most likely at company level. This should not, however, present undue difficulty. Although in recent years we have become used to homogeneous tank companies consisting of one type of tank, mixed tank companies have been used successfully in the past and are being experimented with again.

It might, ultimately, be possible to combine the gun and the guided missile in one vehicle. This would, of course, greatly increase the versatility of tanks and if we regard the guided missile as the antitank weapon and the gun as the general purpose high explosive weapon then there are already several historical precedents for it. The French Type B heavy tank of the '30s, the multi-turreted German Nb.Fz., the British Churchill I, the forerunner of the U. S. Medium M3 and the German 200 ton Maus all had separate antitank and high explosive weapons.

It could also be argued that the ultimate development would be a tank in which the guided missile armament would perform both basic functions. But it is doubtful whether the complication and the inevitable cost of the guided missile would ever be warranted by many battlefield targets and whether its employment in all roles would result in that maximum overall effectiveness which is the object of all operational research into weapon systems.

Conclusion

The main purpose of this article is to put the antitank guided missile in perspective and to indicate its probable future influence on Armor. The picture is necessarily incomplete as this type of guided missile is still in its infancy and what little information there is on it is still largely classified. But there is no room to doubt that it will have a considerable effect on the future development of Armor.

It seems clear that in the first instance the antitank guided missile will reduce considerably the value of heavy armor protection. This is bound to force a reconsideration of some of the ideas on tank design but it will in no way lessen the principal value of the tank as a mobile source of medium range firepower or a heavy weapon carrier, using that term in its broadest sense. On the contrary, the possibility of displacing the heavy gun tank by a guided missile tank offers the chance of considerable weight reduction and of greatly increased mobility of armored units, coupled with reduced logistical requirements, all of which are of the utmost importance from the point of view of future "brush-fire" and major conflicts alike.

None of the possible changes are likely to occur overnight and it is obvious that the current types of tanks will not suddenly become obsolete. But changes are bound to come. If they are introduced skilfully and if full advantage is taken of the possibilities opened by antitank guided missiles, their effect should be to enhance still further the effectiveness of armored units in the field.

Late news releases have stressed the Army's forthcoming reorganization of its divisions into the Pentomic concept in the near future. In fact, for several years we have been troop testing new organizations for Armor, Infantry and Airborne divisions. With new methods of delivering increased firepower being developed, it is a natural trend to revamp our organizations accordingly. This is being done despite the fact that all our new weapons and modes of firepower have not been thoroughly battle-tested, and we pray we never will be called on to do so. This bold move is a tribute to our far-reaching planners responsible for conceiving these ideas and turning them into actions.

The main idea, as determined, is to improve our ability to fight under combat conditions where atomic warfare might obtain. At the same time we must not lose our immediate capability to fight under conventional warfare conditions.

These bold attempts to anticipate the future naturally cannot be perfect "school solutions." By trial and error methods it is conceivable that we can stay abreast, or at least within grasp, of our new weapons and increased firepower, should the "wet run" become a reality. We have seen in the past (at least those of us who have been in this business since the early '40s) the triangularizing of the square Infantry Division. We have also witnessed the passing of the Regimental concept of the Armored Division to the present-day combat command concept. All of these changes have been for the improvement of the firepower to manpower ratio. Now, due to increased firepower, we again must adjust our thinking, discarding many old ideas and adopting new ones, and accepting the newly developed concepts as test proven. Hence, we split our forces into hard-hitting battle-groups capable of much more flexibility than previous formations. Defense against the increased firepower of a potential enemy is of sufficient importance to be considered; thus, dispersion and mobility are both major factors. Dynamic and imaginative leadership at lower levels will be the prime ingredient in making these new organizations and concepts work and thus provide the basis for future tactical doctrine.

It is interesting to note that the proposed changes in the Armored Division are minor as compared with the Infantry and Airborne Divisions. The Armored Division will retain its combat command concept, at least for the time being. Flexibility below combat command level had always allowed for small task forces of reinforced battalion size to operate out of the Armored Division. This can largely be attributed to the World War II Armor organizers and postwar Armor planners who developed our present-day Armored Division. However, let's not be smug. Let's look around us and profit by the experience of others. If certain aspects of the other newly conceived divisions prove valuable to us, let's adopt it within our Armor structure. But for the immediate future, it appears that with slight modification the Armored Division can meet the requirement for the atomic battlefield; at the same time, it is constantly prepared to fulfill its capability on the conventional battlefield, should the immediate occasion arise.

Regarding the proposed changes, they should be unequivocally accepted for the present: they should be thoroughly utilized and not changed until proven unworkable. We should endeavor to understand them. We should keep an open mind. The mind is like a parachute—it works best when it is open.

Further, appreciation for the other branches is probably more important in this new concept than at any previous time. Many World War II veterans remember the lack of knowledge they had of the capabilities and limitations of other branches. If each and every reader of this editorial is honest with himself, he can remember his own shortcomings. Take the separate tank battalion attached to the Infantry Division. In many instances the tanks were not fully appreciated. Nor did the tank commanders realize the assistance they could get from their supporting Infantry and Division Artillery. Many individuals assigned to Tank Destroyer units were not fully exploited because of the lack of appreciation and understanding on the part of the commander to properly utilize the unit's firepower, tactical ability and adeptness in supporting the unit to which attached. Ask yourself this question: What support can your organic Division Artillery give you right now? What are their minimum and maximum ranges? How rapidly can they displace and support you as you move forward? It behooves each and every one of us to learn as much as we can, not only about our own specific field but about all other supporting arms and branches. We must appreciate what they can do to assist us and what we in turn can do (and are expected to do) to support them in the accomplishment of *our* mission. In this day and age, this becomes more complicated as our various weapons systems likewise become more complex. This does not mean that every tank company commander can also operate a Field Artillery battery, be it a guided missile or conventional type unit. But it does mean that he must know what he can expect from the Artillery battery in any given situation. This can be applied to any other arm or service. Not only do personnel in organizational units have to face a tremendous task in reorganization, but the schools must put their shoulders to the wheel to develop and supply the new texts required to teach the new concepts and doctrine.

To a newly commissioned officer the questions must arise, "Is it worth all this effort? Must we gear for future conflict in two separate categories and at the same time practice this most austere economy?" If one were running a business, he would utilize the best known methods practicable to reap the biggest profit. The United States Army is in the biggest business in the world and its reward is peace and freedom. The American public has every right to demand and expect the utmost from its military, regardless of component, Reserve or Active. The price is already at an all-time high. We in the United States Army must maintain the best equipped, best trained, best prepared Army in the world in order to justify this tremendous expense. Thus, we will be ready to meet any exigency or requirement, either large or small, in the defense of our great nation. In such manner we will preserve peace and freedom.



U. S. Army

FOR SALE A BETTER TANK PLATOON

By MAJOR ROY MOORE, JR.

AS one who had the good fortune to command a tank platoon and company during World War II in Europe I found the medium tank platoon of five tanks to be a responsive, hard-hitting fighting unit whose offensive capabilities were generally in direct ratio to the degree of intestinal fortitude exhibited by the lieutenant (or sergeant) in command. The platoon was small in comparison to the firepower it delivered. It had excellent communications, and possessed the mechanical stamina to march a hundred miles, or two hundred if need be, with no particular strain. The two fighting elements, or sections, comprising this platoon facilitated the piston-like attack like a boxer's two fists—a lethal balance of simplicity and economy and firepower found in no other platoon structure of our Army.

This World War II platoon of five tanks had shortcomings, however, which are existent in our current organization, and appear to have been carried forward without correction into the future (PENTAMIC) platoon structure. Believing that the effectiveness of such small combat units is the substance upon which battles are won, I feel it worthwhile to discuss existing deficiencies and to suggest changes which, in my opinion, would result in a unit better suited for tomorrow's battles.

First, the suitability of the medium tank as an all-purpose, day-in-and-day-out platoon command vehicle is questionable. Regardless of any other merits possessed, a 50-ton tank is an utter disappointment as a reconnaissance or liaison vehicle, and the tank platoon

MAJOR ROY MOORE, JR., Armor, served in Europe during World War II with the 735th Tank Battalion. Subsequent to the War he taught at The Armor School and had extensive experience in various Tank Company Commander assignments. He returned to Europe and served in the 2d Armored Division, the last 18 months in the Division G3 Section. Returning Stateside he attended C&GSC prior to his present assignment in the Plans Section, DCS/Pers, D/A. He is co-author, with Major John Brier, of the book entitled *Tank Company Commander's Guide.*

leader so mounted is considerably hamstrung in these necessary platoon activities. There being nothing about the platoon commander's tank that makes it relatively faster or more agile than the other tanks of his platoon, there can be no dashing forward to observe a likely crossing or rapid change of the commander's position within an extended platoon formation. Being tied to a 50-ton tank is a source of considerable exasperation to a vigorous platoon commander when the situation is urgent and he is impatient to get some place.

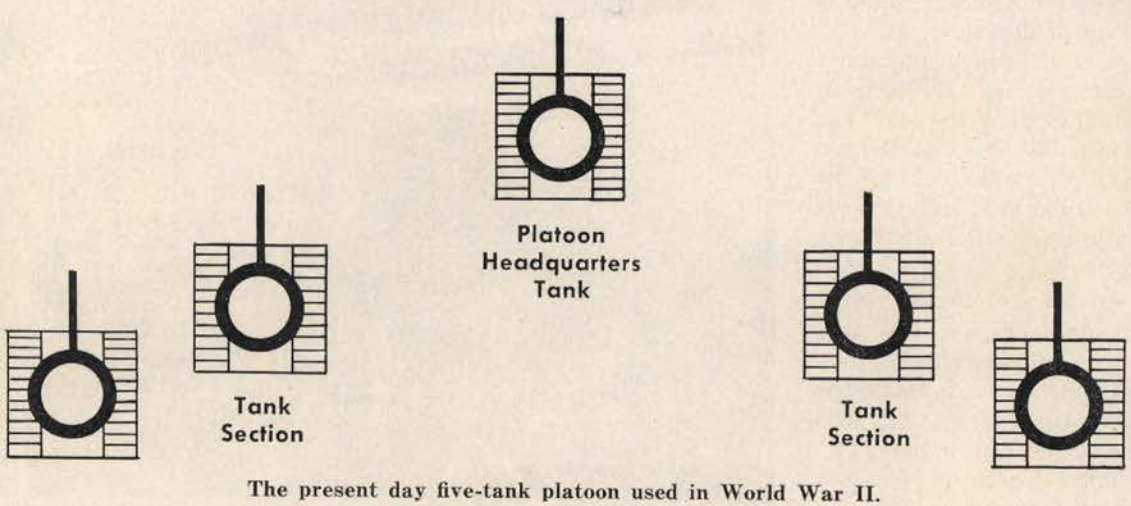
Because of the vehicle in which he rides, the functions of the tank-mounted platoon commander are unnecessarily complex. There are the purely tank command duties of directing the tank's movement, selecting targets, use of optical fire direction equipment, issuing fire orders, being vigilant as to the security of the tank, etc. Superimposed upon these vehicular duties are the responsibilities of a combat unit commander, several of which are: directing the movement of his own and supporting elements, controlling the platoon's fire, being aware of what is taking place, and keeping his troops and the Company Commander informed. Some of these functions are related, many are in conflict with one another. Although the tank and its many accessories have changed considerably over the years, very little has materialized to simplify this tank lieutenant's many essential tasks—indeed, the trend appears to be in the opposite direction. It is believed that by taking the platoon commander out of his tank and getting him into a smaller, faster, less complex vehicle, his primary duty of combat leadership could be made considerably easier and more effective. In this respect the platoon headquarters tank of our current structure would be far better employed in the role for which it was designed—shooting and getting shot at.

There is another disadvantage of mounting the platoon commander in a tank, which hinges on the psychological. A properly inspired tank-mounted platoon commander will oft-times become so involved personally in a fire fight that he loses control of his platoon. In some instances this occurs while he is setting a proper example, and in other times it is due to over-eagerness to bring the weapons of his own tank into action. Such practices are dangerous to the platoon, and are at times unnecessarily fatal to the platoon commander.

In short, then, the tank's overall bulk, complex controls and limited cross-country acceleration, make it a poor and expensive vehicle from which to perform the diverse routine combat activities of a tank platoon commander. A solution to this problem will be discussed later.

One of the characteristics of armor is excellent radio communications which in turn provide the element of control to armor formations. It has always seemed to me that considering the communications provided him, the tank platoon commander surely could control more than four other vehicles. Moreover, the section leader of the platoon, employing mainly arm and hand (or flag) signals, certainly should be able to direct more than one vehicle in addition to his own. It may be argued that the tank platoon sergeant, in addition to guiding his section of two tanks (if you include his own), is second-in-command of the platoon, and that a larger section might interfere with the broader scope of his platoon responsibilities. From a practical point of view, however, it appears that the additional firepower gained from a reasonable addition to these two sections could be made with no appreciable increase in the responsibilities of the section leaders, and would be well within the span of effective control of both the section leaders and the platoon commander.

A serious disadvantage of the platoon of five tanks is that of being so sensitive to tank losses. As now organized, the loss of one tank reduces a maneuvering element (a section) of the platoon to one tank. The wisdom of a one-tank maneuvering element, even at platoon level, is debatable. The loss of two tanks reduces the platoon to a section of three tanks. More often than not, tanks of the company headquarters are pressed into service with a platoon to offset such losses, but these are officers' tanks and the crews do not normally include enlisted tank commanders. Furthermore, strange tanks and crews, even from a parent company, are not im-



The present day five-tank platoon used in World War II.

mediately amalgamated into the operations of such small fighting units. Again, a small increase in the number of tanks of the platoon appears desirable.

The case against the current platoon of five tanks rests on two counts —the shortcomings of today's medium tank as an all around platoon command vehicle, and the inadequate number of tanks comprising the platoon. Let us now develop a remedy for these ills.

In searching for a command vehicle for the tank platoon the jeep merits early consideration. This vehicle's characteristics of small size, speed and versatility are well known, but the jeep would be an unwise selection for a tank platoon headquarters for two reasons. First, the jeep's thin skin would render the platoon commander extremely vulnerable to the enemy artillery and mortar fire that is inevitably attracted to the tanks. Secondly, the jeep when off the road is frequently unable to go where the tanks go. True, the jeep may eventually get there, but it may take considerable doing, and many times the jeep is left floundering far behind the tanks in sloppy or rough terrain. A commander so mounted would be of little value in a scrap. Providing the platoon commander with both a jeep *and* a tank, irrespective of the merits thereof, appears luxurious since he does not need the tank and he cannot effectively command his platoon in combat from a jeep.

What is required is a speedy full tracked carrier of about ten tons, lightly armored all around. The British World War II Bren carrier, with overhead protection added, would be a good point of departure, as would the chassis of the newly introduced U. S. Marine Corps ONTOS. Armored squad carriers of the M59 class, by virtue of bulk, silhouette and general layout, are considered unsuitable for this particular task, and would be but an unfortunate substitute for the real thing.

This bantam command carrier should be amply provided with automatic firepower—perhaps two or more fixed guns firing forward, under driver control, and another gun in a flexible mount overhead to be fired by a crewman *other than* the platoon commander. Such firepower would facilitate the movements of the platoon commander about the battlefield and would provide the authority needed to preclude undignified situations in which lone jeep-mounted officers sometimes find themselves. The platoon commander should be placed within arm's distance of the vehicle driver so as to eliminate the necessity of an intercom and simplify radio transmissions to platoon and company.

In such a fleet little battle wagon the platoon commander could devote full attention to platoon operations. Possessing roughly twice the speed of his charges, the lieutenant would



British Information Services

World War II British Bren carriers.



U. S. Marine Corps

The Ontos.



British Information Services

Latest version of the British Bren carrier.

be able to swiftly place himself where he is most needed without interrupting the movement of his platoon. The smallness of the command carrier and its agility would be its principal security against enemy tank fire. The light armor would furnish protection from atomic effects, small arms fire and shell fragments, and the machine guns would enable the platoon commander to swiftly develop situations, and to escape several of his many occupational hazards.

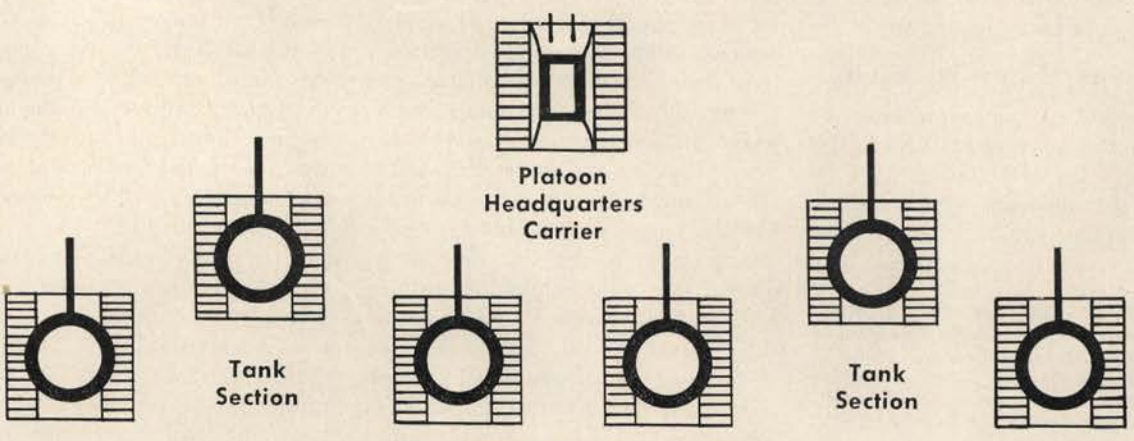
As a combat structure correcting many of the deficiencies existent in the current platoon of five tanks, and retaining the battle-proven simplicity of the current two-section structure, I submit a platoon comprised of the command carrier previously discussed plus two tank sections of three tanks each.

By means of this small revision each of the two fighting elements of the platoon have been provided with 50 percent additional firepower on a full time basis. The sections are more secure in their movements by virtue of their increased number, and the loss of a couple of tanks to the six-tank platoon can be adjusted so as not to destroy the sectional integrity of the unit.

Moreover, the larger platoon more fully utilizes the control features inherent in armor. Such a revision should necessitate no measurable increase in the logistical tail of the company or higher echelon.

The proposed platoon has lost none of its original responsiveness. In fact, it stands to gain in this respect. The increased flexibility of the platoon headquarters should eliminate many interruptions in platoon movement, and would improve the control of the small team of combined arms.

The medium tank was the work horse of our armored formations in World War II, and the tank platoon the basic armor fighting element. In this era of the atom it appears that armor is destined to play a more important role than ever before since it provides the means of rapid ground exploitation of the mass destruction weapon. Indeed, it is inevitable that the greater proportion of the modern army will consist of lightly armored elements. The changes to the tank platoon suggested herein are based primarily on combat observations of the past, but are believed to be in keeping with the increased flexibility that will be required of such small armored combat units on the battlefields of the future—be they atomic or otherwise.



The proposed six-tank platoon.

SAFETY
IN TANK GUNNERY TRAINING

The key to accident prevention in tank gunnery training is INSTRUCTION IN CORRECT PROCEDURE. This instruction will, by repeated emphasis, make correct application a habit.

By LIEUTENANT COLONEL ANTHONY J. MIKETINAC

I WAS the loader on the tank. There was an empty brass shell case on the turret floor which I wanted to remove because it was in the way. As I bent over to pick it up the gunner fired and my head was cut by the recoil of the gun. The gunner did not give any warning he was going to fire."

This is a partial extract from an accident report and describes (or fills the space) on DA form 1051 where it says "How injury occurred." As the officer in charge of firing or the safety officer how would you comment in the space provided for "action taken to prevent recurrence?" You would probably state that the loader was warned to stay clear of the path of recoil of a loaded gun and that the gunner was told to always announce ON THE WAY before firing. Needless to say, this, as well as the majority of accidents which happen could have been prevented. Likewise, the corrective action may prevent a recurrence for these individuals, but what about the other tank crews in the unit?

Emphasize Correct Procedure

The key to accident prevention in tank gunnery training is INSTRUCTION IN CORRECT PROCEDURE; this instruction will, by repeated emphasis, make correct application a habit worth acquiring.

In the Weapons Department of The Armor School we devote considerable effort towards inserting safety precautions and procedures into the instructional units so that the normal procedure will become a safe procedure. The unit of instruction entitled Crew Drill and Service of the Piece is a conference and demonstration where many safety precautions have been inserted; some may have been mentioned in previous instructional units and many will be repeated during range firing practice. For example, when the instructor summarizes the demonstration on the correct procedure for loading the main gun he says, ". . . the loader loaded in the proper manner, stepped clear of the path of recoil and announced UP. By announcing UP, you have informed the crew that the gun is loaded and that you are clear of the path of recoil."

Many times a short phrase inserted into the sequence of instruction can be very effective insofar as putting across a safety precaution. Instructors have formed some excellent teaching phrases which have become common usage and are retained by the students. During a class on the caliber .30 machine gun the instructor in his explanation of disassembly begins by saying "prior to the first step in the disassembly of the caliber .30 machine gun, or any weapon, check to insure the weapon is clear. This is done by a physical inspection (demonstrated)." In the practical examination at the completion of the weapons course, the student is required to disassemble and assemble and adjust headspace on the caliber .30 machine gun. Each phase is pro-rated and failure to clear the weapon counts heavily against his score in the weight of the requirement.

Repeated emphasis becomes annoying unless it is stated in such a manner that the safety teaching point blends with the normal instructional sequence.

Avoid Warnings

We have AR 385-63, Post Range Regulations, Division and Unit SOPs and check lists for the officer in charge, which are written for the express purpose of preventing accidents; nevertheless, accidents do happen. When an accident does occur, usually a commander's first reaction is to place responsibility on some one. Instead he should investigate the adequacy of the training program regarding safety precautions. I am sure everyone is familiar with the safety chart in the headquarters which by a color scheme shows the safety record of each subordinate unit. Also, you know of the safety lecture which is mandatory training. Most individuals are by nature, safety conscious and exercise the proper precautions. However, where repeated emphasis is placed on such phrases as "don't drop a round," "don't handle dud," "don't fire outside the safety limits, don't horseplay," etc., eventually the warnings are not heard and are ignored. The soldier who is instructed properly and learns correct procedure for handling ammunition doesn't need warnings because he will do as he has been instructed. By explaining, demonstrating and then having the soldier ac-

LIEUTENANT COLONEL ANTHONY J. MIKETINAC, Armor, served in Europe during World War II as an Infantry Company Commander in the 5th Infantry Division. Subsequent to the war he transferred to Armor and attended the Advanced Class at The U. S. Army Armor School. He served with the 29th RCT in the Far East prior to his assignment to the Weapons Department of The U. S. Army Armor School where he is presently Chief of the Tank Gunnery Division.

tually do it, you accomplish more than by giving a warning of what not to do.

Safety Officer

In recent years we have seen situations where the corrective action taken to prevent accidents on a range resulted in the addition of an officer or officers being assigned to assist the officer in charge of firing. We know him by the title of Safety Officer. In one post range regulation his responsibility is defined as, "to advise, warn, stop, or attempt to stop, any normally safe condition or procedure from deteriorating into an unsafe one whenever he sees it occurring, or likely to occur," etc.

Isn't this everyone's responsibility? Furthermore, how does he actually do this? What are his specific duties? Certain duties may be given to a Safety Officer; however, the officer in charge cannot delegate his responsibility. For example, some units require an officer to clear all weapons and to inspect men for ammunition. Sometimes the duty is hardly commensurate with the officer's grade and the degree of responsibility required—but, if something happened, a commander has someone who very likely can become the victim when the investigating officer places responsibility. If you require a safety officer on tank gunnery ranges, give him duties to perform, consider his experience and have a purpose for his being there other than complying with a regulation. Examples of some duties which may be assigned a safety officer are as follows:

1. Check that safety limits are clearly defined and understood by all personnel.
2. Check gun tubes before firing.
3. Place road blocks and range guards in proper locations.
4. Instruct and brief personnel on handling ammunition.
5. Enforce no-smoking regulations around tanks and ammunition.
6. Check weapons record books for number of rounds of tube life.
7. Check for any obstructions to the line of fire.
8. Insure that tank commanders understand and comply with communications control and observe flag signals.
9. Supervise the removal of misfires.
10. Control entrance of personnel into impact area, check impact area before firing begins and obtain range clearance from post range officer.

Officer in Charge

"Where several units are firing independently in the same general area, there will be an officer in charge of and responsible for each firing range. *Safety in firing is the responsibility of the officer in charge of the firing.*" (AR 385-63) The regulation is quite clear on who is responsible for safety on ranges, but again, what can the OIC do to prevent accidents if the tank crews have not been properly instructed before they arrive on the range?

Thorough planning and supervision are essential to all range firing exercises. The officer in charge of firing is also responsible for all activities on the range. He should become familiar with his duties and responsibilities well in advance of the firing period. In his planning and preparation for firing he should include a period of instruction for his assistants and crews if he feels the training is necessary for compliance with safety procedures. A general officer once stated upon visiting a range that he can best judge the efficiency of a unit by observing it during range firing. A smooth operating, well organized range is indicative of adequate prior planning and preparation. A firing range free of accidents is also indicative of proper instruction and compliance with safety precautions and regulations. The duties of an officer in charge of range firing are too numerous to mention here and not the purpose of this article; however it must be remembered that the title of officer in charge carries with it the responsibility for safety. Before any range he should obtain and study the following references:

1. AR 385-63
2. Post Range Regulations
3. Unit Range SOP.
4. Current Training Circulars.



U. S. Army

The safety officer of the firing range is shown checking the position of the safety marker with an aiming circle.



U. S. Army

Here the safety officer is performing another one of his duties, that of inspecting the gun tubes prior to firing.

5. Appropriate Weapons Field Manuals

Safety Posters

Sometimes a picture or poster can very effectively teach a safety precaution. For many years there has been a cartoon type drawing posted in our classrooms which shows a tank crewman flying through the air as a result of the recoil of the gun blasting off the rear of the turret, and the caption reads "I told you to check that recoil!" I am sure students who see this in the classroom remember it because when firing tanks it is one check they never miss.

Safety posters distributed by the Department of the Army are very effective; a recent one showed a mortar crew with the words CLEAR BEFORE LOADING. Such signs or posters which usually have only one specific teaching point are helpful and can easily be constructed.

In addition to pictures, slogans or catchy phrases may be initiated, which when they become normal usage teach safe procedures. The word A-C-U-T-E has been used by instructors for many years to help crewmen remember the procedure for putting the turret into power operation. The "A" meaning, alert the crew, insure that crew is in safe position, check tank area for obstructions.

Wrong and Right Way

During your instruction on turret familiarization, conduct of fire, crew drill, service of the piece, non-firing and firing exercises, it is much more effective to teach how to do something rather than how not to do it. For example, in teaching tank crews or recruits, if you say, "in closing the breech don't use your fingers to trip the extractors." This may be the first time the individual has ever heard that a breech could be closed in this manner, furthermore you haven't told him the proper method of using the ramming and extracting tool.

Here are some of the more common or frequent examples of such phrases used in tank gunnery instruction.

1. *WRONG:* Make sure the gun isn't loaded. *RIGHT:* Open the breech, inspect the tube to see it is clean and free of defects, close the breech, then activate the percussion mechanism.

2. *WRONG:* Be sure to check the recoil oil. *RIGHT:* The gunner checks the recoil oil by physically feeling the indicator tape, the system contains the correct amount of oil when you can feel one smooth and one rough edge of the tape.

3. *WRONG:* Don't fire more rounds than specified for the gun. *RIGHT:* Keep the weapons record book up to date, enter number of rounds fired after each range, make note of the number of rounds of tube life remaining, total rounds to be fired must not exceed number authorized by ordnance inspectors.

4. *WRONG:* Don't remove a machine gun from the tank unless the weapon has been cleared. *RIGHT:* At the completion of firing, pull back on the retracting slide handle, with the bolt to the rear, inspect and feel that no round is in the chamber, insert a "T" block in front of the bolt, raise up on the extractor, and allow the bolt to go forward. On orders from the OIC or safety officer remove the machine gun.

5. *WRONG:* Don't try to load a round which is bulged. *RIGHT:* Before rounds are stowed or loaded, they are inspected to insure they are not bulged, dented or dirty.

6. *WRONG:* When uncrating ammunition from boxes do not use an axe to cut the wire. *RIGHT:* Metal



U. S. Army

This instructor is shown explaining and demonstrating the correct procedure for clearing the coaxial machine gun.



U. S. Army

Instruction in correct procedure—an instructor demonstrating proper method of removing a round from container.

bands or wire on ammunition boxes will be cut with wire cutters.

7. *WRONG:* Be careful you don't drop a round because the primer is very sensitive. *RIGHT:* When handling ammunition, keep primer end up and covered at all times, as a round is passed into the turret, primer end up, the loader receives the round over his shoulder, he in turn places his hand on the primer until it is safely secured in the ready rack.

10. *WRONG:* Don't handle duds, they are dangerous and must be taken care of by the ordnance squad. *RIGHT:* The location of a dud will be marked by a white streamer fastened to a stake. The word DUD will be written on the stake, and a report rendered to the post Range Officer. The report will show type and caliber of each dud, the location by range name, coordinate, and the

along with the red flag on the tank and the round will be removed to the misfire bunker under the supervision of an officer.

Conclusion

Safety in gunnery training does not require any special efforts to make tank crewmen become safety conscious. No one wants accidents, much less to be involved in the paper work and responsibility for any serious mis-



U. S. Army

Classroom instruction and demonstration by the instructor emphasize the correct procedure used to load the main gun.



U. S. Army

This instructor, through the use of a training aid, is explaining and demonstrating the correct misfire procedure.

It takes only 15 to 17 pounds pressure to ignite the primer.

8. *WRONG:* Don't pick up any hot brass on a firing range. *RIGHT:* As part of the OVM equipment in each tank there is a pair of asbestos gloves; these gloves are used whenever hot brass is being handled.

9. *WRONG:* Never use you fingers to trip the extractors when closing the breech. *RIGHT:* If you desire to close the breech for any reason other than loading a round of ammunition, use the extracting and ramming tool which is a part of your OVM equipment. This is the extracting portion; this is the ramming (pointing). Place the tips of the fork inside the breech ring so that they are up. Then thrust forward on the extractors (demonstrate) tripping

names of personnel familiar with the location.

11. *WRONG:* If a round fails to fire, dismount, and call the OIC. *RIGHT:* In the event the main armament fails to fire, the gunner will turn off the gun selector switch and announce MISFIRE, the tank commander (90mm gun) using a web belt or strap, recocks the gun and the loader announces UP. The gunner relays on the target, turns on the firing selector switch, announces ON THE WAY, pauses one second and fires. If the gun still fails to fire, the misfire procedure is repeated; and then another attempt to fire would be made, this one manually. If the gun still fails to fire, the gunner announces MISFIRE, the tank commander will display an orange flag

hap. By placing proper emphasis on correct procedure, tank crewmen will form habits which automatically insure sound safety practices. You have heard it said that ammunition and equipment are only as safe as the individuals who use and handle them. This is not entirely correct because many times the tanker has not been instructed properly and is not aware that proper respect and precautions are necessary when handling weapons and ammunition.

Close supervision of gunnery training is essential, and the inspection of range firing practice definitely should include a check list to insure compliance with safety regulations. Accidents can be prevented if personnel are properly instructed and form correct habits and procedures.

On the occasion of Armor's 180th Anniversary the Commanding General, CONARC, had this message delivered to the Assembled Armor officers at Fort Monroe, Virginia.

THE "I" FACTOR

By GENERAL WILLARD G. WYMAN

ALTHOUGH I cannot be with you today, I want you to know that I warmly share your sentiments on this 180th anniversary of Armor. As an old cavalryman, I have personal reason to cherish the gallant traditions symbolized by the crossed sabers on your insignia, and I like to feel that I am still a member of your elite fraternity-at-arms. My purpose in addressing this message to you, however, is not sentimental—but salutary. On a day dedicated to the memory of Stewart, Forrest, Sheridan and Patton, it is more in keeping with the spirit of the occasion for us to look forward to the future needs of the army than to dwell on past glories. It was precisely by responding to the military needs of their own times with foresight rather than hindsight that they wrote some of the most stirring chapters in the saga of the Army's first mobile arm. Accordingly, I take this opportunity to again invite your thoughtful attention to the battlefield of the future.

It is, of course, an old familiar scene to the imagination of every *thinking* soldier—and I recognize no other kind as worthy of the name. But truth often speaks in words too familiar for the brain to understand, so I ask that you heed with the heart as well as the mind.

At once apparent on the battlefield of the future is the need for the mobility, firepower and traditional spirit of Armor. Over-reliance upon passive measures, such as dispersion, for survival on the atomic battlefield would be tactical suicide.

Asked to define the difference between life and death in a single word, Socrates once replied: "Movement." This distinction applies with compelling force to atomic battle. In modern parlance, there will be only "the quick and the dead!"

It is imperative that we apply this truism in all of our planning and training. We must never permit the aspiration which terms our military establishment "National *Defense*" to dampen the inspiration of armor—the blazing spirit of the attack which wins battles once the dice for war are cast. In the future as in the past, the watchwords of victory will be "attack, attack, attack!"

Let those who fear the fury of atomic blows remember that the safest place for a unit on any battlefield is the command post of the enemy! And we won't get there by thinking now in terms of defensive killing zones or any other concept predicated solely upon defensive use of our offensive capabilities. The quickest way to get anywhere is to go! The victorious army of the future will not be a rapier employed in delicate thrust and parry. It will be a mailed fist driven at the heart of the enemy.

So I repeat: the need for the mobility, firepower and traditional spirit of armor on the battlefield of the future has never been more apparent nor more urgent.

In response to this need, the entire Army is now incorporating ideas and modes of thought that have long been traditional to Armor. Even the organizational concepts, tactics, tools and techniques pioneered by Armor are now being adopted by all arms and services as standard and doctrine. Meanwhile the evolution of Armor continues apace—as needs it must—despite handicaps in funds and industrial priorities resulting from the current emphasis on strategic airpower.

However frustrating or formidable these handicaps may appear to us at times, we must not be intimidated or discouraged by them. Actually they may prove to be a boon instead of a bane. By forcing us to deviate from the obvious and easier approaches to our problems, our handicaps may stimulate us to a more evolutionary response to the challenges of the atomic battlefield. Certainly the leap in the evolution of ground warfare achieved by the German Army during the 30's owed much to the obstacles placed in the path of its creative thinkers by the Treaty of Versailles. In its present form, Armor itself is the product of that leap of the imagination. Who knows what improved form may evolve from a similar leap of our minds now over our present obstacles?

There remains another need for the battlefield of the future, the need to inculcate in our leaders and potential leaders the ability to command and to command well. Now, more than ever before, that need, which I shall term the "I" factor, is paramount. Unless a more vigorous response to it is forthcoming in our Army than is now apparent, it matters not how much we improve our means of mobility and firepower. We will be unable to apply them with decisive force in combat! Not only is a more vigorous response to this need due, it is long *overdue*—judging by the battle studies of Sam Marshall and the intelligence reports of our enemies in World War II and Korea.

In our haste to keep pace with the sweeping ad-

vances of our modern technology, it appears that we have too long neglected the vital importance of the "I" factor in the timeless equation of battle. If it sounds mysterious by that name, I assure you that no other symbol more aptly describes it.

The "I" factor symbolizes the difference between ammunition in the cartridge belts of riflemen and kills on the target. The "I" factor represents the difference between tanks frittered away timidly or aimlessely and tanks blasting the enemy out of his CP. The "I" factor epitomizes the difference between the capabilities for movement and firepower of any combat unit—large or small—and the actual application of those capabilities to achieve a decision.

The "I" factor is a man! But not just *any* man in a unit! He is not an arranger, nor a planner, nor a communicator, nor an entertainer—however necessary such men may be. Nor is he an explainer or concurrer. He is a *decider*—a man who is not afraid to say "I" and take the consequences.

At best there can be only one active "I" man at a time at each echelon of command, but there must be that one or the chain of command sags like a piece of spaghetti. Whether he wears stars or bars, his function is the same. He is a *captain!*

As you will readily appreciate, I am not speaking here of officers who merely occupy positions of captaincy in tables of organization. Judging by the results of recent company and battalion tests conducted in the field we have too many officers in such positions today who do just that and nothing more. I am speaking of men with the guts and competence to practice the art of *captainship*—Captains like Patton and Forrest who never said "we" in their lives when there was a decision to be made and they were the ones in the position to make it!

I have refrained from using the word "leadership" in describing the "I" factor in the timeless equation of battle—not because it is inappropriate, but because the word has been so loosely used in print lately that I fear its true meaning is becoming fuzzy. Our libraries are loaded with scientific dissertations on the subject of leadership these days —much of it written, I suspect, by bright young men who adhere to the old saw: "If you can't do it, write about it." One book that I picked up recently was based upon efficiency studies and questionnaire of office workers in big business firms. It purported to prove that the committee concept of personnel relations—the "we" approach—makes for happier and more efficient paper pushers. Perhaps it does, but I have yet to see a committee push a battalion up a hill!

The simple truth is that there are no magic words in the lexicon of leadership that can make a man a captain. Reading the biographies and autobiographies of men who were great captains will help provide the student of captainship with valuable clues. Attendance at our Army schools will help develop the mental tools of captainship. But the ability to use the tools can be developed only by practical application. In short, the essential school of command is the exercise of command.

Today, the Army has more than five thousand such schools of captainship in constant operation in units from the company to the regimental level. Even this number, however, is not sufficient to fully develop the captainship of every officer of the combat arms. It is essential, therefore, that these student spaces in the Army's practical school of command be sought and used by the cream of the officer corps—by outstanding young officers who evince those traits of character and force of mind that distinguish the potential captain from the perennial follower. Unfortunately, this is not now the case—as evinced by reports from the field with which you are already familiar.

Some of you have been asked in recent weeks to contribute your thoughts toward a solution of this problem, and I can assure you that your ideas have been helpful to me. Much of your thinking has been (will be) incorporated into recommendations to the Department of the Army for far-reaching changes in policies governing promotion, integration, elimination and assignment of officers. Today, however, I wish to call upon each one of you to make a more personal contribution.

As a group you represent a sizeable segment of the topflight officers of your arm in the Army. Most of you have already displayed outstanding ability as captains in combat. All of you have demonstrated this potential or you wouldn't be here. * * * But the faculty to command is like a muscle in one respect—it will atrophy from disuse if you let it. Therefore, I urge that you devote thought and effort now to preparing yourselves for future command.

No need, I am sure, for me to spell out the ways and means by which you can accomplish this. The man who can't find his way to captainship, shouldn't! Like every ship that sails the sea, captain*ship* has its own compass built in! So I can only tell you to keep a sharp eye on your compass, and follow the bearing indicated by a great captain of Armor —George S. Patton—in a letter to his son:

"Fill the unforgiving minute with sixty seconds worth of distance run."

General Patton once said that there is no such thing as a good *field* soldier; there are only good soldiers and bad soldiers. I know of no more appropriate words with which to conclude my message to you than to paraphrase his:

There is no such thing as a good staff officer OR a good commander. A GOOD officer is both!

THE ARMOR LEADERSHIP AWARD, 1956



U. S. Army

The Armor Leadership Award, emblematic of the top tank platoon in the U. S. Army, being awarded to Lieutenant James P. Bergen, platoon leader of the winning platoon.

ARMY Regulations 672-73 provide for the institution of an award to be known as the Armor Leadership Award, to be presented annually to the outstanding tank platoon of a designated armored division. The regulation delegates to Commanding General, Continental Army Command the responsibility for administering and perpetuating this award through the Draper Combat Leadership Trust Fund. Background information on this trophy to include the awards was covered in the May-June and March-April 1956 issues of *ARMOR*.

On 19 January 1956, Headquarters, Continental Army Command, by letter to Commander in Chief, United States Army Europe, announced that the 2d Armored Division had been selected to conduct competition for the Armor Leadership Award. To be eligible to compete, platoons had to have attained the status of training required by ATT 17-1. Other than this provision and requiring compliance with the AR, Continental Army Command placed no restrictions on the division, giving the division commander the opportunity to formulate a test based on the division's current mission.

On 31 January, a board of officers was appointed to determine the scope of the competition for the Armor Leadership Award. The board included the Assistant Division Commander, the three combat command commanders, the G3, G4 and a recorder. The board met in February and recommended the following criteria for selection of competing platoons:

1. One platoon, to be selected by the battalion commander,

Prepared by G3 Section, 2d Armored Division

would compete from each tank battalion.

2. The platoon would be commanded by a lieutenant.

3. Platoon personnel would be *frozen* as of 1 August except for replacements received from outside the division.

4. On 1 August each tank battalion was to designate the platoon to compete from that battalion and to submit a roster of the platoon showing the date of assignment of each member.

5. No past records of discipline, maintenance or marksmanship were to be considered.

In discussing the scope of the test, the board members felt that it should be physically and mentally arduous and as comprehensive as possible. It was determined that the G3 Section would work out the details, but that the test would include at least the following items:

1. Physical fitness test.
2. Military Stakes Course.
3. Firing individual weapons for record.
4. Inspection prior to the tactical phase which would include personnel, weapons, vehicles, equipment, military courtesy and discipline.
5. Night road march under blackout and radio listening silence.
6. Bivouac and security in an assembly area.
7. Issuance of orders and test of orders, actions and preparation for attack, defense and withdrawal.
8. Final inspection similar to preliminary inspection. Special factors to be checked included communications, supply and maintenance.

The recommendations of the board were approved by the commanding general, and by the end of February, were formalized by publication in a division training memorandum which provided the basis for all subsequent planning done by the G3 Section. This permitted the tank battalions to begin selection of their platoons.

Preparation and Planning

Drafting detailed plans for the tests was a unique problem, since no reference other than the AR and the above memorandum existed, nor was there any precedent to follow. The planners therefore, using the recommendations of the board as a guide, began their work with a three-fold objective:

1. To make the test as tough and at the same time as comprehensive as possible.
2. To insure, insofar as possible, complete impartiality in administering the test.
3. To provide a high standard of performance for the benefit of future competitors.

In October, the division published Training Memorandum No. 11 which gave specific information as to times and places of the test for each of the competing platoons. It also amplified the board recommendations, so that each tested platoon knew what the test consisted of without knowing precisely when or to what degree each activity would be covered. To accomplish this it was necessary to limit distribution of several of the annexes to the memorandum to control and umpire personnel. Finally, this memorandum covered the many administrative requirements of the test.

The administration of the competition deserves further elaboration. In view of the objectives of the division, noted above, this test could not be administered as a routine platoon training test. 24 officers and almost 200 men were directly involved in the testing and many others were indirectly involved in such matters as providing billeting, supply, maintenance and communications support. The above figure includes an aggressor force of approximately 100 individuals, a military stakes course team of approximately 50, a signal team, an ordnance team, a forward observer team and officers and enlisted personnel to administer the physical fitness test and small arms ranges.

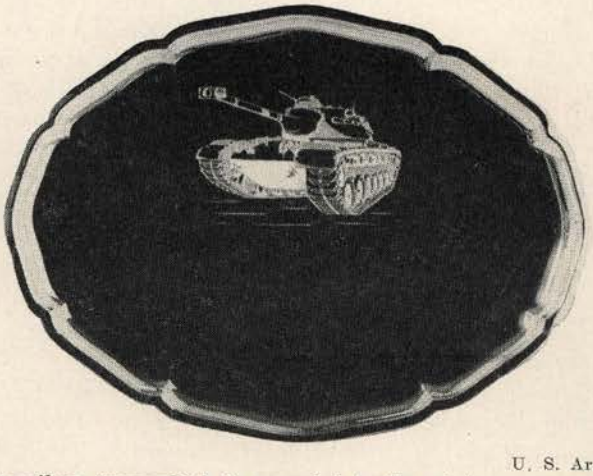
The control and umpire organization was designed to permit one team consisting of a control officer and two umpires to be on duty at all times. This had two advantages:

1. It was possible to begin testing of the second platoon before the first one had finished.



U. S. Army

The silver punch bowl awarded to the tank platoon leader.



U. S. Army

The silver tray which is awarded to the platoon sergeant.

2. The same team judged the same portion of the test for each competing platoon.

The control officer dealt both with the Aggressor force and the company commander of the tested platoon, keeping the latter with him at all times during the tactical portion of the test. The umpires dealt directly with the tested platoon and did all the scoring. The control officer and the company commander followed the action maintaining visual contact.

Additional administrative details covered by Training Memorandum No. 11 included:

1. Travel to the testing area at Baumholder (one of the competing platoons had to travel from Mannheim and one from Mainz).
2. Organization of the aggressor force.
3. Provision of billeting, rations, gasoline and ammunition for aggressor and tested units.
4. Provision of billeting, rations and gasoline for umpire, control and testing personnel.
5. Uniform and vehicle markings for all.
6. Evacuation and hospitalization.
7. Designation of responsibilities for above to the division staff, troop units and the parent company and battalion of the tested platoons.

General plans of operations and scenarios for control and aggressors were included as annexes to the memorandum. These were utilized to draw up more detailed scenarios after a dry run of the problem by the control-umpire staff and the aggressor. The latter scenarios went into considerable detail as to times, events and individual responsibilities and proved invaluable to the execution of the tests.

Assignment of Tasks

The Baumholder Training Area was the logical location for the competition. To the Commanding General, 2d Armored Division Artillery, whose headquarters is located at Camp Baumholder, fell the major burden of providing billeting for the administrative personnel, setting up and operating the physical fitness test and the pistol and submachine gun ranges. In addition, division artillery provided a section of light artillery to support the live firing phase of the exercise, forward observer and fire marking teams, and personnel to umpire the artillery adjustment procedures during the live firing phase.



U. S. Army

Preparation for pre-tactical phase inspection.

The Commandant of the 2d Armored Division Academy, also located at Baumholder, was given the responsibility of setting up and operating the military stakes course and also provided office space for the control staff.

Battalions of Combat Command C contributed to the effort in such matters as providing emergency transportation, rations for the aggressor force, tanks for the stakes course, emergency vehicular evacuation and making shop space available for the tested platoons.

The division ordnance battalion and division signal company provided competent teams for the technical inspections and all of the combat battalions of the division contributed qualified noncommissioned officers to operate stations in the military stakes course.

The G3 Section was responsible for preparation and conduct of the test; arranging for and briefing umpires, control officers, inspection teams and Aggressor personnel; and preparation of the final report. The division range officer, under G3, was responsible for installation of targets for the live firing phase of the test, operation of the Individual Tank Course, road closures and necessary safety measures.

Conduct of the Test

Due to a busy maneuver schedule and the French priority on the Baumholder Range it was not possible to hold the competition until late in the year. With all the preparatory work accomplished, the competition was held between 27 November and 1 December 1956. A new platoon started each day and the test ran for approximately 36 hours. The following paragraphs outline the activities of a typical platoon.

At 1400 on the afternoon prior to beginning the test, the platoon was briefed by the Division G3, who acted as Chief Controller. The briefing consisted of a general outline of the test and last minute administrative details. It was emphasized to each platoon that the test was difficult and that no platoon could expect a perfect score. For this reason competing personnel were not to become discouraged over failure to accomplish any one phase without error since there was ample opportunity during subsequent phases to recoup points lost. The platoon was also told that the umpires and control personnel

were to help them in any way permissible and to relieve them of any harassments not provided by the test conditions.

By 0700 the next day the platoon was ordered to park its tanks in the indoor tank range with tubes down range, preparatory to the inspection which would follow that afternoon. At 0800 the platoon actually began competing by reporting for the physical fitness test. Much emphasis was placed on physical fitness and endurance during the competition and it was necessary to do much more than the minimum requirements of the standard physical fitness test to make a creditable showing.

The platoon then moved to a comprehensive military stakes course consisting of 17 stations designed to test the status of individual training of each member. At the various stations platoon members were required to disassemble and assemble all tank platoon weapons including the breech block of the 90mm gun; to place a tank radio in operation, give a radio call and use the external interphone; to start, drive and stop an M48 tank; boresight the 90mm gun; orient a map; identify CBR warning symbols; emplace and remove an antitank mine; adjust artillery fire; answer questions on combat intelligence; and estimate range. The military stakes course was run against time and no partial scores were given on any station. The solution given or performance required had to be correct in all respects or no score was given the competing platoon member.

Following the military stakes course, the platoon was released to its parent company for dinner. At noon the platoon members reported to small arms ranges to fire their individual TO&E weapons, pistol and submachine gun. Firing consisted of the standard course for each weapon. No alibis were allowed. When the small arms firing was completed, competitors were released to prepare for the pre-tactical phase inspection which was conducted at 1600 hours.

The pre-tactical phase inspection consisted of a layout of all personal clothing and equipment together with an OVM display. The platoon was instructed to follow its company or battalion SOP for these displays to provide a standard pattern for uniformity with which the platoon members were familiar. The platoon was required to submit to the umpires, two copies of the governing SOP. This phase included a technical inspection of vehicles and weapons by an ordnance team and of communications equipment by a signal team. It was conducted in the indoor tank range to give all platoons an equal opportunity to have the inspection conducted under similar conditions regardless of weather.

On completion of the inspection, the platoon leader was given a warning order for the night movement of his platoon to a forward assembly area. Time was allowed for supper and at 1900 the movement order was issued to the platoon leader requiring him to cross his IP at 2000. Overlays with this and subsequent orders were on a 1/50,000 map. As with most training areas, highly accurate, overprinted maps of the Baumholder area are normally used and tend to oversimplify the task of map reading. At the time the movement order was issued, all maps of 1/25,000 scale were taken from the platoon and maps of 1/50,000 scale were issued. This exchange was designed to eliminate the ease of operation facilitated by the larger scale maps, and to give the platoon maps of a scale it might reasonably expect to use in actual combat. In order to lend realism to the tactical situations, all orders to the platoon leader, although emanating from the control staff, were given him by his company commander.

The platoon moved out shortly before 2000 hours, and closed in its assembly area prior to 0100 the following morning. In the assembly area, the platoon accomplished its resupply, was joined by an artillery forward observer and was issued an order for the next action required. The platoon was given the mission of advance guard for the parent battalion and moved out on this mission at 0700. (At the time of the year the test was given, daylight occurs at approximately 0800.)

The platoon encountered a minefield shortly after crossing the IP and was ordered by the company commander (following the guidance of the control officer) to bypass to the West and continue the assigned mission. Shortly after the platoon bypassed the minefield, the company commander was given the next message for the platoon leader. This message gave the location of an enemy position occupied by an estimated Aggressor platoon. The platoon leader was ordered to attack and seize this position. This order introduced the live fire phase of the test.

The tactical instructions received by the platoon leader up to this point



U. S. Army

Conducting the individual weapons firing for score.

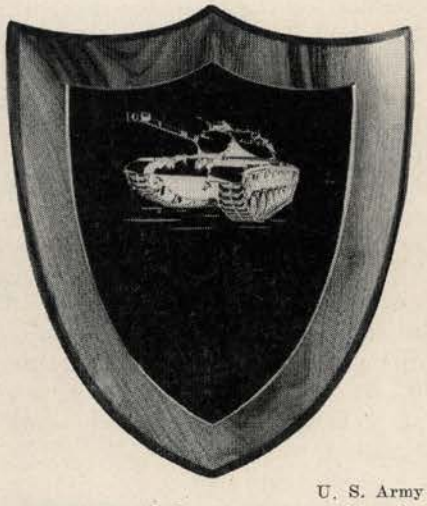
were designed to maneuver him into a position from which he could use live ammunition with due regard to range limitations and safety considerations. The umpires explained to him that this was the live firing phase of the test. Targets had been placed on the ridge which the platoon leader had been given as his objective. When the platoon leader requested artillery he was informed that the forward observer was not in position to observe and that the platoon leader would have to handle his own target designation and adjustment. The forward observer directed the FDC to report on the company channel and the platoon leader was graded on his knowledge and use of artillery adjustment procedures while acting as his own forward observer.

After completion of the attack and seizure of the objective, the Aggressor force was moved into position by the control officer. The mission of the tested platoon was changed to that of flank guard for the parent battalion. In order to avoid a complicated radio message and to give the Aggressor time to move into position, these instructions were issued by messenger and the platoon was ordered to defend —pending the arrival of the messenger. The messenger was delayed until the Aggressor forces were in position. His new orders gave the platoon leader his mission, axis of advance, the location of the lead elements of the main body and the approximate route of march of the main body.

The platoon moved out on its mission encountering small arms fire, minefields, obstacles and live aggressor, both tank and infantry, designed to test the platoon leader's reactions and to determine his ability to concentrate on his mission when faced by various situations. Minefields also served the purpose of denying the platoon leader certain terrain and forced him to use the avenue of approach desired by the control staff. While on the flank guard mission, the platoon leader received several messages from the company commander giving him brief intelligence items or advising him of the progress of the main body.

Next the platoon was put in a defensive position. When secured the platoon leader was expected to call for gasoline and ammunition. He was allowed one hour to accomplish this phase. After one hour, whether or not resupply had been completed, the Aggressor began probing the platoon position. 15 minutes later the Aggressor attacked with a superior force requiring the platoon to withdraw. The company commander ordered the platoon to delay through three designated delaying positions back to the company perimeter. The tactical phase terminated with the execution of the delay and the platoon returned to the post.

Upon return to the main post the platoon was given two hours to prepare for its final inspection. This was also conducted indoors due to darkness and to permit a more thorough inspection to be conducted. The final inspection was a repetition of the pretactical inspection except that personal clothing and equipment were not inspected.



U. S. Army

Plaque awarded to company (for its retention) of the winning tank platoon.

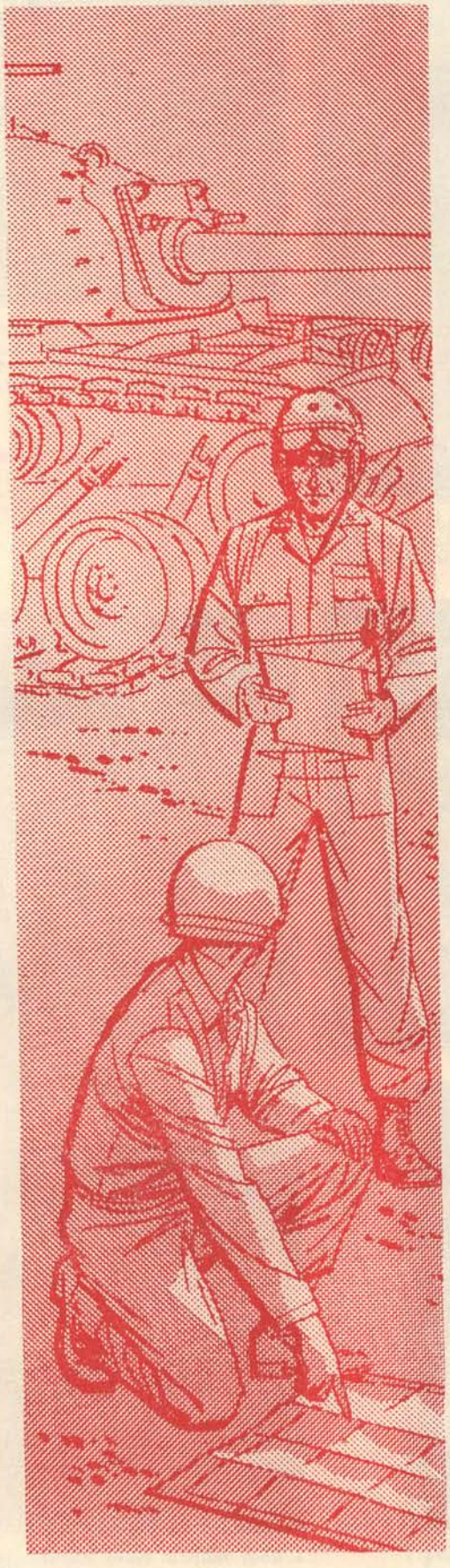
The final phase was the tank crew proficiency course which is a combat course for single tanks consisting of a series of surprise targets, some stationary and some moving. There are targets for all of the tank weapons including the 90mm both HE and shot, and an aircraft target for the cupola-mounted caliber .50 machine gun. It was originally intended that the tank crew proficiency test be fired immediately after the completion of the tactical phase and it is still believed that this would have made the test more exacting. Since daylight hours were limited, it was necessary to fire all platoons the day after the last platoon had completed its test.

The tactical phase throughout was made as realistic as possible. Large numbers of demolitions and simulators were used to add realism. The Aggressor force consisted of one reconnaissance platoon, the defense platoon and tank section from Division Headquarters and an engineer detachment; a total of 102 individuals. Only portions of this large force were used at any one time and at the completion of each phase the Aggressor for that phase would fade away to the flanks uncovering the Aggressor for the succeeding phase. This obviated the necessity of requiring Aggressor to retreat rapidly to successive positions.

Conclusion

The division's objectives were accomplished by the test. Competition between the four participating platoons was keen and each had an opportunity to demonstrate its capabilities in every phase of training. All personnel involved considered the test exacting, comprehensive and fairly administered. In spite of a total possible score of over 4500 points, competition was such that it was only after completion of the tank crew proficiency course on the last day that the winner could definitely be determined.

The winner of the first Armor Leadership Award under the provisions of AR 672-73 was the First Platoon, Company B, 57th Tank Battalion, commanded by Second Lieutenant James P. Bergen. The Armor Leadership Award was formally presented to Lt. Bergen by Major General C. Stanton Babcock, Commanding General, 2d Armored Division, at a review by Combat Command A, Coleman Barracks, Germany. The award will be held by Company B, 57th Tank Battalion for one year, after which it will go to the parent company of the next winning platoon. Individual awards, appropriately engraved, were also presented by General Babcock. Lt. Bergen received a silver punch bowl, Master Sergeant Fred W. Snyder, the platoon sergeant, a silver tray, and an engraved wrist-watch was awarded to each member of the platoon.

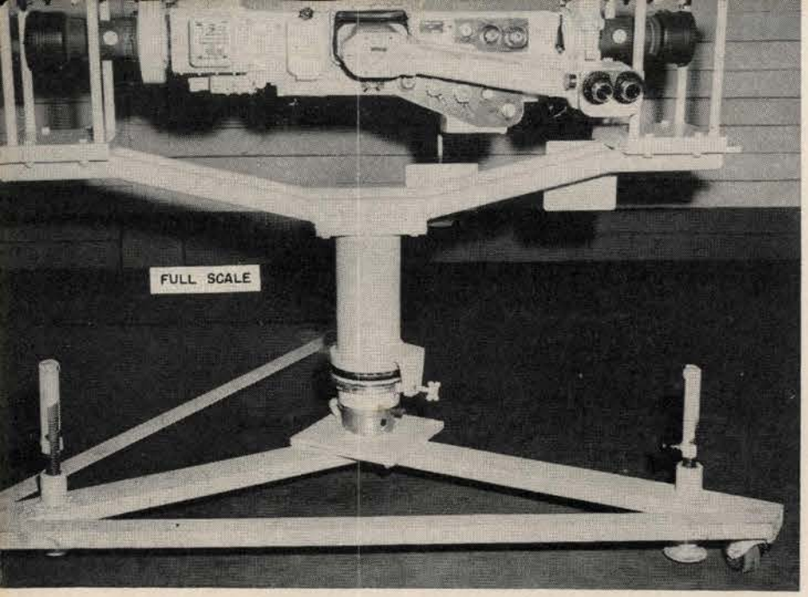


THE USE OF TRAINING AIDS WITHIN THE U. S. ARMY ARMOR SCHOOL*

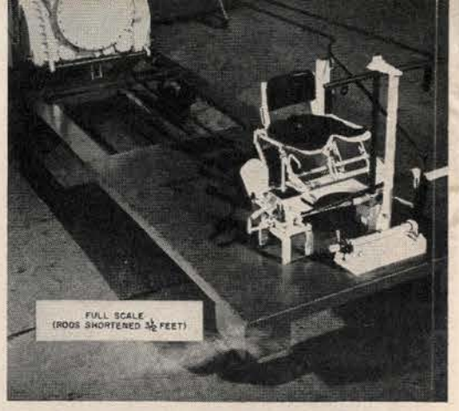
The U. S. Army Armor School's mission is the development and teaching of armor tactics and techniques, to include units of the armored division, the armored cavalry regiment, the armor group and tank reconaissance units of infantry and airborne divisions. In the accomplishment of this mission, The U. S. Army Armor School, through its instruction, prepares officers for duty as commanders of armored units and as staff members to include the division staff. Enlisted men are trained as noncommissioned leaders and technicians required in armor units. In order to provide the high standard of training required, instructors must present subjects in a completely understandable and receptive manner. Thus, all School instruction demands the most imaginative and ingenious employment of training aids which can be contrived by the instructor. Therefore, in support of the accepted idea that the hearing of instruction alone is not sufficient, The School utilizes a variety of training aids to ensure that the student will be receptive to a maximum degree and that the period of memory retention will be extended by the appeal to more than one of the five senses.

On the next two pages are photographs of typical training aids utilized by Armor School instructors. The nine training aids shown and described are, of course, only representative of the many types used at The U. S. Army Armor School. Instructors at the school are constantly studying devices to assist instruction, and The U. S. Army Armor School has an organic training aids shop to assist them in the never-ending quest for a better means to vitalize instruction.

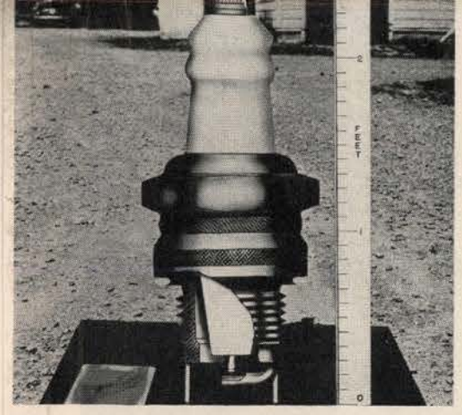
*2D LIEUTENANT PRENTISS F. TAAFFE, the author of this article, is a member of the Nonresident Instruction Department of The U. S. Army Armor School, Fort Knox, Kentucky.



ple of external utilization of tank instruments as aids for large groups is the Range In this instance a rolling platform and cradle is used to house it. A group as a receive simultaneous instruction on the device as opposed to one man inside a tank.

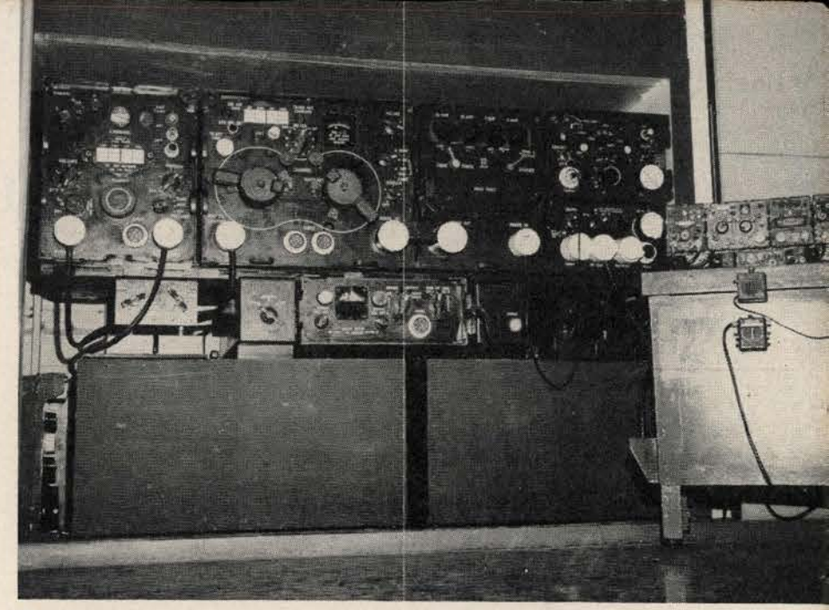


The shifting and steering linkage trainer was adopted from the M41 tank. Through its use the student can see what is taking place as a result of his own movement of the controls.



This enlarged cut-away of an internal combustion engine spark plug is typical of the enlarged type training aid utilized by The School for its relatively large group instruction.

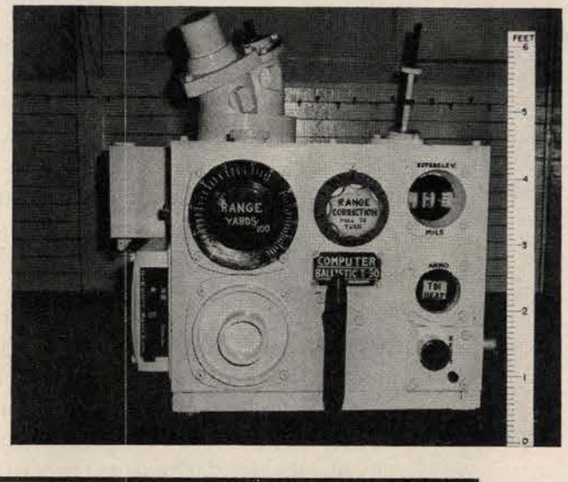
TRAINING AIDS

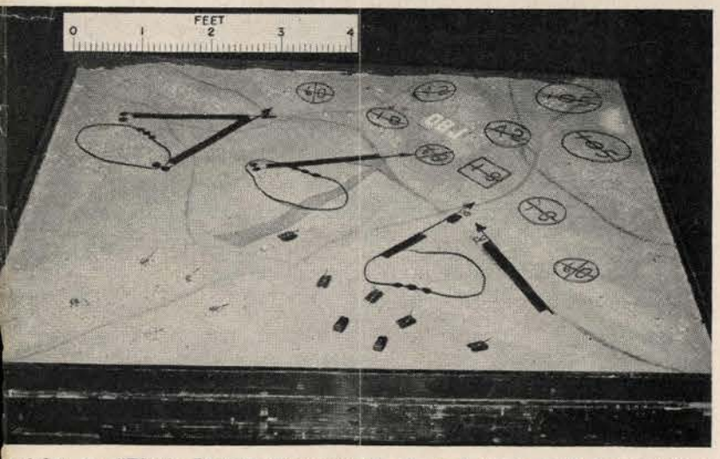


For large classes it is necessary to use wood and metal mock-ups such as a radio se in armor units. This permits the group to see each adjustment of the controls. N actual set in the foreground, the same type students use concurrently with the ins

All Photos U. S. Army

an example of certain ruments peculiar to ks, the Ballistic Com- er is used in wood and tal mock-up form ap- ximately 12 feet wide, classes too large to as- ble on a single tank.

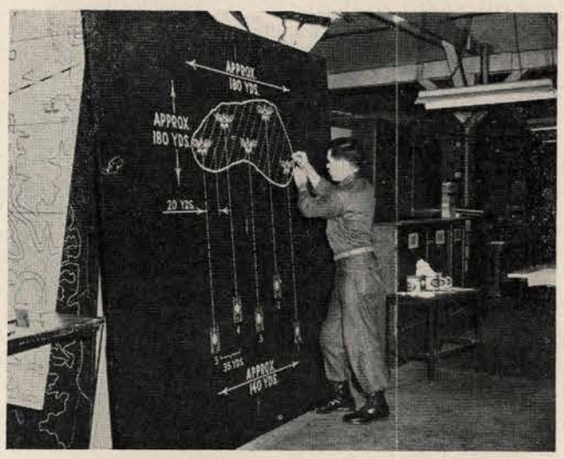




aviolet or "Black Light" illumination is used in a bold eye-catching entation, such as this movable (note rollers) tactical terrain board rein the objects have been marked with phosphorescent chalk or paint.



A floor map in color enables the instructor to maneuver model armored vehicles tactically to create battle realism. The employment of this aid in an amphitheater type classroom further enhances the instruction by presenting to the student an illusion of the depth dimension.



TAS conducts outdoo night exercises. To instru the students, a blackboar with objects on the boar painted with phosphores cent paint, is used to as sist in the understandin of what is taking plac



To show nuclear reaction, ping-pong balls are placed on mouse traps. As a tra (atom) is set off, the balls (neutrons) are released. In less than two secon all neutrons are released, showing the reaction from release of a single neutro

THE DIVISION SUPPLY CONTROL POINT IS THE G4's MOST VERSATILE TOOL

By CAPTAIN EDWARD L. WAGGENER

THE Armored Division G4, during field operations, must make use of all resources available to accomplish the tasks placed before him.

The G4 is provided many necessary tools to accomplish his mission. Tools such as the technical services are coordinated and work wonders in supplying the tons of equipment required to support an armored division in field operations, yet the inevitable problems concerning the S4 or even the lone truck driver "who did not get the word" arise. It is to this individual that the G4 must direct his ingenuity and resources.

In planning and coordinating publication of an Administrative Order, the G4 endeavors to include all necessary information, yet refrain from including unnecessary trivia. The location of and use of the division and applicable Army Supply Points are usually pinpointed down to the last few meters, but do not forget the man who does not see the Administrative Order or cannot read his map! In his case, the G4 must make use of his most versatile tool, the Division Supply Control Point. Experience has taught us where to locate the DSCP but not how to fully utilize it. The DSCP is one of the most, if not the most, important installations the G4 supervises. Invariably located on the Main Supply Route behind the combat command field trains and forward of the division supply points, the DSCP should be the first installation the resupply convoy commander or the lone vehicle driver sees on his rearward trip. In order to insure that the DSCP is seen, an MP team, usually composed of two or more MP's, is normally attached to the DSCP. The mission of the policeman on duty is to stop rearward bound supply vehicles; determine their destination and give them necessary instructions. If division personnel are constantly indoctrinated with the SOP that the DSCP will always be located on the MSR just forward of the supply points, they need to know no other locations. The convoy commander or vehicle driver heads rearward on the MSR; the MP stops him at the DSCP; he checks in and is directed to the applicable supply point and is soon on the road again back to his organization.

What should the composition of the Division Supply Control Point be? First and foremost, it should be small and fully mobile. An M109 shop van or comparable vehicle is ideal. The officer-in-charge should have a quarter-ton truck for liaison purposes. The MP traffic team should have a quarter-ton truck. There must be a three-quarter-ton radio vehicle attached. These four vehicles are the maximum number in the DSCP. Attached to, but not an integral part of the DSCP, should be a 35 gallon-per-minute Water Point detachment. How many times during field operations are single vehicles towing a water trailer spotted roaming the countryside looking for a combat command water point? Again, indoctrinate all personnel that there will always be a water point located somewhere near the DSCP, and that the location of this point will be known at the DSCP. This particular water point should never be used for the entire division, but as the primary source of water supply for Division Troops and Division Trains, and as an emergency source for the remainder of the division. With this source of water supply directly under the control of the DSCP there is no reason for any unit to be denied water because their own combat command water point is moving, lost, or broken down.

What personnel should be used to operate the DSCP? Where are they to come from? To answer these two questions let us consider for whom the DSCP works directly. The G4 has primary interest, but his section is not large enough to provide personnel. Normal requirements are four people; one officer and three enlisted men. Because the DSCP works so closely with the Quartermaster Battalion, an ideal solution is for this battalion to provide operating person-

CAPTAIN EDWARD L. WAGGENER, Armor, served in Europe during World War II with the 20th Armored Division. Reverting to civilian status after the War he was recalled to active duty in 1951. Assigned to the 2d Armored Division he was in the G4 section. He now holds the same position in the 4th Armored Division.

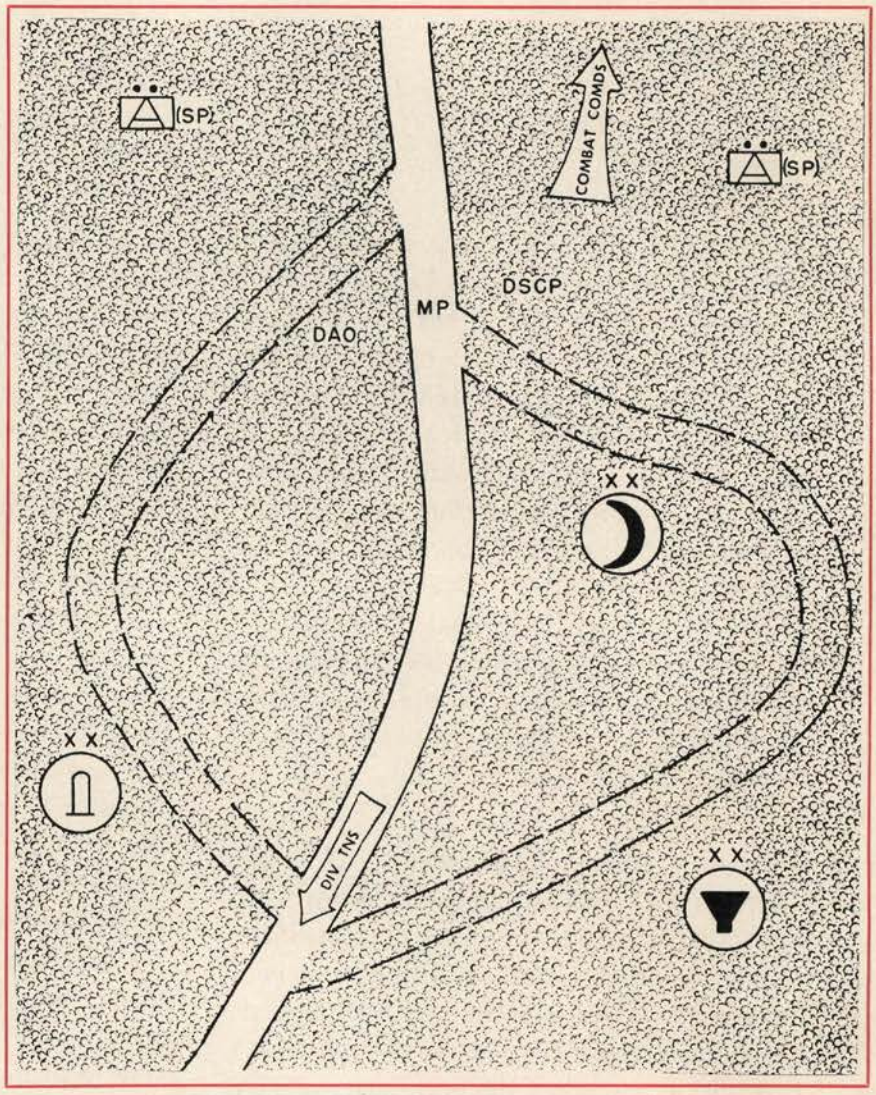
nel. Due to the close harmony required between the G4 and the Division Quartermaster, this solution provides the best results. Of necessity, DSCP operations are usually around-the-clock, but by stationing qualified personnel at the installation, four people can handle the load except for local security which must be provided by Trains.

In order to exploit to the fullest the inherent possibilities of the DSCP, an effective operating SOP must be established. A logistical situation map must be kept up to date; locations of major elements of the division must be plotted thereon to provide information to the stream of lost and information-seeking personnel that will stop. Provisions must be made for handling written messages that will be left for pick-up by the technical services. The SOP must include provisions for feeding the DSCP personnel, and will include alternate methods of procuring food and water. Registers for visitors should be provided for historical purposes; message logs should be kept.

The division G4 assumes the responsibility of feeding information to the DSCP. Frequent liaison visits are necessary in order to insure that the DSCP situation map is current. Moving and locating the DSCP is another function reserved as the exclusive right of the G4. Just as he designates the location of Division Trains and the supply points, so does he hand pick the exact location of the DSCP.

Personnel at the DSCP may also greatly assist in keeping their information current. Each seeker of information is also a source. It must be SOP to ascertain from each visitor the location of known units, plus current tactical information. Frequently the officer-in-charge may make recommendations to the G4 on many items because of information he has gleaned from such sources.

Properly staffed, properly equipped and properly used, the results accomplished for the Armored Division by the Division Supply Control Point are almost beyond description. All that is required is a little imagination and a little initiative. Thus G4's problems in supporting combat operations are greatly reduced. It is hard to visualize an Armored Division operating without a DSCP.



DEFINITION OF A DSCP

A division supply control point is a control activity and installation, located on the division main supply road in the vicinity of the division mobile supply points. Its mission is to regulate and expedite logistical support of the combat elements, particularly resupply during combat.

During the past several years while the incumbent Secretary-Treasurer-Editor has been holding down this chair, it has been his good fortune to work closely with most of the Secretaries of the various Armored Division Associations. A lot of these endeavors have been accomplished through the mails. The majority of these Division Associations are made up of personnel who served with the Armored Divisions during World War II. There are four exceptions, however. The four Armored Division Associations bearing the same numerical designations as the four active Army Armored Divisions also have many members presently serving in these units.

During calendar year 1956, your editor wrote to all twelve secretaries asking them to supply address lists of their members. Everyone complied. (For a list of the incumbent Division Association Secretaries, see page 35, November-December 1956 issue of *ARMOR*.) In addition, we asked the Secretaries to give us an advertising plug in the next issue of their various news bulletins. To date, every bulletin that has been published since that time has graciously taken note and we are most appreciative. In return, we have established a yearly roundup of current information concerning the activities of the various Division Associations to include business addresses, forthcoming convention sites and tentative dates for the next get-togethers. We have also supplied photographs and material for news bulletins when requested.

In talking to Armored personnel, both past and present, in the Washington area, who are members of one or more of these Division Associations, and to Secretaries of several Associations whom we have had the pleasure of dealing with in person when they have been in our fair Capital, it has occurred to us that there is a possibility that all Armored Division Associations might want to simultaneously meet for their Annual Conventions some year in the near future here in Washington, D. C. There is no intent to run these Division Associations or any one of their meetings. (We keep busy enough with our own Association, which incidentally is holding its 68th Annual Meeting at Fort Knox, Kentucky, on the 4th and 5th of April.) Nor do we have any desire to have any Association lose its identity in any way whatsoever. But over the war years there were many cross assignments from one division to another. Also many armored personnel have friends in other Division Associations. So, as a common meeting ground and as a point of departure, we are going to go out on a limb and make certain proposals.

We propose that all Armored Division Associations meet here in Washington simultaneously over Labor Day weekend, 1960. Other interested Associations are invited to join us. For example, some World War I Tank Corps Association members have expressed an interest. Also, some Separate Tank Battalion organizations and one National Guard Armored Division Association have indicated they are interested. If the various Armored Division Associations are interested in pursuing this idea further, it is suggested that each Association appoint a representative, preferably located in the Washington area, to meet with each other and at the call

of this writer in the near future, to draw up preliminary plans for a joint meeting. Please contact this office with the representative's name and address. If this idea is acceptable to most Association representatives they can approach their Associations with this proposal at their forthcoming 1957 reunions. If acceptable by the various groups, then we can go on from there and turn these proposals into something more concrete than words.

What do we have in mind? Let us wander a bit. Each Association will have its own business meeting and social get-togethers during the entire weekend. However, for the noon luncheon on Saturday we might jointly meet in one composite group for the more serious side of these gatherings. What about the Saturday evening banquets? That can be worked out by the committee. But as a vantage point upon which to build, we suggest that each Association have its own social affair in the evening. On Sunday it is suggested that we all meet for a common worship service honoring those who have given their "last full measure of devotion."

What will such a meeting accomplish? We believe that it will bring together many personnel who soldiered together at one time or other. By holding such a gathering in our Capital city, it is believed that we will be able to assemble many additional members who are still in service, in addition to a great number of persons now civilians but who continue to have an interest in the defense of our great nation. Further, with a target date of some three years hence to assemble for such a huge convention, each Association can use this focal point to build up interest in its own organization. It can serve to hold it together and to endeavor to turn out *en masse* thus assuring each Division Association of a respectable representation. Interest in the mobile field was evidenced by many Association members when they responded to a promotional drive put on by this Association during the past year. Thus, we feel that their interest in a joint meeting will prove beneficial to all who can attend.

How does the Armor Association enter into the picture? We intend to publicize the progress of such an undertaking through these pages. We intend to coordinate the planning group made up of the appointed representatives from the Associations. And we will lend whatever assistance we can to make this meeting an outstanding success.

Is the idea worth pursuing? This can be answered only by each and every Association appointing a representative to meet with this writer to explore the feasibility of such a plan. As soon as we get a representative group which will bring together the majority of these Associations, we will call a meeting and discuss it further. We want everybody's comments, both *pro* and *con*. We are not sure this is the right approach, but we sincerely believe it is worth the effort to find out.

Let us hear from you.

The Editor

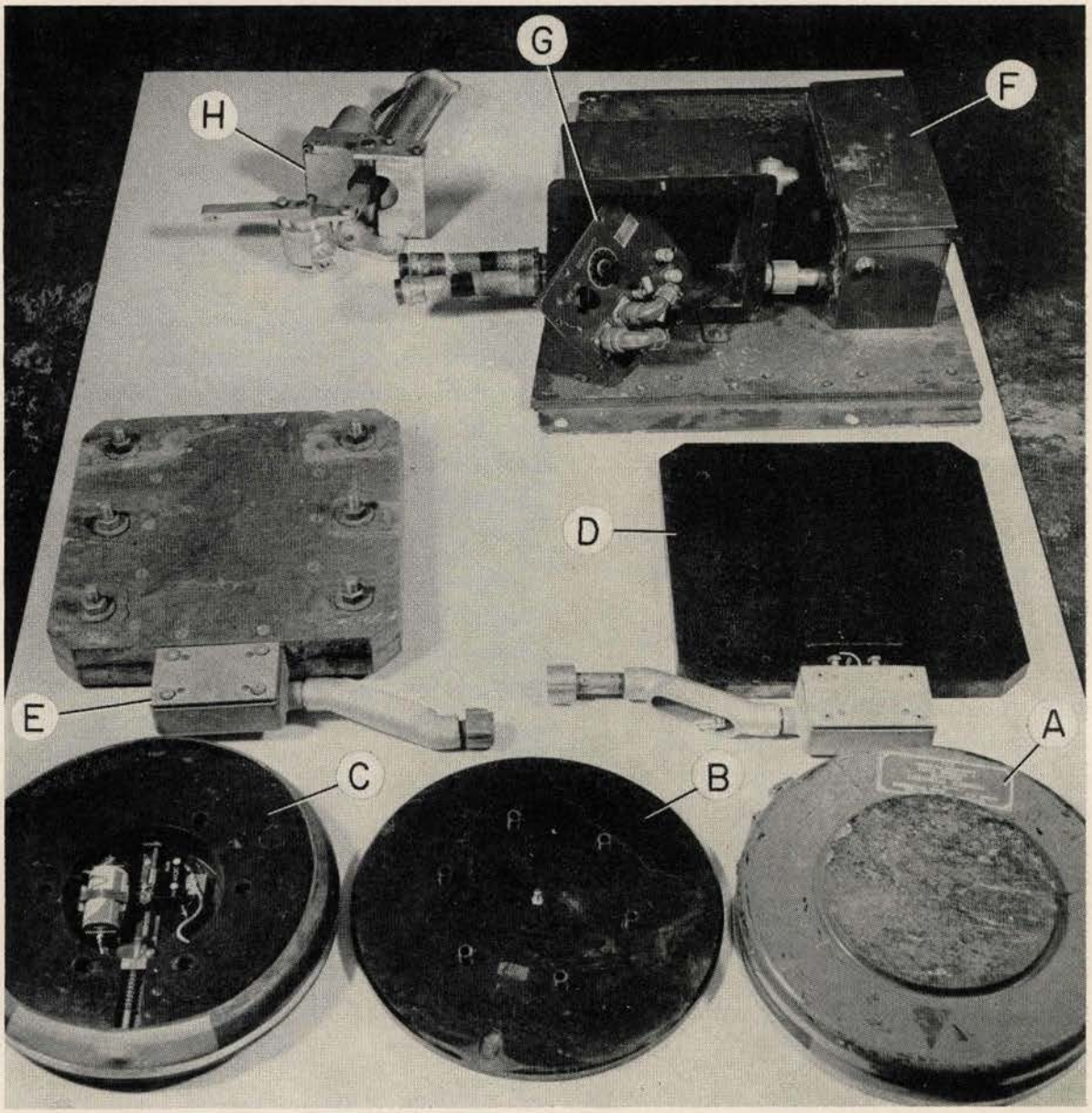


Figure 1. A—Top view of antitank mine simulator. B—Top portion of antitank mine simulator. C—Interior of antitank mine simulator. D—Interior of receiver coil. E—Preamplifier. F—Battery box. G—Receiver. H—Stopping mechanism.

ANTITANK MINE SIMULATOR

By LIEUTENANT COLONEL HORACE S. McILROY

LIEUTENANT COLONEL HORACE S. McILROY, Armor, graduated from the A&M College of Texas in 1937. During World War II he served in Europe with the 10th Armored Division. Subsequent to the War he was in the Constabulary, attended Command and General Staff College, and held various key positions in the 1st Armored Division at Fort Hood. He was next assigned to SHAPE in 1952. Returning Stateside, he was assigned to his present position in the Maintenance and Supply Division Section, CONARC.

AN antitank mine simulator has been developed by Technical Operations, Incorporated (TOI), Arlington, Massachusetts for the Combat Operations Research Group (CORG) of Headquarters, CONARC. The development of the mine simulator was initiated primarily to provide a device which would aid in the assessment of the effects of weapons (mines) employed against personnel and matériel in field tests and experiments.

This device should be of much value to the new Army Combat Developments Test and Experimentation Center (CDTEC) in the collection of data to establish mine field effects in tactical warfare. It should also prove of value as a training aid for use in training exercises.

The antitank mine-simulator system was designed for use with the M48 tank. However, the system can be readily modified for use on other tanks or track vehicles of any nature.

Equipment required is shown in *Figure 1*, and the location of the equipment is shown in *Figure 2*. The materials consist of:

1. *Antitank Mine Simulator* (see A, B, C, *Figure 1*). It corresponds to the M15 AT mine.

2. *Receiver System* (see D, E, F, G, *Figure 1*). This consists of a receiver, receiver coils and amplifier which receives an electromagnetic signal from the mine simulator and amplifies it.

3. *Stopping Mechanism* (see H, *Figure 1*). A mechanical device for shifting the tank's transmission into neutral.

The functioning of the system requires that the mine simulator(s) be buried in the ground and that the receiver system and stopping mechanism be mounted on a tank. This mounting is accomplished by the use of existing studs and bolts and requires no modification of the tank other than a minor one to the transmission.

The system operates as follows: A tank, running over the mine-simulator pressure plate, trips a switch. This causes the mine to emit an electromagnetic signal which is picked up by the nearest of the two receiver coils mounted on the belly of the tank. The signal is carried by cable to the receiver mounted on the left forward fender of the tank. There the signal is amplified and forwarded by cable to the stopping mechanism mounted on the transmission in the engine compartment. The stopping mechanism, through a mechanical process initiated by the receiver, shifts the transmission into neutral. The driver cannot prevent this action, nor can he shift back into gear and proceed until the on-tank stopping mechanism has been reset. The reset handle, *Figure 2*, may be modified and inclosed in a locked case for use on maneuvers. The key(s) to the locks could be given to maneuver umpires, thereby increasing maneuver reality by requiring the umpire's presence before a tank could proceed on its mission. Test of the device has assured that vibration, traveling cross-country, and operation of mechanical and electrical components of the tank will not affect the operation.

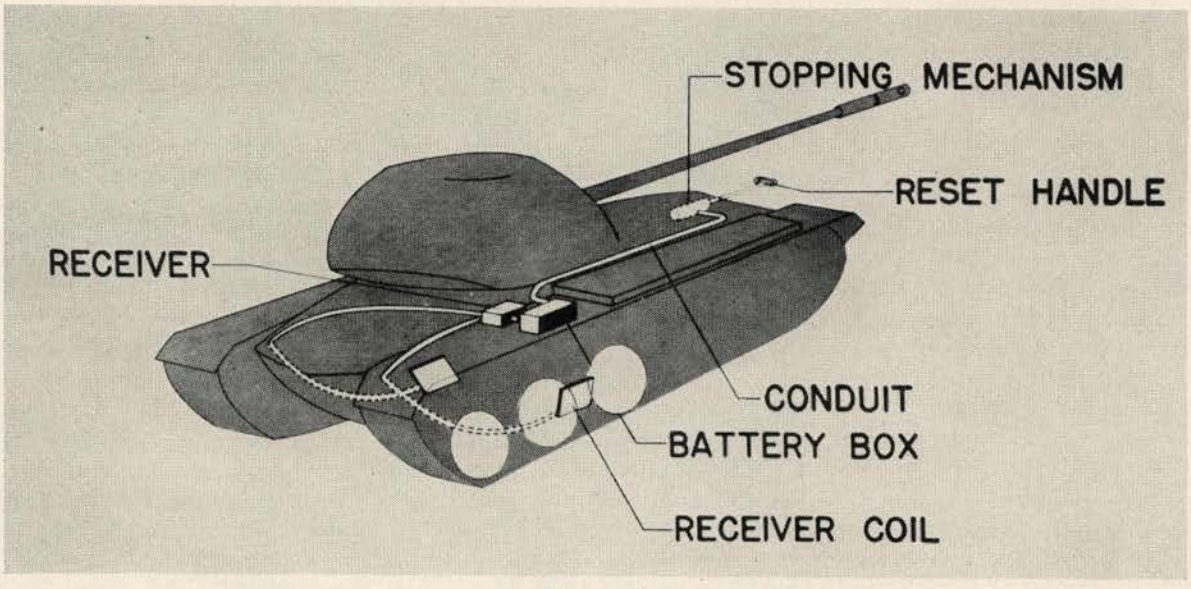


Figure 2.

The regular flow of letters and cards from its alumni attests to the effectiveness of The U. S. Army Armor School's program in that it is

Making Friends Around the World

By LIEUTENANT COLONEL HERSCHEL H. HUTSINPILLER

AMONG the strongest supporters of the United States Army are the officers and enlisted men, from free countries throughout the world, who have graduated from The U. S. Army Armor School at Fort Knox. Not only are they appreciative of the training which they received, but they have taken home many pleasant memories of their tour at Fort Knox.

This combination of providing effective training and achieving good will results from a studied effort on the part of The U. S. Army Armor School, whose Foreign Liaison Section is the principal coordinating agency in this effort.

From the moment a student arrives the Foreign Liaison Section is at his service. He is met at the airport, the bus station or the railroad station by a member of the section, who takes him to Fort Knox and assists him with his billeting and administrative processing.

In addition to serving as the central administrative agency for the students from foreign countries, the section also does everything possible to facilitate their adjustment to a strange land. The student relies heavily upon the Foreign Liaison Section for advice, assistance and guidance during his stay at The U. S. Army Armor School, with regard to both personal and professional problems. At the end of his tour, he finds that the section arranges his transportation, expedites his clearance from the post and, finally, escorts him to his plane, train or bus.



U. S. Army

A foreign officer and his sponsor, who is a member of the staff and faculty of the School, get to know each other better over the proverbial cup of coffee.

The U. S. Army Armor School is convinced that its responsibilities toward the foreign student extend beyond his academic training. It is the belief of the School that a thorough orientation on American life and frequent social contacts with Americans do much toward making foreign students friends of the United States in general, and of the United States Army in particular. To accomplish this the School draws upon both the military community of Fort Knox and the surrounding civilian communities.

At the forefront of the military community is the student's sponsor, who plays a major role in making the foreign student feel at home, in orienting him on American life and in ensuring his successful completion of academic work. The sponsor, who is a member of the staff and faculty of The U. S. Army Armor School, usually has had experience in the student's country, may speak his language, and generally is of comparable rank. In effect, the sponsor is the student's counselor.

The sponsor displays a personal interest in the student. He monitors his academic progress and assists him with his problems. Sponsors frequently invite students into their homes, particularly on traditional holidays, thereby giving the students a better insight into American family life.

American classmates of the foreign student also assist the foreign student with his academic work and invite him to participate in sports and social activities. It is the policy of The U. S. Army Armor School to intermix the foreign and American students, both in the classroom and in the billets, thereby promoting the integration of the foreign student into the school community and encouraging him to feel that he is an accepted member of the group.

Let it not be thought that the distaff side is forgotten. Wives who accompany their husbands to Fort Knox find that the ladies of the International Group always are willing to lend a helping hand. The International Group is a section of the Women's Club. One or more members of the group always are on tap to show the new arrival how to set up housekeeping in a strange land, and then stand by to give any assistance which might be required. Every imaginable service, from assistance in shopping to chauffering children to the doctor, is provided. The group also schedules a series of social activities to assist the foreign wife to become more familiar with American life and to

LIEUTENANT COLONEL HERSCHEL H. HUTSINPILLER, Armor, a 1939 graduate of the University of Michigan, served in Europe during World War II. Subsequent to the War he served in Rumania as Assistant MA. Returning Stateside he attended school at Knox and went to the 1st Armored Division. He is the Chief of the Allied Liaison Section at The U. S. Army Armor Center.

develop a circle of American friends.

In addition, there is the usual variety of Army post social activities, in which the foreign student participates on an equal basis with the American officer. Every foreign officer who attends The U. S. Army Armor School becomes a member of the Officers Open Mess and his membership is provided without the payment of dues.

Another device for making the foreign student feel that he is a full-fledged member of the School is the internationally-known cup of coffee. Normally, each class is invited to a coffee call soon after the start of the course. Here the foreign student meets informally with the Assistant Commandant, key members of the School staff, department directors and the student sponsors.

Fort Knox is justifiably proud of the support it receives from the surrounding civilian communities in orienting foreign students on American life. Organized civilian support was initiated when "Operation Hospitality" was set up in July 1954, with the Louisville Chamber of Commerce activating the necessary civilian promotion. Other nearby communities have since joined in this activity.

Approximately 30 civic organizations regularly invite foreign officers to their dinners and meetings under the auspices of "Operation Hospitality." Normally, the students attend these affairs in pairs. They are taken to the meeting place, where they are met by a representative of the organization who serves as their host. Such affairs give the foreign officer a fine opportunity to observe the workings of American society.

Nor can it be said that "Operation Hospitality" is one-sided, for the foreign officers frequently find that they are in demand as guest speakers at these same organizations, at conventions, etc. Such appearances are encouraged, since they give the foreign student the opportunity to express himself and serve as evidence of American interest in his homeland.

It is not unusual for lasting friendships to develop from these encounters, and the foreign officers frequently are extended invitations to visit in American homes as a result of the contacts made.

The University of Louisville invites the foreign student at Fort Knox to attend activities planned for foreign students who are enrolled in the University. These include such activities as a series of lectures on various phases of life, given by outstanding leaders in all fields of the American scene.

To demonstrate "old fashioned American hospitality" and to promote international understanding, the International Club of the Louisville YWCA holds meetings twice each month. All foreigners in the area are invited. Here, the foreign student, who frequently meets other representatives of his homeland, learns about the United States and other countries by attending short illustrated lectures. The social activities, which are a part of each meeting, enable the student to enlarge his circle of friends.

Further orientation on America is provided by the guided tours organized by the Foreign Liaison Section. Whenever the schedule of instruction permits sufficient time, the foreign students are taken in class groups on tours of nearby radio and TV stations, newspaper plants, factories, tobacco plants, distilleries, horse farms, etc. Tours also are made to the birthplace of Lincoln, My Old Kentucky Home and other places of historic interest. These permit the student to see America at work and give him some idea of our cultural and historical development.

Several thousand officers and enlisted men from all parts of the world have studied at The U. S. Army Armor School since 1942 when the first students from foreign countries arrived. During the six years it has been in existence, the Foreign Liaison Section has worked with more than 1,400 students. Normally, approximately 200 officers arrive each year, and as many as 36 different countries may be represented at any given time.

The regular flow of letters and cards from its alumni attests to the effectiveness of The U. S. Army Armor School's program. Not only do the students invariably express their appreciation as they leave Fort Knox, but many take the time to sit down and write their "alma mater" after they reach their homeland. Here, then, is proof of the friendships which result from the studied and cooperative effort to build good will among the foreign students who attend The U. S. Army Armor School.



U. S. Army

The foreign students of a graduating class are discussing their course with representatives of teaching departments.

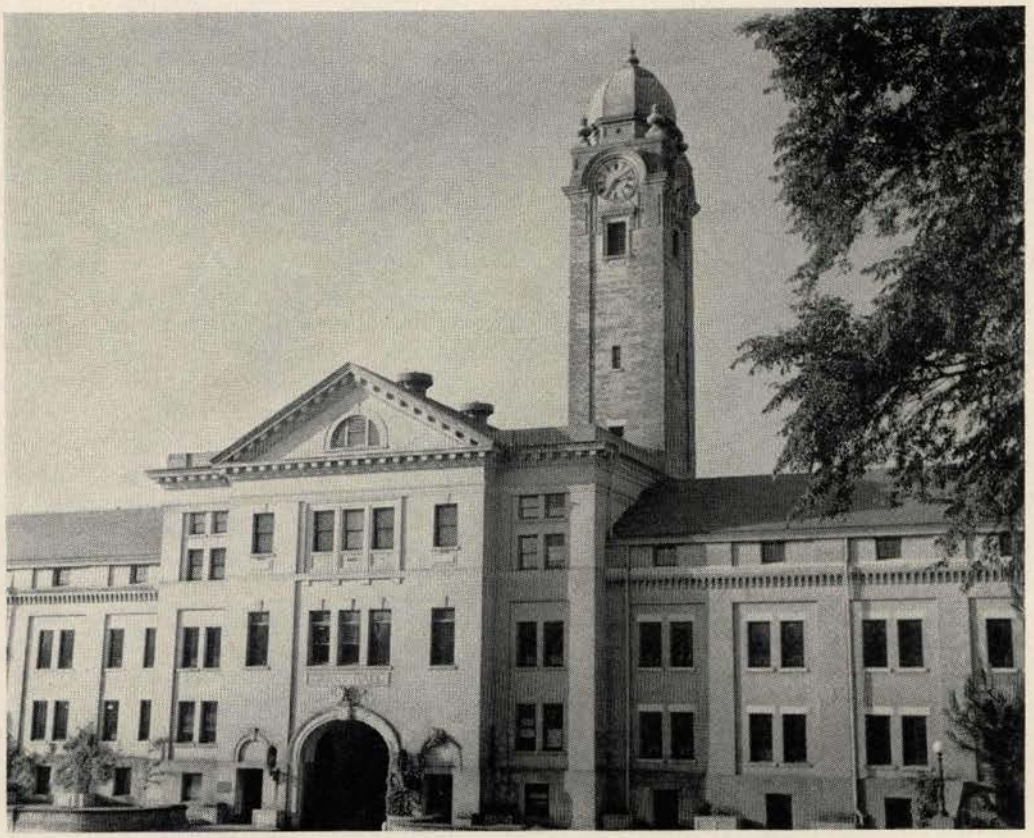


U. S. Army

Wives of foreign students are not forgotten as The International Group of Women's Club make them feel at home.

Prep Course for Leavenworth

By MAJOR L. GORDON HILL, JR.



IF I had understood the commander's estimate early in the course, I would have learned twice as much."

"That business of analyzing the terrain—picking out the critical parts—and selecting avenues of approach: if I had mastered that during the first few weeks instead of the last month, I would have finished in the top quarter of the class."

These are typical comments of recent graduates of the Command and General Staff College. They refer to some "basic" subjects that are covered during the first month of the resident courses—subjects that all students must learn early. Or else, they spend a miserable year fumbling around with "tools" they really don't understand.

The fact that an officer, with perhaps 14 years' service, reaches Leavenworth without knowing various tactical fundamentals may seem hard to understand. A partial explanation can be found in the answers to these questions:

How many Quartermaster officers have ever selected critical terrain?

How many Armor officers appreciate the detailed terrain analysis that is necessary in infantry division operations?

How many Artillery officers have ever selected an objective?

How many Ordnance officers know the implication of an order that directs him to move from A to B "without delay"?

How many Infantry officers, without changing step, can lift themselves above the company and battalion level and critique a course of action for a division attack?

Applying these questions to prospective Leavenworth students, the answer invariably is "very, very few." Also consider the fact that C&GSC is the Army's only school that teaches, without favor or slant, tactics of the combined arms.

If you have completed your branch

MAJOR L. GORDON HILL, JR., Artillery, is a graduate of the 1955-56 course at the Command and General Staff College and is presently stationed there at Fort Leavenworth, Kansas.

advanced course, and are expecting to attend Leavenworth, you should get ready for it. A little preparation not only will make the course easier for you, but it will enable you to learn much more while a student at the College. And after all, you are going there to learn. Prior preparation becomes even more important when you consider how the student body has changed recently. For some years following World War II, Leavenworth was "catching up" with the backlog of eligible officers who were unable to attend during the War. The typical student in those postwar years was older than today's student and he brought to the College a broader background of experience. The typical student several years ago was a lieutenant colonel; today he is a major, and in the current regular class of 532 U. S. Army officers, there are 108 captains.

The College is not going to lower its standards in order to accommodate the lack of experience and youthfulness of today's student. Consequently the prospective student can either take steps to prepare himself or look forward to a frantic year of trying to keep up. "Prior preparation" does not mean wildly grabbing field manuals and cramming away. That will take a lot of time and will not do much good. Instead, here is a recommended three-step "prep" course that must be considered a minimum:

First: If you have not been working with maps lately, get a copy of the new FM 21-26, *Map Reading,* and spend 30 minutes browsing through it. *That's all!* This will prepare 99 44/100% of prospective students for the map reading part of the Leavenworth course.

Second: This step takes longer. Enroll in the C&GSC extension course program for *seven* specific subcourses. (The College offers a total of 41 subcourses.) Time devoted now to these do-it-yourself kits will save an officer many precious hours after he gets to Leavenworth. Here is a brief description of these subcourses:

Subcourse 2, *Basic Subjects,* is concerned primarily with staff organization and procedures and the organization of the infantry division; these are the very basic "tools" for the Leavenworth student. This subcourse has lessons on leadership, rules of land warfare and public information.

Subcourse 3, *Fundamentals of Combat,* covers the principles of war and the fundamentals of offense and defense. One-half of the regular course curriculum consists of division, corps and army operations which are taught mostly by applicatory map exercises. Every operational map exercise makes use of the principles of war and the fundamentals of offense or defense.

Subcourse 4, *G1 Functions and Techniques-I,* is an introduction to G1 activities at division level. It deals with the fundamentals and procedures employed by the G1 in such matters as morale, discipline, replacements and prisoners of war. These matters will be major problem areas on the atomic battlefield.

Subcourse 6, *G2 Functions and Techniques-I,* covers the all-important topics of tactical study of weather and terrain, and the intelligence estimate. There are about 45 operational map exercises taught in the regular course. A major part of each one is the weather and terrain and the intelligence estimate. This subcourse also has lessons on Aggressor military forces. Aggressor is the enemy of the C&GSC student throughout the resident course.

Subcourse 8, *G3 Functions and Techniques-I,* includes two "musts": the estimate of the situation and operation orders to include overlay techniques. If there is anything that the College pounds on all year, it is the estimate of the situation. A student places himself at a disadvantage by not learning the estimate early in the course; yet many do not. At some time during each exercise dealing with combat or logistical operations, from division to army level, as well as the communications zone, the student has to write at least part of an operation order. The sooner he masters the technique of these orders and their overlays, the sooner he can get to the real business of writing clear, complete and concise orders.

Subcourse 10, *G4 Functions and Techniques-I* deals with division logistics in combat and includes such topics as the principles of supply, logistical organization, and characteristics of service units. These fundamentals will provide the prospective resident student with a solid foundation on which to base more advanced instruction.

Subcourse 12, *Technical Considerations in Employment of Atomic Weapons,* teaches the techniques employed in analyzing targets, selecting weapons, calculating damage and casualties, and ensuring troop safety. The big majority of Leavenworth's map exercises are played under atomic conditions. Past students have had considerable difficulty with the technical aspects of atomic weapons; but atomics are here to stay, so a little frustration can be allayed by learning some of it in advance.

Although most extension course students are not on active duty, any officer on active duty who is eligible for the regular or associate course at C&GSC may enroll in these subcourses. Enrollment is the ultimate in simplicity: fill out *one* copy of DA Form 145 asking for subcourses 2, 3, 4, 6, 8, 10 and 12; get your superior to indorse it and mail it through your branch school to the Director, Department VI, C&GSC, Fort Leavenworth, Kansas. Mark your application, "In preparation for resident course."

Third: Read two books—a general work on military history and a biography of a famous military leader. This can be done concurrently with the second step.

There are many general works on military history, some stuffy and some interesting. A brand new one that reads like a novel is the *Military Heritage of America* by Dupuy and Dupuy. For the biography, either Patton's *War As I Knew It* or Desmond Young's *Rommel: Desert Fox* is recommended. These books illustrate many leadership characteristics and tactical aspects which will prove helpful at C&GSC. There are many other good ones. In fact, C&GSC furnishes each new extension course enrollee with a list of books which presents a progressive and integrated coverage of the military art. The books on the list, which was prepared in the office of the Chief of Military History, Department of the Army, are recommended for the Army officer's professional background reading.

Although the three-step "prep" course described does not necessarily have the official indorsement of C&GSC, this writer feels that if it were a commercial product, he would give it a "double-your-money-back" guarantee.

CONTENTS SECRET

By CAPTAIN CHARLES P. SKINNER

SIR, my clearance for interim secret came through today. May I tell my folks?"

How are you going to answer this eager young soldier, with his big wide eyes and his pride in his new status of one-who-can-be-trusted? Why shouldn't he tell his folks? What harm is in it? They will also be proud. His dad will remark casually as he steps into the barber chair in Hometown, U.S.A., "Junior got cleared for interim secret, he writes."

Barber shop, hm. Who is that character hiding behind the newspaper, letting other customers have his turn? Tonight he will short wave his confederate near Junior's camp. The enemy will go to work on susceptible young Junior to find out what he knows.

And then, trouble for you. One of your men has leaked a piece of "defense information and material the unauthorized disclosure of which COULD RESULT IN SERIOUS DAMAGE TO THE NATION."*

Now wait a minute; not all Hometown, U.S.A., barber shops accommodate spies whose plotting is going to lead right back to your orderly room. Let's not be a worry wart, a nail-biting, feverish wreck sleeping in front of the company safe. Nobody is too much worried about *your* guarding the secrets. It is your men, your subordinates, the ones for whom you are responsible for whom we are concerned. How do you keep those under you from spilling the beans? Take a look at a couple of newspaper items that have appeared recently. We are not out to embarrass anybody, so please bear with the asterisks. Better yet, just for kicks, substitute data from your own outfit for the asterisked spaces.

HONOLULU (UP)—The FBI is seeking the serviceman or servicemen who disclosed that ***. The Honolulu Advertiser reported this today.**

The informant also said two servicemen were blinded by ***.**

The FBI's only comment on the story was: "We are interested in any possible security violations involving the ***, which we are obligated to enforce."**

The newspaper said authorities consider it "imperative to find the leak on *** and plug it, no matter what service he belongs to. (He was not a Navy Man.)"—*The Boston Globe*, 17 June 1956.**

With due credit to the virtuous Navy PIO who seems to have been standing watch in the *Honolulu Advertiser's* city room, let us all shiver slightly while we listen for FBI footsteps to come around our orderly rooms.

Here is another one:

WASHINGTON, Aug 3 (UP)—An *** has streaked over California at more than ***** miles an hour—an all time high speed mark for piloted aircraft.**

Authorities disclosed last night that ***.**

Informed sources said that the Defense Department vetoed *** plans to announce details of the history-making flight. However ***** achievement became known in ***** at the annual ***** convention.—Quincy, Mass., *Patriot Ledger*, 3 August 1956.**

How do those items sound when written up around the classified stuff your outfit is handling? Whom do they lead to but the *Responsible Officer*, as always?

While you may never serve in one of the hush-hush units which operate classified equipment or engage in a classified mission, your turn for assignment to staff duties or to higher commands is pretty well bound to involve you in the toils of DD Form 398, Personal History Statement, and your resulting security clearance.

Guarding yourself is not the rough part. Your own personal integrity is a good safeguard against mistakes. That virtue plus some extra caution should protect you fairly well. What constitutes your real worry is your responsibility for subordinates who share the secrets with which you have been entrusted.

It seems to me that there are two subjects on which troop commanders are genuinely justified when indulging themselves in speech making. You might want to add VD and sanitation and a lot of other things to the list. They are important. By me though, accidental discharge of firearms and safeguarding of security information head the list.

In the first instance, writing the letter to a fatality's parents must be a nightmare; he wasn't killed by the enemy, the only way a soldier should ever have to die before his time, if he must at all. In the second instance the whole nation is hurt. Both issues do respond to the ability of a leader to speak forcefully, convincingly and persuasively to major portions of his command (which is speech making), *frequently*.

How young are children when they first begin to chant, "I know a secret—," and how long do they keep it? How old are they when they first get curious? You won't get much argument when you claim that the more intelligent a man is, the more curious he must be.

When a grownup soldier begins to receive information which he is told is classified, he is very susceptible to an attack of fallacious pride. This pride is dangerous. It is the sort of false pride that leads a fellow to tell his best friend and maybe others some things that they do not need to know. The blabbermouth soon gets a reputation for "knowing things."

Secrecy, the keeping of secrets, knowing something someone else does not know, is one of the most interesting subjects in all our books, plays and movies. Spy stories are sure fire entertainment. One of the keys to holding people's interest in such

*AR 380-5.

CAPTAIN CHARLES P. SKINNER, Signal Corps, is presently on Reserve Component duty stationed at Northeastern University, Boston, Massachusetts.

pieces is to let them know part of the inside story before the hero finds it out.

A lot of us read the ending of the mystery as soon as we first get absorbed in the plot. People watching a shoot-'em-up wish they could warn the "good guy" about the *second* villain hiding behind the door; it's a trap. Just because he's got the drop on the first hombre, he thinks he and the girl are going to get away, but he's wrong! And the crowd knows all this and feels superior.

There probably is no man alive who does not feel some of this misplaced pride in the fact that he knows big secrets. The bigger the man is, the less likely he is to go around saying past the back of his hand to his buddy, "Hey, did you know that bzz, bzz, bzz?" All the same, he has to fight it, as the rest of us must.

Your men have been investigated and cleared, and every six months, in a voice trembling with emotion, you read them that thrilling bedtime story, AR 380-5. The men are a *bottle;* the secrets are *ether,* which evaporates too. No doubt in your mind about who the *cork* is, it's you. What should you tell your men in order to control the evaporation?

For one thing, you can explore the psychology angle with them; don't think it's over their heads. Talk to them about pride, temptation, immaturity; make them understand themselves and their motives. Then, see if you can't convince them of this: that the Army did them no favor when they were singled out to be entrusted with secrets.

Now that they have been cleared, they are on the well-known spot. Every time a leak occurs, they are suspect. If they watch themselves, they are in no danger. But if they are careless, whammo! AR 380-5 keeps repeating one incessant theme, "such punishment as a court-martial may direct." The offense of "aiding the enemy" can warrant the death penalty.

Perhaps it will help your men to be reminded of an old but true saying, that yesterday's headlines are found in today's ashcan. In other words, no matter how hot this stuff is that they were told today, let's play it cool. Before they realize, it will be old stuff. If they are really cut out for security clearance, they will soon find out that plenty of new material keeps coming in. They can count on it, and they will soon be getting their true pride from the fact that they have been *keeping* secrets, not just knowing them, and still are and can expect to keep some more.

Over a period of time, you can indoctrinate your men with the idea that secrets are dangerous things for them to know. Dangerous because a man never knows when he might be made the scapegoat for security leaks in his area, if he has been careless. He could have the book thrown at him, especially if it appears that an example has to be made. His only safety is in being very careful with what he does know and *avoiding* what he does not need to know.

There is another topic you need for any speech making you may decide to do on this subject. The old analogy of the bad apple in the barrel really applies in this safeguarding problem. When one man leaks one of the outfit's secrets, then everybody is in bad. The least of their problem is the investigation which will involve all of them while the culprit is being found. All of them will be under suspicion and will probably suffer some personal inconveniences, like cancelled leaves and administrative restrictions. This is the way an outfit gets a bad name around a post.

For their own personal comfort and protection, the men must be taught to turn the bad apple in before he fouls up the barrel for the rest of them. More than one deaf ear will be turned your way during your attempts to convince your men how necessary it is to turn in an errant buddy. It is worth a try though, on two counts. First, as mentioned, the men just cannot afford to have a blabbermouth around in their sensitive situation. He is almost as bad as the kind that is careless with weapons. Secondly, if they really think anything of the guy, then they will be doing him a favor by helping to get him removed from a position where he can only get himself in trouble.

If you can get your men to tell you about the weak sister, a lot of grief will be saved. For you can often have a man's clearance revoked just by recommending such action. It will not improve the outlook for his career, but it is not nearly so bad as the real damage he may do himself if allowed to continue with a clearance. And remember security violations in your outfit do not help your own record.

Talks with the men about safeguarding secrets will at least impress them with your own concern over the matter, and that counts for something. Talk to them as a group, but call somebody in occasionally and talk to him privately, in a more intimate way than can be managed with a group. Sure it will take time, but security is worth it. Work most often with those who need it most. Gossip about such chats with you will help to tighten security.

Warn your men that sometimes a higher-up spills something. That revolting development is not good for morale, especially when the item, one which your unit handles, continues to carry its high classification for a while after the break. It is just one of those things about which nothing can be done at your own level, but your men will be better reconciled to it if you have anticipated it in your talks.

Those newspaper items that were quoted earlier: if a security leak in your own outfit were limelighted in such a fashion, would you be able to say, "It was unpreventable"? Nobody could say that, but there is at least a little comfort in being able to say to yourself that you gave it a good try.

About that young soldier who wants to boast that he has been cleared, there seems to be no regulation to prevent his making such a statement, except the obligation to use common sense and reasonable judgment depending on the circumstances. You cannot really stop him from telling his parents, and it might be ill-advised to try. But now that he has asked you the question, it is a good time to try convincing him that he has not received an award. Far from it, he just has a new burden. Very little tangible compensation is going to come his way. Instead he is on thin ice and will have to watch his step.

So, Captain *Cork,* if you are going to hold the *ether* in the *bottle,* believe this: the degree to which your soldiers are protecting the security information they need to know depends on how much time you find to keep re-indoctrinating them, forcefully, effectively and frequently.

The main mission of the Communications section is to provide the commander with all possible means of communications utilizing the equipment on hand.

PROBLEM OF COMMUNICATIONS

By SFC STEPHEN P. LOCKOVICH

WHAT are the problems of Communications? The last two issues of *ARMOR* covered them in small detail. Most unit commanders and noncoms know the Communication systems in their units. We also know that you cannot move or shoot unless you communicate in one way or another. We all stress proper maintenance of vehicles, arms and billets, but when it comes to communications everything is taken for granted.

We are aware that the SOI, SSI and SOP control our communications in our unit as far as our mission is concerned. We also know that the equipment should be maintained and personnel trained not only in their TO&E slots but in the other jobs of the section as well. Our greatest fault is that we do little or nothing to correct this situation.

The main mission of the Communications section is to provide the commander with all possible means of communications utilizing the equipment on hand. This cannot be done if all the emphasis is placed on vehicles, billets and other sections of the unit, and taking it for granted that the section can accomplish any mission with superior results. Each and every man in the section has to be and should be thoroughly trained in his job. This cannot be accomplished when the men are assigned to other duties and details.

Sufficient time is not being allotted for On the Job Training and organized maintenance of equipment. Usually OJT is being used for maintenance in order to get caught up. Preventive Maintenance should be an everyday occurrence in the section. All items have to be thoroughly checked for proper operation and serviceability. Numerous times the only maintenance that is being done is that the rosters are being maintained and not the equipment. Sufficient time and men should be allotted to the section in order that the equipment can be maintained in a state of readiness and that the equipment operates in the manner prescribed by the appropriate TMs.

It has been said that the Section is the "eyes and ears" of the commander. This holds true for they receive by sound and sight, messages for the commander. This calls for a man who can assume responsibility, for one error can lead to serious trouble. Then why do we assign men who have no sense of responsibility and who are not trustworthy to the Section? Time after time men who have gone sour in a unit are eventually assigned to the Communications section. Correspondence of great importance at one time or another passes through these men's hands creating serious problems.

The Unit communication SOP should be adhered to at all times with only the commander and communications officer making necessary changes. There are times when everyone wants to make changes and they want things done their way. When this occurs it causes confusion and the job not getting done. SOPs should contain information concerning scheduled maintenance, training, requisitions procedure and information pertaining to the accomplishment of the mission itself and nothing else.

In order to establish and maintain communications we must always stress the following points:

1. Preventive maintenance should be stressed to all concerned at all times, and that it should be scheduled and the equipment properly maintained.
2. Everyone in the chain of command understands and realizes the problems of maintaining communications equipment and training personnel.
3. Sufficient time should be allotted for the section to have classes, on the job training and maintenance.
4. We cannot move or shoot unless we communicate.

Superior communications should be the goal we all want to reach. For without communications the blind cannot lead the blind.

SERGEANT FIRST CLASS STEPHEN P. LOCKOVICH, Armor, is presently the Communications Chief of the 2d Battalion, 2d Armored Cavalry Regiment, Fort George G. Meade, Maryland.

FROM THESE PAGES

65 Years Ago

Cavalry upon the field of battle has always been designed chiefly for operations with the *arme blanche,* which, as is known, has existed without improvement since the most ancient times. The rapid improvement of fire-arms, and the general growth of technical knowledge in the present century, have given decisive importance to fire-arms in latter times.

All training in time of peace has become subordinated to the most careful instruction in firing, not only in the infantry and artillery but also in the cavalry, and a great portion of the time set apart for the instruction of the soldier is thus consumed. The improvement in fire-arms and the complete immutability of the *arme blanche,* together with the ease of proof in time of peace, by means of certain calculated percentages, of the results of training the men in firing and the utter impossibility of an estimate of the probabilities of action with the *arme blanche* in battle—have gradually led men to the false conviction that in future battles all will depend upon the knowledge let out at the enemy in heaps of projectiles.

The decided importance of the *arme blanche* in battle seems to be forgotten in time of peace, on account of the denial of the possibility of the immediate participation in the battle of its representative—the cavalry.

Translated by First Lieutenant Carl Reichmann

Conversations on Cavalry; by Prince Kraft Zu Hohenlohe-Ingelfingen

50 Years Ago

The author calls attention to the fact that war has undergone a momentous change, that arms of precision have reached such a degree of perfection that the direct frontal attack of intrenched positions can rarely ever be expected to succeed, that it has ceased to be possible to ride straight at the front of an unshaken enemy, and that cavalry is therefore compelled to work around the enemy's flanks, and thus exercise pressure upon his communications. He concludes rightly enough that all these conditions taken together must of necessity increase the importance of strategy in the wars of the future, and especially in the use of cavalry, which alone remains a specialized service. He recognizes the fact that even in the older countries and larger armies of Europe cavalry can scarcely count "on having the wastage of war made good by equally well trained men and horses." He points out that the proportion cavalry bears in Europe to the ever increasing numerical proportion of the other arms has steadily receded, until cavalry in a mobilized army is numerically an almost insignificant factor. He recognizes the great results achieved by the mounted troops alternately on both sides during the American Civil War, but seems to think that such opportunities can no longer be anticipated. In this he is evidently wrong.

General James H. Wilson

Modern Cavalry

25 Years Ago

The mobility of cavalry still leaves it in its same relative position with the other arms, just as valuable in its special role as ever in the past. Let us review with a very wide, sweeping glance the past of the cavalry; review enough to enable us to appreciate that fact that it was not chivalry, imagination, fal-de-ral, or other nonsense that caused the eminent soldiers of the past to include mounted forces in their armies.

The time of Alexander the Great is about as far back as it seems necessary to go. He is generally recognized as one of the world's eminent soldiers. We have read that he displayed before his father, Philip of Macedon, quite a little flair for horsemanship. The decisiveness of Alexander's victories rests not with the infantry phalanx, but with his cavalry. The phalanx cracked the opposing force into fragments, his cavalry ground those fragments to dust. Great soldiers are only those who destroy their enemies by a proper combination of the means at hand, or who destroy all resistance by making further resistance an invitation to inevitable destruction. Alexander was such a one, and has therefore been called "The Great."

Major General Lytle Brown

The Cavalry

10 Years Ago

A comparison of the fluid techniques of the recent war with the static type of operation prevailing during World War I leads us to conclude that: 1. Armor restored the power of maneuver to the battlefield. 2. Armor prevented a stabilized war in trenches and fortifications. 3. Armor had a direct and compelling influence on the tactics and strategy employed by both sides. 4. Armor can operate on any type of strategic terrain. 5. Armored divisions are organized primarily for offensive action in hostile rear areas. 6. Armored successes are generally achieved after initial tank-supported operations have created the opportunity for exploitation. 7. Armored operations should be closely supported by other equally mobile troops. 8. Armor, *as such,* has earned its right to ground arm status and is here to stay.

The question now arises, what is the tank? Is it a mobile pillbox? Is it artillery? Is it an armored vehicle? Is it a combat vehicle? Obviously, the tank could not be defined as a mobile pillbox since it is capable of strategic movement; neither could it be classed as artillery because it closes with the enemy. The tank is an armored vehicle, but this designation is inconclusive since it is also a fighting or combat vehicle. From the strictly military point of view, the tank may be described as an armored vehicle designed to provide mobile firepower, as well as sufficient protection to personnel to permit engaging the enemy at close range as dictated by the tactical requirements of fluid warfare.

Colonel Hayden A. Sears

Armor and Mobility

NEWS NOTES

Army Pentomic Concept to be Developed During Maneuver in Louisiana

Exercise KING COLE, a command post and field training exercise, will be held in the Louisiana Maneuver Area during March 27-April 16, the Department of the Army and Headquarters CONARC announced recently.

More than 20,000 troops, including men from the 1st Armored, 1st and 3d Infantry, and 82d and 101st Airborne Divisions, will participate.

Purpose of the exercise is to provide training for commanders and staffs in tactical, intelligence and logistical operations under assumed conditions of extensive atomic, chemical-biological-radiological and electronic warfare capabilities. Special weapons, antiaircraft and other participating units will receive realistic field training.

During KING COLE, the Army will conduct certain tactical troop tests to further develop the "Pentomic" concept of organization, doctrine and techniques as they relate to future operations. Headquarters of the 101st Airborne Division, 1st Infantry Division and 1st Armored Division will test the new organization under field conditions.

The "Pentomic" concept relates to a pentagonal type structure, one of five battle groups. It is geared to the anticipated requirements of combat in which atomic weapons may be used. The "Pentomic" organization includes a numerical reduction in the division's strength and its redistribution throughout the combat zone.

West Point Preparatory School to Move to Fort Belvoir, Virginia

The West Point Preparatory School will move from Stewart Air Force Base, Newburgh, New York, to Fort Belvoir, Virginia, during July, 1957, the Department of the Army announced recently.

The School, established in 1946, is designed to prepare students for the entrance requirements to the United States Military Academy and condition them for life at West Point.

The 20-week course is open to all qualified members of the Armed Forces on active duty who have been nominated or who will compete for appointments to the U. S. Military Academy. Instruction at the school is specifically designed to prepare candidates for not only the academic program, but for other aspects of cadet training, including the honor system and familiarity with Army customs and traditions.

Army Combat Surveillance Agency

The Army Combat Surveillance Agency (ACSA) will soon be established in Washington, D. C., the Department of the Army announced recently.

The new agency will coordinate and expedite the production of a combat surveillance system to be used by troop commanders. This system will use improved electronic equipment and techniques which will aid commanders in gaining battlefield information about the enemy.

The new agency will concern itself with research, development and test of techniques and equipment, production of equipment and systems, development of doctrine and procedures for its employment, and training of necessary technical personnel.

The new agency, under the jurisdiction of the Army's Chief Signal Officer, will be headed by Brigadier General Francis F. Uhrhane.



U. S. Army

Lacross, new surface-to-surface missile designed for close support.

New Artillery Insignia

A new artillery insignia, symbolizing the modernization of artillery weapons, has been adopted by the Army and will be in use beginning in 1958, the Department of the Army announced recently.

The insignia displays the familiar crossed artillery cannons with a composite missile placed vertically at the center. It will replace the present insignia, which was adopted in 1907.

Current plans call for the new design to be worn by all Artillery officers as soon as the insignia becomes available.

Enlisted insignia will be issued initially to personnel assigned to missile

units and later to those in all other Artillery units. Guidons and standards of Artillery units bearing the old insignia will be changed as they wear out.

Traditions of Regiments Preserved in Pentomic Army

Traditions of the Army's historic "regiments of the line" will be preserved under a newly adopted combat arms regimental system, the Department of the Army announced recently.

Infantry, Artillery, Cavalry and Armor units in the pentomic Army will bear the designations of distinguished regiments whose colors have been carried into battle by generations of American soldiers. By perpetuating organizations which distinguished themselves at Yorktown, Gettsyburg, San Juan Hill, Chateau Thierry, Normandy and the Pusan Bridgehead the Army intends to give the soldier of today a link with the past as well as a stake in the future.

The regiments will be institutional rather than tactical. Each "parent regiment" will field a variable number of combat units, depending upon the size of the Army at any one time. Under the regimental system, the battalions of old Artillery regiments may well fire guided missiles, and the squadrons of old Cavalry regiments will reconnoiter in airplanes rather than on horseback.

Changeover to the system will be gradual, geared to conversion of the Army to the pentomic concept. Ultimately every combat unit will bear the flag of one of the Army's historic regiments.

Washington Chapter Meetings for 1957

The local Washington Armor chapter committee recently met and made plans for the year 1957. The chairman for this year's committee is Brigadier General Frank H. Britton, Chief of the Armor Branch, Career Management Division, TAG, D/A.

Three meetings are planned for the year. The Spring meeting will be held on the 2d of May. The Fall meeting is scheduled for the 6th of September and the anniversary meeting will be held on the 12th of December. This last meeting will be in commemoration of the 181st anniversary of Armor.

30th Infantry Division Association Convention

The 11th Annual Convention of the 30th Infantry Division will be held in Boston, Massachusetts on July 2, 3 and 4, 1957. Convention Headquarters will be the Hotel Somerset. All inquiries should be directed to Major Saul Solow, 42 Parkway Drive, Hicksville, N. Y.

Schedule of Forthcoming Classes at The U. S. Army Armor School

As this issue is closed for press it is learned there will be two Armor Officer Advance Classes for fiscal year 1958 at The U. S. Army Armor School. Capacity of each of these two classes will be 125 students. There are also scheduled four Associate Armor Officer Advance classes. The tentative dates for these classes are:

ARMOR OFFICER ADVANCED COURSE, FISCAL YEAR 1958

Class No.	*Reporting date*	*Starting date*	*Closing date*
1.	3 September 1957	6 September 1957	3 June 1958
2.	13 January 1958	16 January 1958	26 September 1958

ASSOCIATE ARMOR OFFICER ADVANCED CLASS

Class No.	*Reporting date*	*Starting date*	*Closing date*
1.	19 August 1957	21 August 1957	19 December 1957
2.	23 September 1957	25 September 1957	6 February 1958
3.	17 February 1958	19 February 1958	18 June 1958
4.	12 May 1958	14 May 1958	11 September 1958

The names of the officers selected to attend the Armor Officer Advanced Courses will be published in the March-April NEWSLETTER.

COMMAND CHANGES



U. S. Army

Major General Robert L. Howze, Jr.
Deputy CG, Sixth Army



U. S. Army

Major General Edward G. Farrand
CG, 1st Armored Division

T54 Characteristics Released

The new Russian T54 tank (see page 62, this issue) contains the following characteristics:

Weight (combat loaded):	40 tons
Primary Armament:	100mm gun
Engine:	12 cylinder, diesel
Horsepower:	500
Maximum speed:	30 mph
Cruising range:	230 miles with jettisonable fuel tanks

Army Reservists Increased During Last Half of 1956

The number of Army Reservists in a paid participating status shot up 34,400 in the last six months of 1956 to reach a total of more than 240,000 by December 31, the highest total yet recorded, the Department of the Army announced recently.

Of the enlisted strength, 18,000, aged 17 to 18½, signed up for the six months active duty for training program. Many of these are among the 12,000 reserve component trainees now undergoing active duty training.

At the present rate of increase, Army Reservist gains in a paid participating status will by June 30, 1957, the end of the fiscal year, considerably exceed the 43,000 recorded the year previous when that figure was the greatest yearly net gain ever made in the history of the Army Reserve.

Since the passage of the Reserve Forces Act of 1955, the strength of the Army Reserve—in a paid participating status—has increased by a total of more than 76,000, of which approximately 69,000 were enlisted men.

Attention New York Armor Personnel

Mr. John J. Conlon, Commander, Tank Corps Post 715, American Legion has asked that it be brought to the attention of all Armored Men in the New York City area that their post will hold their 39th Annual Dinner at the Famous Kitchen, starting at 6:30 PM on the 27th of April. All are welcome. The cost is $5.00 per person and ladies are welcome. Contact Mr. Edward A. Maltby, 179 Marcy Avenue, Brooklyn.

New Units Designated to Gyroscope

The 2d and 4th Armored Divisions are slated to exchange stations commencing in November 1957. The 2d and 3d Cavalry Regiments will also exchange posts in February 1958 according to a recent D/A press release.



U. S. Army

This or That? What's with Tradition?

MAJOR JAMES H. LEACH

It appears to me that tradition being a thing of the past brought forward is now being left in the past to die—to be forgotten or vaguely remembered.

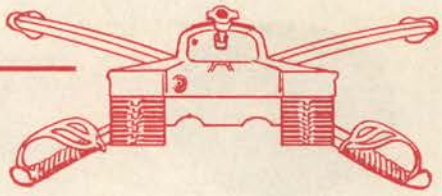
In this day of horsepower—jet and rocket power, speed, dash and mobility, one simple thing, so simple in fact that I have hesitated to mention it except for the fact that it means *esprit* to Armor men today and has meant *outstanding* to Armor men of yesterday, is the Armor cap!

The distinctive high crown cap worn so proudly for over 16 years is no longer the badge of recognition for the elite Armor troops. If one looks across the parade ground at Headquarters, U. S. Army Armor Center, he will find the base of the Flag Pole ringed by 16 stone monuments dedicated to the memory of Armor troopers of our famous Armored Divisions—all of whose men proudly wore the Armor cap—wore it proudly on what was commonly called the "right" side—it being worn as we all know—crown up on the left side of the head.

Is there not some justification for retention of this traditional usage or habit as it has come to be for thousands of us? After all, this tradition was started by the Grandfather of the Armored Force—Lieutenant General Daniel Van Voorhis at least as early as 1938.

Some of our other elite branches have been fortunate enough to retain their patches, both shoulder and cap, while the Armor trooper has lost his distinctive identity. It is not that we are not Army first—far from it. We just believe that this thread of tradition should be used to advantage—for *esprit*—for TANKERS.

MAJOR JAMES H. LEACH is presently in the G1 Section, The U. S. Army Armor Center, Fort Knox, Kentucky.



news from
THE U. S. ARMY ARMOR SCHOOL

Proper Treatment of the CD-850 Transmission

In years past, during the age of the controlled differential and syncromesh transmission, it was often necessary to assign the huskiest member of the tank crew to the job of driving the tank. At the same time, because of the relatively simple and rugged construction of these types of transmission and differential, there was not too much danger of failures in these units. In today's tanks, with the easy steering, shifting and braking provided by the cross-drive transmission, driving is no longer such a back-breaking, fatiguing task. However, the possibility of trouble is considerably greater, and precise adjustments and careful servicing are necessary.

The CD-850 transmission will give excellent service if it receives proper treatment. *It must not be abused.* Crew members must constantly take care to ensure that the delicate steering and shifting linkages from the driver's compartment to the control valve bodies are not distorted in any way. There have been instances when it was necessary for a crew member to sit on top of the transmission and make shifts by hand, at the control valve body, in order to get the tank back to the motor park. Such a situation is usually caused by the shift linkage being bent to such a degree that the driver cannot properly operate the vehicle. One particularly critical point is on top of the transmission where the linkage is unprotected. Crew members must be taught not to step on the linkage at this point nor allow it to be damaged in any other way.

The driver is not expected to be qualified in making adjustments on the transmission, but he should certainly be able to recognize a malfunction and cause it to be reported to the organizational maintenance personnel. *A tank should not be operated, except in emergency, if it does not shift and steer properly.*

The technical manual gives the proper method for adjusting the steering and shifting linkages, and the organizational mechanic should follow these prescribed procedures very closely. There are a number of pivot points in the linkage, and these, of course, are subject to wear. If they become badly worn, it will be impossible to take up the slack in the linkage by adjusting it. In this situation, the defective parts should be replaced.

The TM also specifies that the organizational mechanic will inspect and, if necessary, adjust the reverse and low range bands on the CD-850 transmission at the scheduled service. However, it is advisable to check the adjustment of these bands every time the power package is removed for any reason. The bands should always be adjusted with a torque wrench as directed by the TM.

Another function that the CD-850 transmission performs is braking. Here, again, the driver must be able to recognize a malfunction and report it. When the organizational mechanic is making an adjustment in the brake linkage, he should always bring the linkage rod clevis to meet the brake "apply" arm. The brake arm should never be moved to meet the clevis; doing so will partially apply the brake. Instead, the linkage should be shortened or lengthened as necessary to make its clevis line up with the brake arm.

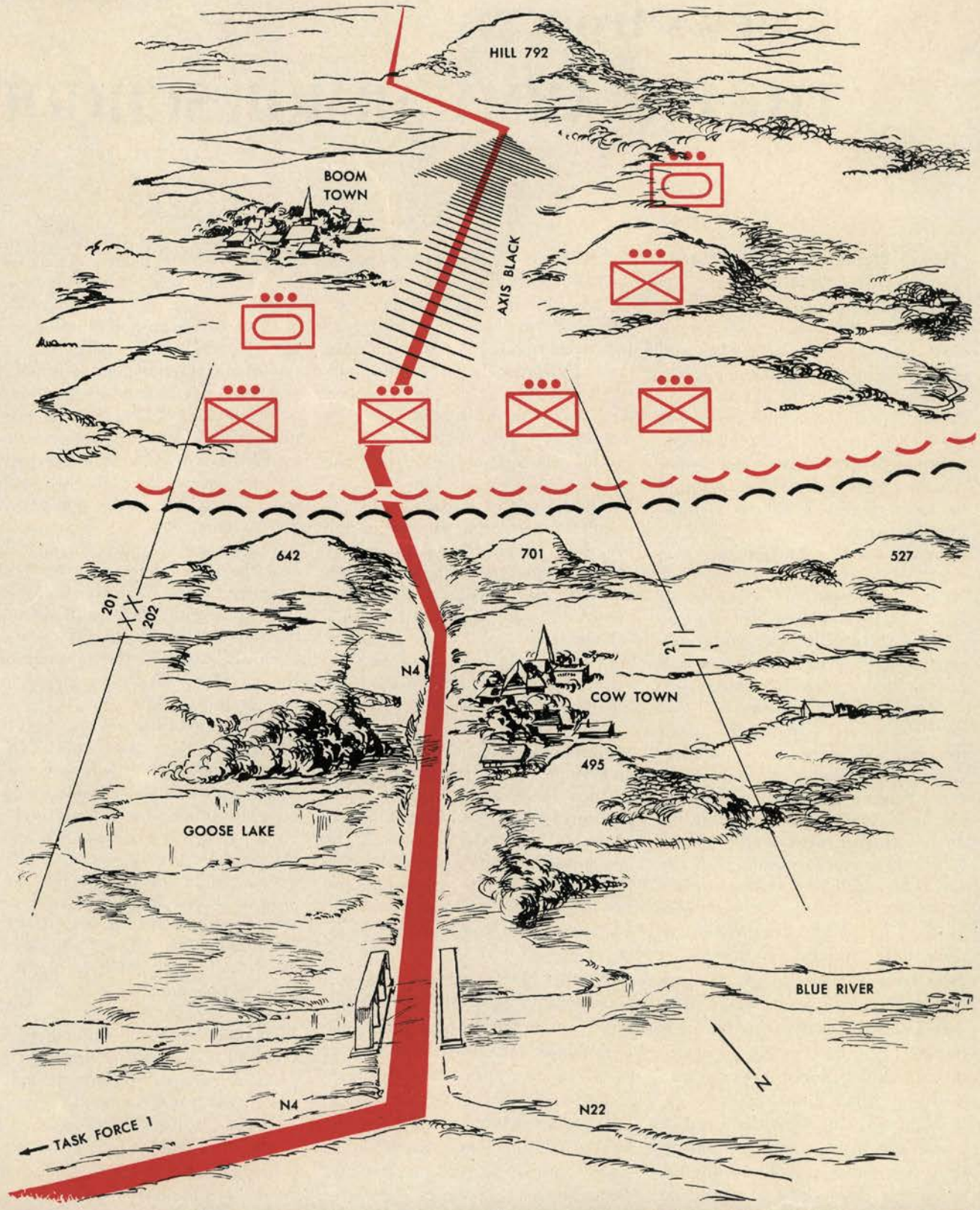
However important the aforementioned checks and services may be, one of the most important functions that the crew members can perform is the checks and services of the transmission oil coolers. Improper functioning of the oil coolers could cause overheating and resultant damage to the transmission. The driver should examine the oil coolers and all connecting lines to ensure that there are no leaks, that the air passages are free of obstruction caused by dirt or trash, and that all mounting bolts and hose connections are secure. In the event of the overheating of the transmission, the oil filters should be cleaned as soon as time permits.

There are other things that the driver must do to keep the CD-850 transmission operating properly. *He must ensure that the transmission contains the proper amount and type of oil at all times. He must not allow trash and dirt to collect where it might get caught in the linkage. He must practice proper driving procedures by not shifting to reverse except when the tank is stopped and the engine idling, and by not down-shifting from high to low range at a high rate of speed.*

Properly used and maintained, the CD-850 transmission will give dependable service for a long period of time without major repair. The small amount of care and effort required to ensure this type of service is more than compensated for by the advantages this transmission gives: ease of driving and complete control of the tank by the driver.

HOW WOULD YOU DO IT?

A Presentation of the United States Army Armor School



AUTHOR: CAPT R E O'BRIEN ILLUSTRATED BY: PVT D MONTROSS

SITUATION



GENERAL.

Task Force 1, a part of CCA, 301st Armored Division, is located in an assembly area 12 miles west of RJ N4 N22. The task force consists of the 1st Tank Battalion minus one tank company, with one rifle company from the 121st Armored Infantry Battalion attached.

SPECIAL.

At 101130 Jan the task force commander received orders: (1) to attack at 110600 Jan through the 21st Infantry Regiment on Axis Black and seize Hill 792; (2) be prepared to continue the attack on order to seize crossings over Muddy River, 15 miles north of Hill 792. Enemy situation is as indicated on the sketch. Beginning of morning nautical twilight (BMNT) is 110555. Line of departure is line of contact.

PROBLEM

You are S4 of Task Force 1. You are planning the logistical support for tomorrow's operation. The S3 informs you that the task force organization for this operation will be one tank-heavy team, one armored-infantry-heavy team, and two tank companies. The operation will be a passage through friendly infantry lines and a penetration of the enemy's defensive line, followed by an exploitation to seize crossings over Muddy River, 15 miles north of Hill 792. Initially the task force will be moving slowly during the penetration of the enemy's defensive line. Once the task force gets into the exploitation, it will be moving rapidly.

1. Under the above circumstances, how would you organize the task force trains (both combat trains and field trains)? (See Note 1.)

2. How would the company trains be organized? (See Note 2.)

3. Would you refuel the combat vehicles of the task force prior to crossing the line of departure? If so, where?

4. What is your plan for the evacuation of disabled vehicles after the task force has crossed the line of departure?

NOTE 1: The following vehicles make up the task force trains:

SUPPLY PLATOON

1 ¼-ton truck
1 ¾-ton truck
27 2½-ton trucks,* consisting of . . .
1 2½-ton truck (rations)
11 2½-ton trucks (fuel and lubricants) with 8 1½-ton cargo trailers
15 2½-ton trucks (ammunition) with 7 1½-ton cargo trailers

MAINTENANCE PLATOON

1 ¼-ton truck
1 ¾-ton truck
3 2½-ton trucks
2 M74 recovery vehicles
2 M62 5-ton wreckers

MEDICAL DETACHMENT

1 ¼-ton truck
4 ¼-ton ambulances
1 ¾-ton truck
1 ¾-ton ambulance

NOTE 2: The following vehicles make up the company trains:

COMPANY TRAINS

HEADQUARTERS AND SERVICE COMPANY

Maintenance Section
1 ¼-ton truck with trailer
1 2½-ton truck with trailer

Administrative, Mess, and Supply Section
1 2½-ton baggage truck
2 2½-ton kitchen trucks

TANK COMPANY

Maintenance Section
1 ¼-ton truck with trailer
1 M59 armored utility vehicle with trailer
1 M74 recovery vehicle

Administrative, Mess, and Supply Section
1 2½-ton baggage truck
1 2½-ton kitchen truck

ARMORED INFANTRY RIFLE COMPANY

Maintenance Section
1 ¼-ton truck with trailer
1 M59 armored utility vehicle with trailer

Administrative, Mess, and Supply Section
1 2½-ton baggage truck
1 2½-ton kitchen truck
1 ¼-ton truck

*In the supply platoon of the 1st Tank Battalion there are 29 2½-ton cargo vehicles. The detached tank company is normally supported with four of these vehicles. The armored infantry company attached to the 1st Tank Battalion is normally supported with 2 2½-ton cargo vehicles from its parent organization. Therefore, Task Force 1 has 27 2½-ton cargo vehicles to support the operation.

SOLUTION

1. The organization of the task force trains is one of the major responsibilities of the S4. After considering the mission assigned, organization of the task force, and expected enemy resistance, you decide to organize your trains as follows:

a. **Battalion task force combat trains.** The task force combat trains will consist of the personnel, vehicles, and supplies needed for the immediate support of the operation. The trains will consist of fuel and lubricant trucks, ammunition trucks, maintenance personnel and vehicles, and medical personnel and vehicles. For this operation the task force combat trains would be organized as follows:

(1) From the supply platoon.
- 6 2½-ton fuel and lubricant trucks.
- 4 1½-ton cargo trailers with fuel and lubricants.
- 5 2½-ton ammunition trucks.

(2) From the maintenance platoon.
- 1 ¼-ton truck (motor officer).
- 1 ¾-ton truck.
- 2 M74 recovery vehicles.
- 2 2½-ton spare parts trucks (with 1½-ton cargo trailers).
- 1 M62 wrecker.

(3) From the medical detachment.
- 1 ¼-ton truck (surgeon).
- 1 ¾-ton truck (with 1-ton trailer)
- 1 ¾-ton ambulance.

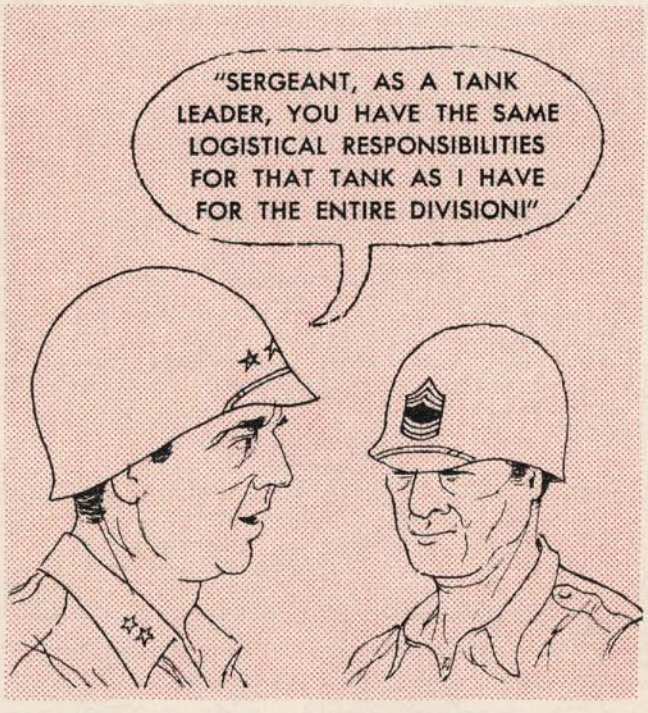
b. **Battalion task force field trains.** The task force field trains consist of the task force logistical elements not required for the immediate support of combat operations. For this operation they will be organized as follows:

(1) From the supply platoon.
- 1 ¼-ton truck (supply platoon leader).
- 1 ¾-ton truck (supply warrant officer).
- 10 2½-ton ammunition trucks.
- 7 1½-ton cargo trailers loaded with ammunition.
- 1 2½-ton truck (rations).
- *5 2½-ton fuel and lubricant trucks.
- *4 1½-ton cargo trailers with fuel and lubricants.

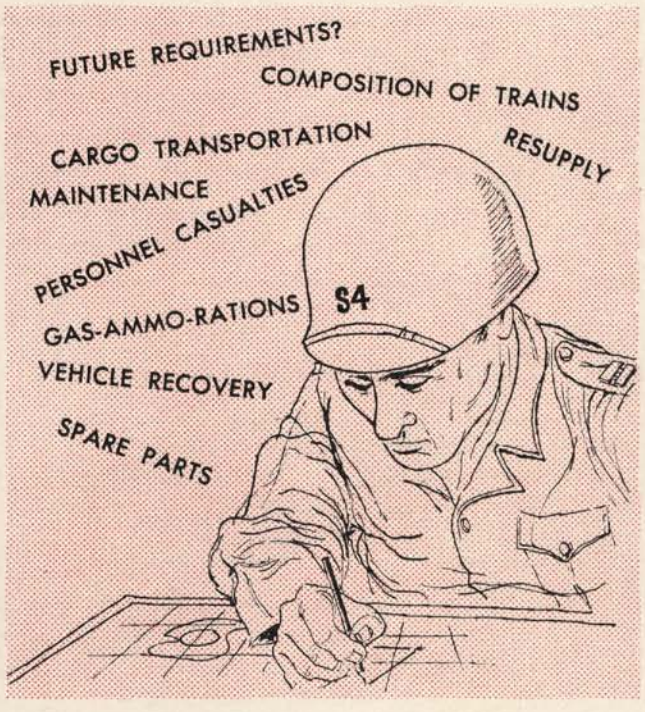
(2) From the maintenance platoon.
- 1 2½-ton spare parts truck.
- 1 M62 wrecker.

(3) From each company.
- 1 2½-ton baggage truck (with 1½-ton water trailer).
- 1 2½-ton kitchen truck** (with 1½-ton cargo trailer).

2. Organization of the company trains is the responsibility of the respective company commanders. However, as the task force S4, you might be asked for advice as to the organization of these trains. You would recommend the following:



LOGISTICS IS A FUNCTION OF COMMAND



"ADVANCE PLANNING IS ESSENTIAL"

a. **Headquarters and service company trains.**

(1) To remain with the unit (from the maintenance section).

1 2½-ton truck with 1½-ton cargo trailer.
1 ¼-ton truck with ¼-ton trailer.

(2) To be located in the task force field trains area (from the administrative, mess, and supply section).

2 2½-ton kitchen trucks with 1½-ton cargo trailers.
1 2½-ton baggage truck with 1½-ton water trailer.

b. **Tank and armored infantry company trains.**

(1) To remain with the unit.

Maintenance Section.

1 ¼-ton truck with ¼-ton trailer.
1 M59 armored utility vehicle with 1½-ton trailer.
1 M74 recovery vehicle (tank company trains only).

Attached medical personnel.

1 ¼-ton ambulance with aid-evacuation team.

(2) To be located in the task force field trains area (from the administrative, mess, and supply section).

1 2½-ton kitchen truck with 1½-ton cargo trailer.
1 2½-ton baggage truck with 1½-ton water trailer.

3. Armor units refuel at every opportunity. In this situation the task force S4 will attach one truck with a cargo trailer loaded with fuel and lubricants to each tank company and the armored infantry company. Headquarters and service company will have attached one fuel and lubricant truck without trailer. This attachment will be made prior to leaving the assembly area. The trucks will be taken **from** the task force field trains. The trucks will march in the company column. The task force will halt and refuel in the area between Goose Lake and Hills 701 and 642. As soon as possible after refueling, fuel and lubricant trucks from the field trains will be moved up to the combat trains, and loads of other trucks will be reconstituted so as to maintain a total of nine trucks in the combat trains.

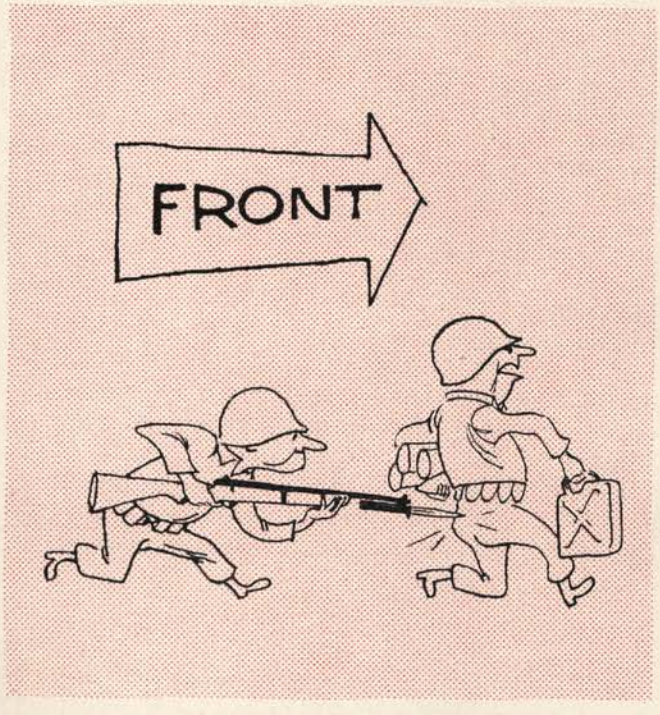
4. The plan for the evacuation of disabled vehicles during tomorrow's operation will be as follows:

a. Company maintenance sections will evacuate disabled vehicles to road N4 on the task force axis of advance.

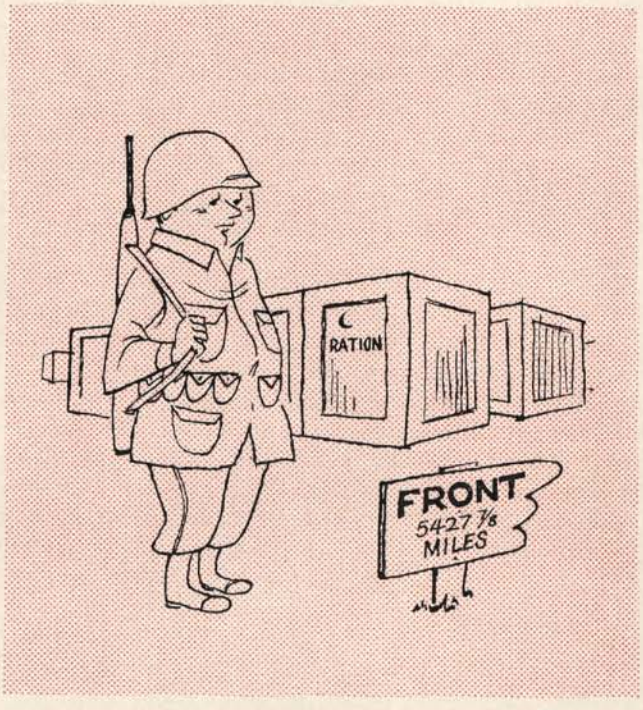
b. The task force maintenance platoon will recover disabled vehicles and attempt to repair them. If repair is not feasible, the maintenance platoon will evacuate the vehicles to the combat command axis of advance.

*See paragraph 3.

**There are two kitchen trucks in the administrative, mess, and supply section of headquarters and service company.



IMPETUS OF SUPPLY IS FROM REAR TO FRONT



RESERVES ARE MAINTAINED AT ALL ECHELONS

The Book Section

THE RED ARMY

THE RED ARMY: The Red Army —1918 to 1945; The Soviet Army—1946 to the Present. Edited by B. H. Liddell Hart. Harcourt, Brace and Company, New York. $6.00

Reviewed by

Lieutenant Colonel Robert B. Rigg

THERE is no single expert on the Soviet Army. Ask any military observer whose professional task it has been to view this force. Liddell Hart's book has great merit because he has marshalled a *group* of military analysts and officers to describe and define the army of both modern Russia and the prewar era. His symposium covers a lot of ground.

The empire of secrecy and sudden death hides a multitude of facts under the seal of security. Now and then a knothole view through the Iron Curtain brings strange facts to life. Take the case of this unit. It was a typical Russian regiment because it did some untypical things. In 1945 its grey masses of soldiers fought and captured a town in Czechoslovakia well ahead of schedule because the men had been told it would be their only objective for the day. Having liberated the town's brewery the Russians liquidated its contents. Then came the sudden and unexpected order to advance. The wine-sodden soldiers lurched into tactical formations. The Russian regiment was drunk in all ranks. The Germans were ready on all flanks. Intoxicated with success and liquor the Soviets attacked with frontal vigor. The regiment was decimated. No American ever saw this unit. No American ever will. The Soviet Army has secretly stricken this regimental number from its military lists. This was a small incident—one not described in this book—yet it represents two significant things: one, that the Soviet security conceals and covers up a multitude of things about Soviet Army strengths and weaknesses. Second, it is a mistake to try to characterize or judge the Soviet Army by a single, or typical index. This Army has a multitude of hues and facets. It is as variable as the men who make up its ranks. Gaidukov's soldiers in Azerbaijan were disciplined to perfection. Malinovsky's men in Manchuria raped and robbed civilians with abandon. Turkomen soldiers differ from the Khirghiz. Today, Cossacks man fighter planes and tanks, and so do Uzbeks, but who can say which group produces the best pilots? This army is a conglomeration of many different segments, and so is the book that describes it. If the reader is disturbed or jarred by the varied descriptions, and even the periodic contradictions, of the Soviet Army in Liddell Hart's excellent book, then he is facing the reality of evaluating this formidable and variable military force.

Americans who met the Soviets on the Elbe will be wise to discard many of their hasty impressions and get up-

With the exception of the Sovfoto picture of the SU-152 and the portraits on the opposite page all photos used with this review are Department of the Army releases of the latest equipment in use in the Russian Army.

10% discount on orders over $5.00. Remit with order and we pay postage.

Prices subject to change without notice. Be sure to send a complete address.

to-date on the Red Army as described in this book. More importantly, Americans who have never shaken a Russion hand or heard a Soviet *"Nyet!"* should read this text.

"The aim of this book is to provide a reliable account, and comprehensive picture of the Soviet Army. . . ." With this introduction Liddell Hart chalks out the objective of his symposium, and his imposing "order of authors" lists such experts as: Generals Weygand, Dittmar, Guderian, Bayerlein, Guillaume, Blumentritt, Student; Field Marshal von Manstein; Sir Eric Ashby, Sir David Kelly, J. M. Mackintosh, R. M. Ogorkiewicz, R. L. Garthoff, Colonels Miksche, Ely, Reinhardt, Andolenko and others. For the most part they attack the subject with first hand knowledge even though some of it is dated.

The Soviet Army "has the characteristics both of the primitive hordes and of a robot force, or of a 'Frankenstein monster,'" states author Hart whose pages are well filled with German generals' evaluations of the robot army: ("We admired their escapes from pockets at night . . . like packs of wolves. No terrain was for them impassable or distasteful.") And while the experience of the Germans is vital to any evaluation of this army, the author errs some in balancing his book. It is highly slanted to the war in Europe.

However, even though Manchuria was a capsule war, the Japanese saw and fought the most modern Russian army ever fielded for combat during World War II. The Japanese also saw the roughest elements ever uniformed under the Red Star. For example, the mass raping and brutality that General Kovtun-Stankevitch's convict-liberated troops superimposed on Manchuria in 1945-46 are too lurid to print in most publications. Nor does Hart's book contain an adequate description of the ultra modern Soviet force—a combination of airborne and armored troops—that swept the famed Kwantung Army into the oblivion of Siberian prison camps. Why? Because in the Western World the least documented portion of the Soviet Army's World War II record is the Manchurian campaign. Here was blitzkrieg at its Russian best. Here was demonstrated, in capsule form (now dated, but not to be ignored), some of the Soviet tactics of the future.



SU-152

The land of no cabinet crises and many death sentences has produced a succession of armies, the quality of which has varied within a generation. There was the big Russian army that attacked Finland's 200,000 inadequately armed troops which in turn produced more than 200,000 Soviet casualties—a figure that even Moscow officially acknowledged. Then there was the Red Army of 1941 which possessed between 21,000 to 24,000 tanks—and yet it was chewed up by the Germans with only about 3,200 tanks. This Communist army lost some three million men in the first five months of combat, yet from out of it the Russians salvaged sufficient

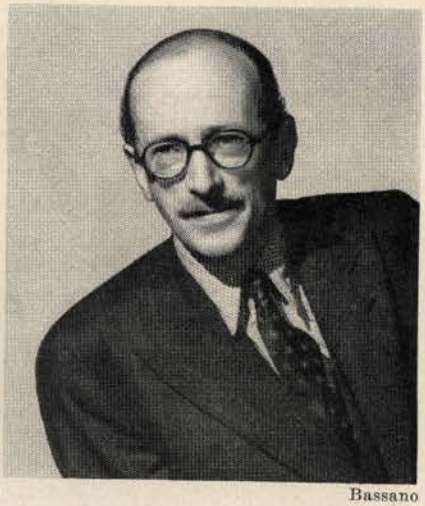
The Reviewer



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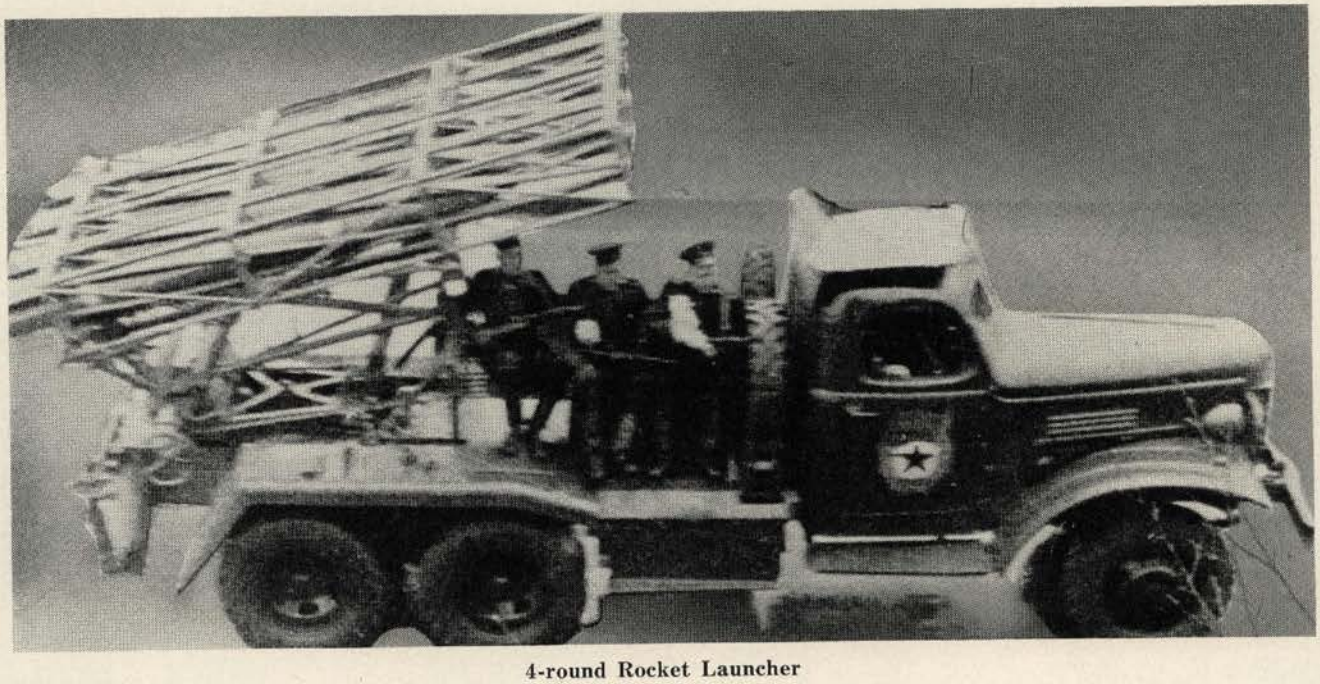
LIEUTENANT COLONEL ROBERT B. RIGG, Armor, author of *Red China's Fighting Hordes* and *Realistic Combat Training,* served with Soviet Army Forces in both theaters of operations during World War II. His authoritative source of material on communism is also based on actual experience as AMA to China where he observed three years of the China Civil War. He is now assigned as a member of the General Staff, D/A.

The Editor



Bassano

B. H. LIDDELL HART, famed British Military analyst, has written or edited numerous volumes which include *The Rommel Papers, Strategy, Defense of the West, Revolution in Warfare* and *The Other Side of the Hill.* Long an Armor exponent, he has written many times for ARMOR. He has been the military correspondent for several leading British periodicals and is the military editor for the Encyclopedia Brittanica.

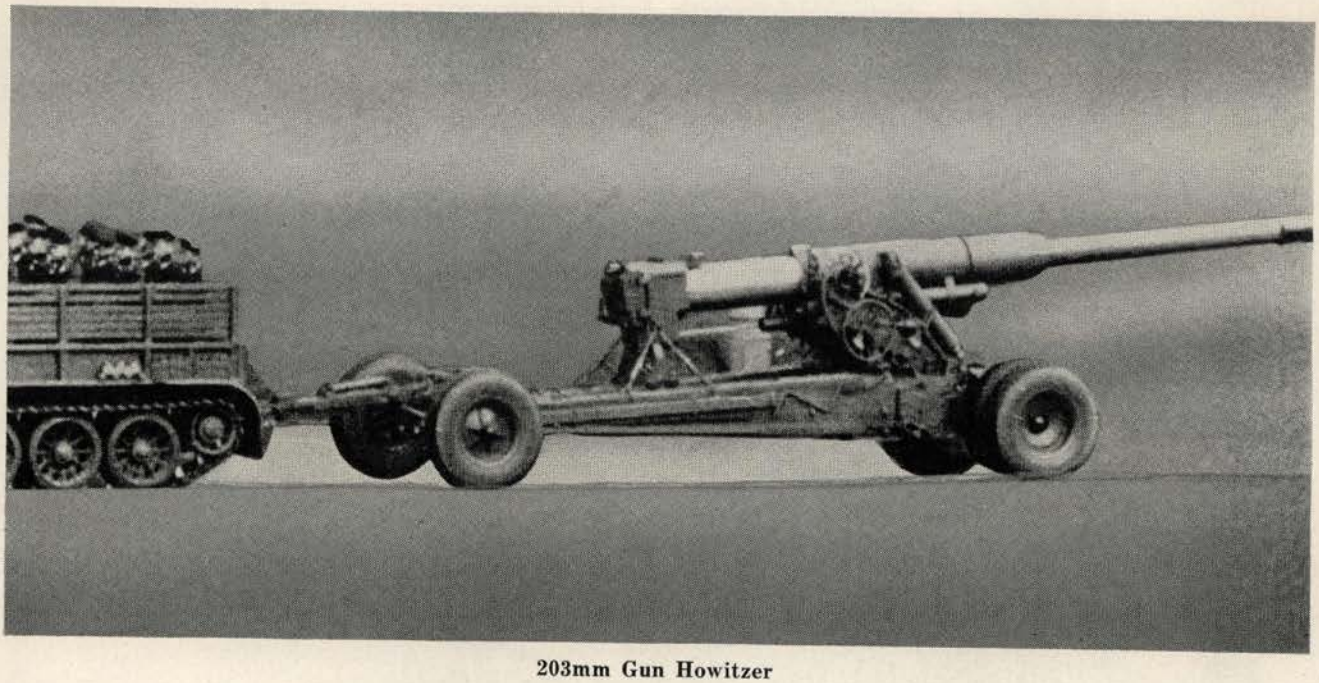


4-round Rocket Launcher

leaders to reorganize their forces and produce the quality force that swept the German tide back to the bunkers of Berlin. The post-war ground forces of Moscovy are well defined in this book. For example, the transition from an infantry-heavy ground force in 1945 (527 divisions and 302 armored and mechanized brigades) to the heavily armored-balanced force (65 armored and 105 rifle divisions) of today is well described. These and other Soviet armies of varying quality are aptly covered and yet the military reader will hunger for more on atomic-type army of today. But by the time the reader arrives at Chapter 37 the book gets down to some of the hard facts and factors of atomic age reality and nuclear parity ("two scorpions in a bottle, neither can strike



Medium Tank T54 (100mm) in traveling position



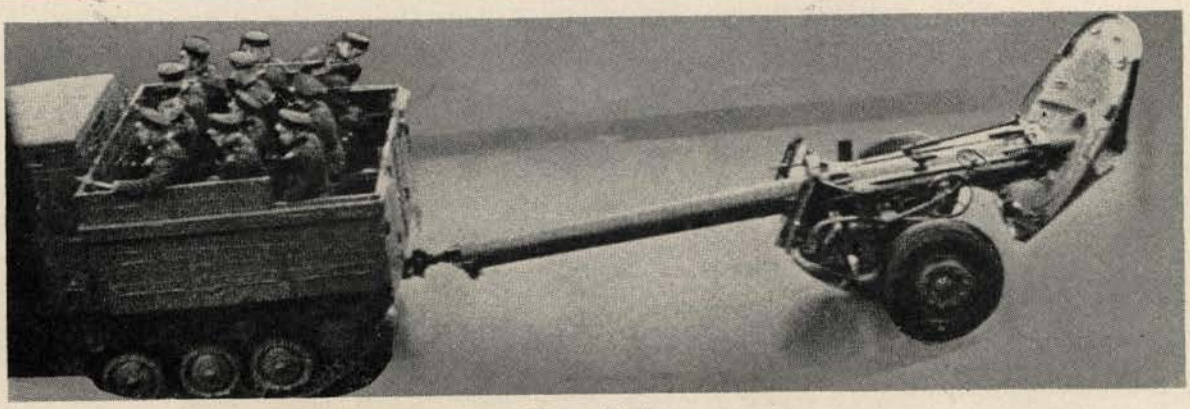
203mm Gun Howitzer

a fatal blow without exposing its own vitals. . . . What if one scorpion goes to sleep?") and Colonel Reinhardt describes some of the measures and means by which the Soviets are shaping their armies for the atomic battlefield. The reader would like more facts on this subject. However, Colonel Reinhardt points to the place of Soviet armor in any future conflict:

"Not only have the Soviet military chiefs grasped the fact that armoured formations are 'hard' atomic targets while advancing infantry as distinctly 'soft' ones, but the demands of atomic battlefields (great mobility and more dispersion) are better met by tanks, self-propelled artillery and infantry in armoured personnel carriers than by dismounted infantry."



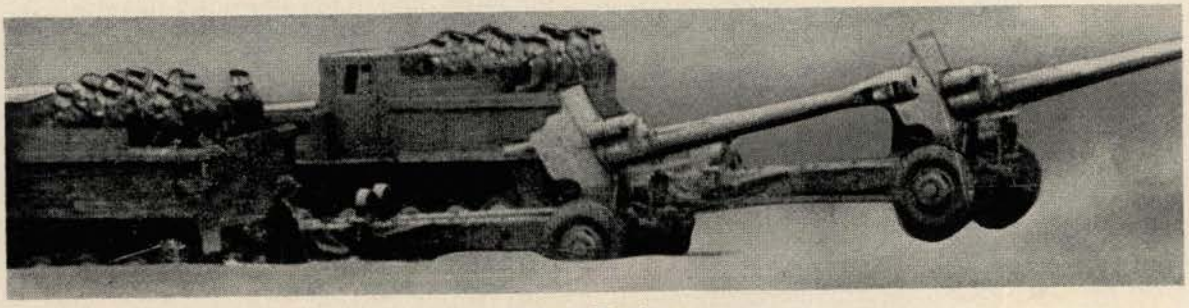
Hound Helicopter



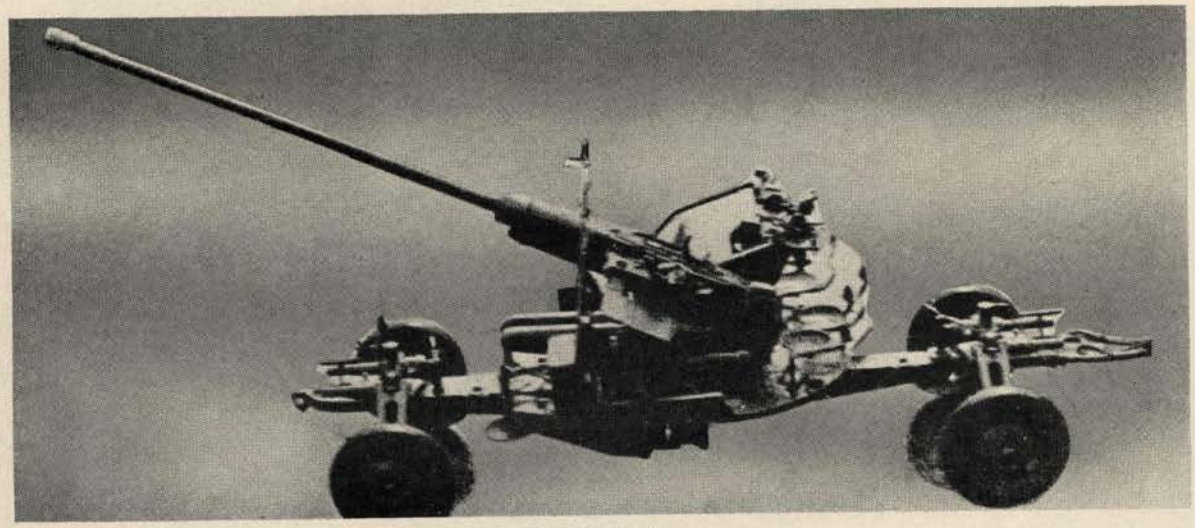
240mm Mortar



122mm Field Gun



152mm Howitzer



57mm AA Gun



Quadruple AA Machine Gun



6 x 6 Armored Personnel Carrier



6-inch Rocket Launcher (16 round)



9-inch Rocket Launcher (12 round)



Horse Helicopter

Armor-wise American tankers will find a talented and familiar author in R. M. Ogorkiewicz who rests too long on the history of Russian tanks and does not mention the T54 tank. However, he emphasizes important points: Soviet design simplicity and "good enough" quality—solid warning that we had better consider what the Soviets regard as "tank expendability." In short let's not over-invest in expensive, gadget ridden luxury cruisers (except for range finders and gun sights) when we could purchase more gun tubes on tracks! The reviewer's one conclusion is: let's invest in airborne tanks even if we have to strip off significant armor protection—but never gun power. In war, our survival could rest on the number of airborne tanks we can *project,* and not on the number of heavy, landborne tanks that can *protect* themselves. General Bayerlein covers Soviet armor in World War II. Captain Galay follows up with "Recent Trends," but Soviet armor deserves a lengthier treatment considering its new post-war proportion and its future potential in atomic warfare.

Parachute-wise soldiers and strategy-minded Americans will appreciate German General Student's evaluation of the airborne arm. "Alaska presents itself to Russian airborne troops as an ideal objective. The USA would also be well advised to protect especially their advanced bases, and atomic bases . . . above all those situated in remote places." Thus General Student closes his chapter on one of the most veiled secrets of the USSR: its airborne forces. And he adds that in 1955 the Russian air-transport fleet "was estimated to be 7,500 transport planes."

Elsewhere, the book lacks up-to-date data on Russia's progress in 3-Dimensional warfare. It is too bad the publishers couldn't have obtained one of several qualified American authors who could have described Soviet progress in helicopters and the advances the Russians have publicly demonstrated in the vertical lift of troops and weapons.

Closing out Hart's excellent book is a valuable chapter by Sir Eric Ashby on "Science and the Soviet Army." It draws precise focus on some future trends and it will shock the complacent. Ashby speaks first hand. He has worked in the laboratories of the Soviet Academy of Science. His last sentence is worth remembering: "And they have one quality we in the West have lost: a deep inferiority complex which drives them to spectacular achievements."

Some $64,000 questions on the Soviet Army will still challenge the experts. One of them is this: While the written doctrines may be modified and updated, how will the combat-veteran officer corps really adapt this army to the indicated conditions of the atomic warfare? The first mistake an "expert" on *this* army can make is to believe that all the published Soviet tactical doctrine is being followed *as it is written.* The Soviet officer corps is cocky and confident that *their* methods, as applied in World War II, were *the* world's best methods. They were like this even after the Russian Civil War! There is the possibility that an inner complacency and over-confidence within the leadership of this army can still result in the failure to properly apply the written word. As any officer knows, it takes a long time to get "the word" down to the lowest ranks.

Since 1945 the Soviet Army has undergone a great many changes and yet the Western military public has been fed largely on facts pertinent to Russia's army of World War II vintage. It is high time that this situation be corrected. Liddell Hart aims primarily at this objective, but some of his authors hit the mark only intermittently. Some are influenced by war experiences and others are handicapped by lack of sufficient up-to-date material. However, they do a highly creditable job even though the results are blurred in places.

Over-all *The Red Army* adds up to the best available public documentary of the force it describes. Liddell Hart and all of his authors are to be congratulated for their efforts. At the same time they are to be encouraged to create a companion volume on the atomic age military force of the Soviet Union—a text that will pick up the total combination of Russia's military might in 1950 and project it to 1965.

IN TORNADO'S WAKE:

A History of the 8th Armored Division

IN TORNADO'S WAKE: A History of the 8th Armored Division. By Captain Charles R. Leach. Published by 8th Armored Division Association. Price $5.00.

Reviewed by
Maj. Gen. Ernest N. Harmon, Ret.

THIS is a story of a Division that possibly did more than its share in training replacements, both officers and men, for other Divisions and, finally, received the call of battle itself.

It is written in two general sections, the first—the description of the life and activities of the Division Stateside and the second—its experiences overseas and in combat. The book is profusely illustrated and in looking over the photographs of its senior officers one remembers faces that have appeared in many of our Division histories and have been connected with the development of the Armored Force and the Armored Force School from the beginning of Armor.

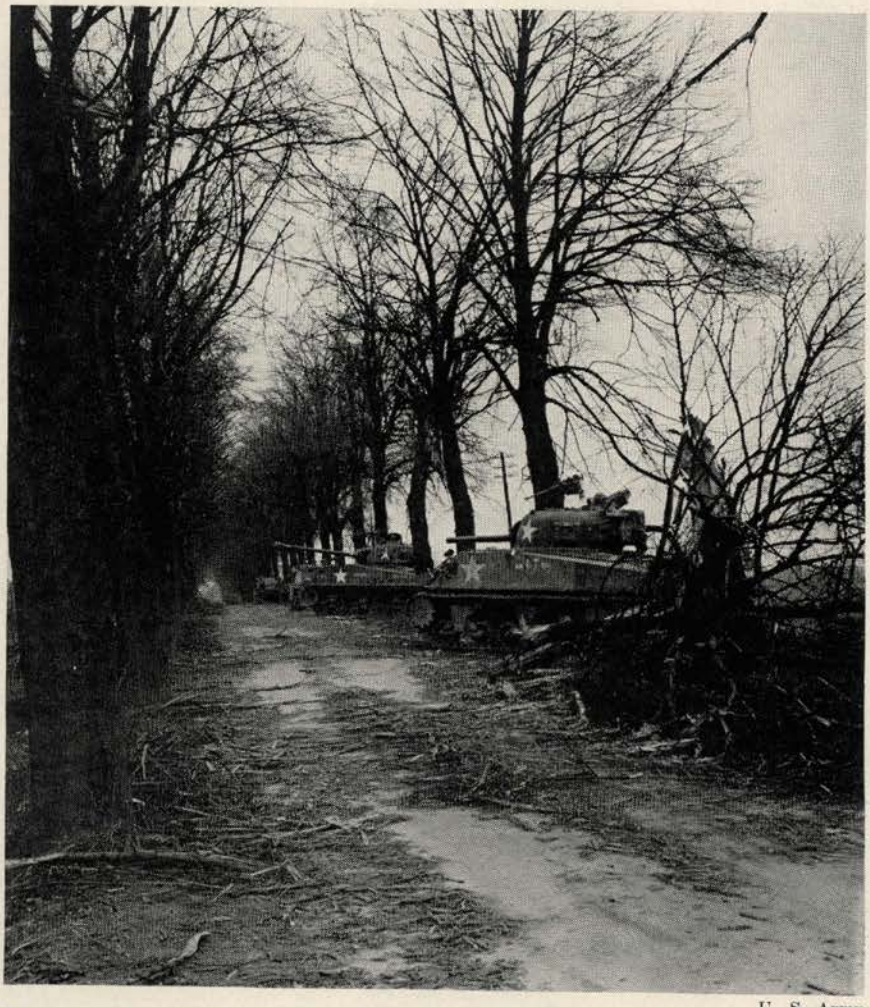
The history is written by a junior officer who makes no claim to distinction as either an historian or writer. In honesty, therefore, it could not be called well written in the sense of grouping together various events, as these are all mixed up pretty much as they occurred—athletic, training, etc. However, it does present a great many incidents and later on in the combat section gives many small unit actions that could well be developed into very fine historical examples. I would say one great fault with the book from the reader's standpoint is the lack of maps and sketches. This makes it difficult to follow the movement of the Division and many undoubtedly fine small unit actions could be better understood had sketches been available for the reader.

There were several phases or incidents in the history that I think are well worth consideration and thought by the military student. First, the difficulty of maintaining a high state of morale in a Division that was designated a Training Division in war, and, at the same time, to keep alive the spirit and hope that eventually this status would change and it could be designated a unit to go into battle.

During all this training period the Division was kept up to date with the latest battle experiences coming from the battlefronts and the spirit and morale were maintained at a high level by a very fine commander, Major General Benjamin Grimes.

It was of particular interest to me to read how some 4,000 replacements had been sent from this Division into Tunisia. In Africa we wondered where the replacements went to—why they did not arrive to any great extent—what happened to them, as we knew that Armored replacements would be given excellent training at Fort Knox. The men we received in the 1st Armored Division, for the most part, were either taken from the 2d Armored Division and sent to Tunisia from Morocco or were soldiers with scarcely any training in Armor whatever.

The answer, of course, was that our planners in Washington had pro-



U. S. Army

Tanks of the 8th Armored Division answer German artillery near Kirchhellen.



THE AUTHOR

Captain Charles R. Leach, Armor, put in all his World War II service in enlisted status with the 8th Armored Division. Discharged in 1946 he received his AB and MA degrees from Ohio State University. Commissioned in the Reserves he was studying for his Doctorate when he was recalled in 1951 and assigned as instructor at OCS, Fort Riley. Studying Russian he went to Germany and spent two years in the Foreign Area Specialist Russian Program. He is presently in a General Staff assignment in the Department of the Army.

vided for combat units but had not provided sufficiently for those rear installations and elements that are so necessary to keep the forward units in battle. We found ourselves in need of railhead units, truck drivers and units at the ports to unload ships. Thousands of our well-trained Armored replacements found themselves sidetracked for this kind of work for lack of proper provision or priority for men who were especially trained for these operations. It was a known fact that during the early days in Tunisia the 1st Armored Division was kept in battle principally by the equipment and men taken from the 2d Armored Division in Morocco, which was thus greatly reduced in strength and combat efficiency.



U. S. Army

Troops of the 8th Armored Division attacking the town of Rhinsberg, Germany.

In February 1943 the 8th Armored Division really began to train itself for combat duty. It is interesting to see with what confidence they greeted their new Commander, Major General John M. Devine, who came to them after considerable combat experience in Europe. When men are about to go to war and go into battle there is nothing that they desire more than to be led by officers and men who have had prior battle experience. Their tribute and confidence in General Devine should be a great source of satisfaction and pleasure to him, as I am sure it is.

In its first days of combat the Division had to fight, as all Armored Divisions were required to fight during the war, for a chance to work together as a team and as a unit. Various headquarters were continually attempting to detach parts of its very valuable combat strength and seemed loath to give it a chance or an opportunity to operate as a unit.

About the time that it went into battle there was a general idea held by the Joint Chiefs of Staff in Washington that new Divisions should be trained for battle by degrees, so to speak. Regiments should be sent to older Divisions and get their first battle experience as attachments one by one before being fought as part of their own Divisions.

I think this was a mistake, although it sounded very well from a theoreti-



THE REVIEWER

Major General Ernest N. Harmon, Retired, a 1917 USMA graduate, led Cavalry troops at the front in World War I. He commanded the task force from the 2d Armored Division which initially landed at Safi, French Morocco. He later commanded the 1st Armored in Tunisia. He next assumed command of the 2d Armored Division and subsequently the XXII corps by the end of the war. He organized and commanded the U. S. Constabulary in Germany. Retiring in 1948 he is now the President of Norwich University, Northfield, Vermont.

cal standpoint. It, however, failed to recognize the great value of tradition and homogeneity within the Division for which the commanders had worked so hard and so long during the training period.

The early Divisions had to go in and fight from the beginning. They made their mistakes, but gradually developed as fine fighting units, gaining great *esprit de corps* and pride in organization.

To my mind all during the war, *esprit de corps,* pride in organization and tradition were altogether too lightly treated and considered by our planners in the United States. One of the great failures in the Army today is the suppression, directly or indirectly, of this great asset to battle, an asset or a factor that has won as many battles as any other one cause or factor if one will but study history.

The Division did well in combat because it had learned its battle lessons well. As a Division history I am sure it will be read and appreciated by the men who passed through it, as it is written about the details that the men and junior officers experienced. With more maps and sketches undoubtedly it could furnish many fine examples of well led small units in combat against equal or larger forces of the enemy.

The story of this Division is well and aptly summed up in the foreword by General John Devine. "This is the story of a young division, a division that did more than its share of training men for combat, and of sweating out Louisiana maneuvers, before at last taking up the burden of war itself. . . . It was a division ready to overcome any obstacle in its path, to accomplish any mission that might be assigned to it." During the latter stages of the war the Division gave an excellent account of itself and avoided many of the mistakes of the older Divisions in the earlier stages of the fighting.

It is a story of gallant and devoted officers and men who took their different missions and tasks seriously and wrote an important page in the contribution of American Armor to the winning of World War II.



U. S. Army

Gen. Patton making farewell speech prior to the Division's redeployment to US.

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the mechanics of vehicle mobility

THEORY OF LAND LOCOMOTION

By M. G. Bekker

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ARMOR magazine is published under the auspices of the United States Armor Association, and is not an official publication. Contributions appearing herein do not necessarily reflect official thought or indorsement. Articles appearing in this publication represent the personal views of the author and are published to stimulate interest in, provoke thought on, and provide an open forum for decorous discussion of military affairs.

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LETTERS TO THE EDITOR

Re: A New Tank Platoon

Dear Sir:

Major Roy Moore's outstanding article in the March-April issue on the six-tank platoon should be required reading for every branch qualified soldier in Armor. His well stated arguments deserve the careful and unprejudiced study of each such individual on active duty today.

Certainly the fundamental idea of a three-tank basic formation for fire OR maneuver at any given moment is sound and logical. The build-up of a combat organization from this basic structure could be regarded from many viewpoints. For example: a tank troop comprising five three-tank combat groups plus a three-carrier command group. With a Master Sergeant commanding each combat group, and an officer-led command team in each carrier, we build inherent flexibility simultaneously with unity of command at the grass roots level. Food for thought?

My point here is not at all to deprecate Major Moore's commendable presentation. On the contrary, he deserves the attention of all of us because he has publicly opened the door on a train of thought not previously discussed in open forum. I do say this, though: first, articles such as Major Moore's should be considered from an unbiased and open-eyed point of view; second, the thinking reader should not limit his attention to the immediate argument presented, but rather should use it as a springboard to original thinking of his own on the subject.

More power to our ever-improving forum, *ARMOR*.

Major John B. Stockton
Combat Aviation Company
3d Infantry Division
Fort Benning, Georgia

On Leadership

Dear Sir:

Recently, I read the article in your January-February issue, by General Robinett on the subject of Leadership. General Robinett's distinguished career, and particularly his outstanding battle experience in Tunisia, where he suffered the wound from which he retired, well qualify him to write on this subject. And in his article he thoroughly lives up to the expectations.

The article is scholarly, exhaustive and furnishes a sure signboard to the aspiring young leader. The subject of leadership, being an abstract one, is difficult to cover. I think he succeeds admirably in naming and explaining briefly and lucidly the essential qualities which compose it. He has a novel approach, too, in his pointing out the effects on the leadership and records of various historical characters by their lack of some one, or more, of these qualities. Of course, more practical examples of the application of these principles would be helpful and an amplification of some of the historical events alluded to would be interesting for those not as erudite as General Robinett. However this article is an excellent coverage, in general, of a difficult subject.

Colonel John L. Hines, Jr., Ret.
4545 Conn. Ave.
Washington 8, D. C.

Armor and Army Aviation

Dear Sir:

Is Armor taking full advantage of Army Aviation?

Each branch of service exists because of its ability to carry out a certain function necessary to success in battle. In the case of Armor it is the ability to fight mounted. The sole reason for the existence of Armor is to engage the enemy with mounted firepower. The effectiveness with which Armor can carry out this role depends upon the possession and application of a number of characteristics among which are: mobility, weapon power, communication and observation, all of which, together with others, must be incorporated in a balanced organization. Any feature or device that does not contribute to the ability to fight mounted should be omitted and, conversely, every device which does so contribute should be adopted provided it does not unbalance the whole.

Infantry exists because of its ability to engage the enemy with dismounted firepower. It too must possess the characteristics of mobility, weapon power, communication and observation. What, then, is the distinction? It is simply this: that whereas Infantry fights dismounted, Armor can also fight mounted. Mounted combat involves an increase in the tempo of battle. It demands faster communication and observation. On the whole, communications devices have kept step with improvements in mobility and weapons. To a much lesser extent has Armor incorporated and developed the possibilities inherent in Army Aviation.

Army Aviation got a late start due in part to the precipitate manner in which the Army completely divorced itself from all forms of aviation with the advent of the Air Force. Currently that hasty blunder is being corrected as responsible leadership recognizes the distinction between the battle roles of the Air Force and the Army, and the requirement that each have the essential tools to carry out its role.

In view of its relative tempo of action, Armor has a greater requirement for organic Army Aviation than has Infantry. We have built more mobility and weapon power into our Armor units than we can effectively use unless we greatly expand and intensify the use of Army Aviation in all of the many ways by which it can contribute. It is reasonable to anticipate that research will uncover many additional uses of Army Aviation in the field of mounted combat. These demand the closest attention of all Armor officers.

Major General Robert W. Grow
527 Valley Lane
Falls Church, Va.

● *After witnessing the Aero-cavalry demonstration at our Annual Meeting it can be safely said we are moving in the right direction.* Ed.

More Awards

Dear Sir:

As a tribute to your excellent publication and as an award to a soldier from this post each month for outstanding performance, Sub-Camp Fuji Special Services, Honshu, Japan is presenting a

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With sincere congratulations from Sub-Camp Fuji and members of the 70th Tank Battalion on your fine magazine, I remain

LIEUTENANT PETER ORLICH
Headquarters
U. S. Army Garrison
Sub-Camp Fuji
APO 56, San Francisco, Calif.

● *We are deeply honored and appreciative.* ED.

Well, What is a Tank?

Dear Sir:

In the January-February issue of *ARMOR* there appears in the Letters to the Editor column a letter from Dr. H. Karl Boyer in which he criticizes certain aspects of my article, "What Is A Tank," which appeared in the September-October issue. As I indicated to you in the letter which forwarded my manuscript, I expected the article to be controversial. However, there are certain errors in Dr. Boyer's letter concerning my article which should be corrected.

Dr. Boyer says that an *"experiment* designed to *prove* that a heavy tank may be superior to a faster one because of better ride characteristics is meaningless." This may well be true, but I made no such statement in my article. I stated that, "Recent *tests* have also *revealed* that the capability of a combat vehicle to attain a high speed on a road does not automatically give that vehicle a high cross country (speed) capability." I explained that to obtain a vehicle with a high speed the horsepower to weight ratio of the vehicle must be high, which normally means a vehicle of light weight. I also explained that the ride characteristics of a light vehicle are such that the crew are unable to perform their functions long before the *top speed* of the vehicle is reached. I also correlated this fact with the fact that the tracking speed of modern gun control systems is such that even high speed is no substitute for adequate armor protection. One must remember that a tank carries people who must operate the vehicle and that if the ride characteristics are such that the crew can do nothing but hang on, then the vehicle is useless as a fighting machine. This test was *designed* to *discover* whether or not high speed was an adequate substitute for inadequate armor protection; it revealed that such was not the case; the test was not an *experiment* designed to *prove* anything. The test, as are all tests at Board No. 2, was rigidly controlled; the results were reported through official channels.

The Doctor's remark as to time to negotiate ditches versus time to traverse the remainder of a course is obviously true but injects conditions which played no part in the reported test. We knew this elementary fact before we began, as any motorist knows it takes longer to traverse a street if delayed by traffic than it does if not so delayed. His divisional example is equally elementary but shows little knowledge of exploitation, for exploitation requires a *fighting* vehicle which can overcome the rear guard action and delaying tactics of a retreating enemy; one cannot do much exploitation in an Indianapolis race car mounting any caliber of gun.

As to his question as to interpretation of the test to conclude that the heavy tank gave a worse ride than the others, my answer is, No, for we operated *all* the vehicles at the maximum speed at which the crew could perform their functions so the ride characteristics were approximately equal at the average speed attained.

The statement that I made that fast tanks would have to mount a light gun to save weight he attempts to disprove by stating that the 90mm gun on the seven ton *carriage* means that you can put one in a 25 ton tank. All I can say here is that the best U. S. designers of tanks in the business have been unable to do so to date excepting at the sacrifice of adequate armor protection. The size of the gun directly influences the diameter of the turret ring, which directly influences the length and width of the area to be armored. And until we get an unconventional recoilless (or non-recoiling) tank gun with the required accuracy and power, or make some other technical break-through in the field of unconventional weapons or light armor metal, I am afraid the designers have no other choice. The vehicle which he mentions is the new self-propelled, airborne antitank gun which was specially designed to be dropped by parachute and has no armor protection whatsoever.

I am a little sad, from the author's point of view, that Dr. Boyer made the statement that my habit of denying that tanks I consider bad tanks are not tanks at all is nonsense. For that was expressly the purpose of the entire article and the reason behind my arguments for a tank to be properly classed a tank only if it incorporated the correct degree of firepower, armor protection and mobility *required* to enable it to perform tank missions on the battlefield to include the defeat of its hostile counterpart!

In his last paragraph the Doctor writes that my article states that ". . . you should armor up to the 50 ton load limit the bridges can carry. . . ," I made no such statement, nor did I even infer such an approach. If he will re-read the center column on page 8 of the article, he will find that my statement was to the effect that the provision of *inadequate* armor which brought the weight of a tank above the allowable cargo load of aircraft was erroneous since the allowable cargo load of current aircraft (25 tons) and the capacity of division bridging (50 tons) allowed wide latitude in the provision of *adequate* armor within these weight limitations.

The Doctor's concluding remark that he can design a 36 ton tank that can outfight our current mediums (M48A2) and have far greater mobility and lessened fuel consumption is of great interest. I sincerely hope he is correct. We in Armor have been searching for such a tank for years! As a matter of fact, we would be overjoyed to receive an air transportable *tank* which could outfight our present mediums and those of any foreign country.

LT. COLONEL CARROLL MCFALLS, JR.
Hdqs, MAAG, France
APO 230, New York, New York

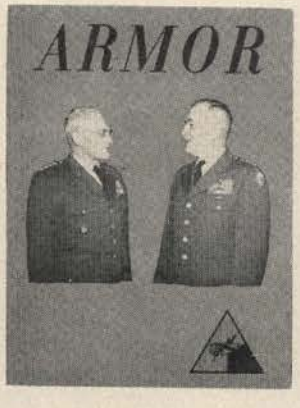
Amphibious Operations and the Marines

Dear Sir:

The article on Armored Amphibious Operations by Mr. Richard Ogorkiewicz was well received by the mobile minded marines at Quantico. In fact it was so well received that the Library's copies have disappeared. Can you help?

LIEUTENANT COLONEL V. J. FENILI
300 East George Mason Road
Falls Church, Virginia

● *We sure can and did. Ten extra copies.* ED.



THE COVER

General Willard G. Wyman, Commanding General of US Continental Army Command, is pictured *(right)* as he takes over as the new president of The U. S. Armor Association from General Williston B. Palmer, Vice Chief of Staff, United States Army, at 68th Annual Meeting of the Association held at The United States Army Armor Center.

CARDED

WHO WILL COMMAND OUR TANKS?

By DR. ROBERT A. BAKER



U. S. Army

During mobilization, the men in uniform at the beginning can expect soon to function two levels higher than their peacetime assignments. The quality of our wartime leadership, then, depends to a very great degree upon the leadership training we give our men in peacetime.

DURING the past five years, it has become increasingly clear that we are not training enough Tank Commanders to meet our mobilization needs. It now appears that only unusual measures can guarantee an adequate supply of well-trained Tank Commanders during rapid mobilization. This article is an attempt to summarize the situation—to portray some of the important facts on Tank Commander training—where we are, how we got there and where we are headed.

Since most TOE Armor organizations are well-staffed with senior NCO's serving as Tank Commanders, the question: *Who will command our tanks?* might sound facetious. Although a few organizations may be temporarily short of competent TC's, there are usually junior NCO's in the companies who can assume the duties temporarily and after enough experience can assume them permanently. It is reasonable to assume this surfeit has resulted primarily from operation Gyroscope and the establishment of the various Armor NCO schools within particular units or Army Areas. Examples include the Seventh Army's Tank Commander School; the 4th Armored Division's Tank Leader's Course and the 3rd Armored Division's recently established TC Academy. Best known of all is the Advanced NCO Course at The Armor School, which has served long and well as a post-graduate training ground for outstanding crew members, men who are capable of assimilating the knowledge and assuming the responsibilities of an Armor leader.

But this leads us to another question, *Why are such schools necessary?* A simple, direct answer is that each organization must train additional Tank Commanders to replace those who are lost through transfers, retirements and so forth. For the senior men refresher training is a helpful means of introducing new matériel and improved tactical concepts. An equally direct but more critical reply is simply that the Armor training programs are not designed to prepare the average replacement for the job of commanding a tank.

The potential tanker, after enlistment or induction, receives eight weeks of Basic Combat Training. Then he is usually sent to the U. S. Army Training Center: Armor (USATCA) at Fort Knox for Advanced Individual Training: Armor (ATP 17-600). Here he receives eight weeks of instruction in all the fundamentals of Armor. Next he is assigned to some TOE Armor organization for duty. During his duty status his training is continued according to the second phase of the Basic Unit Training program, ATP 17-201 (the AIT phase of ATP 17-201 is almost identical with ATP 17-600), after which his formal Armor training is over. By this time he has acquired some skill or know-how in carrying out the duties of one or another of the crew positions. Although there are additional unit training programs, such as ATP 17-300, Tank Battalion Unit Training, and ATP 17-304, Combat Command and Division Training, the duties and activities of the tank crewman are the same as before. His role is still that of Gunner, Driver or Loader on his own tank. But what about the Tank Commander? He was omitted because the average Armor trainee rarely rises to this level. After his USATCA training, the typical graduate finds himself in a tank company assigned to a tank crew as a Loader or a Gunner. In a non-combat situation it is these crew positions that best fit his level of skill and training. Although the Tank Gunner assignment is a critical one in combat, in a non-shooting situation the assignment can be held by a less experienced man. As a result, Platoon Leaders and Company Commanders frequently designate the replacement as Gunner. Because of the shortages of adequate ranges, ammunition cost and the limited firing of the tank weapons, the inexperienced crewman can meet the job requirements for a non-shooting Gunner. Usually the replacement cannot be assigned as a Driver, for older and more experienced men already in the crew have acquired the driving skill and maintenance know-how essential to the daily operation of the tank. Under the supervision of these crew members, however, the replacement gradually acquires job experience and Armor knowledge before his period of enlistment ends. Occasionally, he is given the opportunity to drive and on rare occasions is allowed to briefly occupy the Tank Commander's cupola. If his driving skill and maintenance ability turn out to be exceptional, he may acquire stripes and assume the duties and responsibilities of the Driver. It is the rarest individual, however, who after about a year and a half in a TOE unit is able to acquire enough knowledge and skill, leadership, rank and self-confidence to warrant his being promoted to the position of Tank Commander. As a result, most AUS personnel serve in the crew position of Gunner, Driver or Loader, and are discharged after having had an extremely limited chance to command a tank. For RA personnel, the career pattern is quite similar, except that after years of service and experience in all crew positions they eventually become TC's.

At present very few crewmen in

DR. ROBERT A. BAKER received his BS and MS degrees from the University of Kentucky and his Doctorate from Stanford University. During World War II he served in Europe with the US Army Air Corps. Subsequent to the War he was a research scientist at Lincoln Laboratory, MIT. He is now a senior scientist at the United States Army Armor Human Research Unit, Fort Knox. Since 1954 he has worked closely with the various departments of The US Army Armor School conducting research on various problems of tank crew training.



U. S. Army

The control of tremendous firepower is a part of the tank commander's job.

the Armor reserve units have actually served as a Tank Commander or have had on-the-job training in his duties and responsibilities. Though most unit commanders recognize the problem and the value of sending able US personnel to the NCO schools, they are aware that US personnel would be discharged shortly after returning from school and would therefore be of little value to their unit. So most commanders prefer to send career soldiers, because only RA personnel will be around to take over the TC's job when there is attrition of key personnel.

The fact that very few reserve personnel have had experience or duty as Tank Commanders was clearly shown by a recent survey of USAR and National Guard Armor personnel conducted by the Armor Human Research Unit, CONARC. A tabulation of all the Tank Commanders in all the tank battalions of reserve organizations in all six Army Areas, located a total of 2,910 Tank Commanders. Of this number only 649 were found to have had previous active duty as crewmen. Next, if we look at organizational charts and assume that all these organizations will be brought up to full TOE strength during mobilization, we find that there would be 7,207 tanks which would require Tank Commanders. There is some discrepancy between supply and demand: 4,297 tanks would be without Tank Commanders.

Due to the constant turnover in personnel, these figures are not intended to be exact. They are accurate enough, however, to clarify the discrepancy between the available number of Tank Commanders and the number needed in an emergency. Actually, there is evidence that the discrepancy is even greater than the raw numbers suggest. First, if we note that only 649 reserve Tank Commanders have had active duty as a *tank crewman,* and remember that a tank crewman is not necessarily by any means a qualified Tank Commander, this number is not the correct one. When it is also remembered that *active duty* includes many reservists who fought with the M5A1, the M26 or the M4A1E8 (the "Easy Eight") during World War II or in Korea, and that the absence of the latest models of tanks in the reserve units makes it difficult, if not impossible, for TC's to acquire a combat-ready level of skill, the picture is still darker.

Because this potential shortage of well-trained, highly-skilled commanders is so great, perhaps it would be advantageous to take some immediate positive steps at every command level to increase the number of qualified Tank Commanders both in the Army and in the reserves. Suggestions for a theoretically sound and practical program will be discussed.

First, however, other pertinent information should be considered. Though all Armor personnel may agree, in principle, with the need for more and better TC's, they are less likely to agree about what Tank Commanders should be like or how they should be produced. One approach to producing them is to consider the Tank Commander's job. If we can specify his job requirements and duties and if we know what he is like on the average, we can draw up blueprints, go into production, and be sure to get what we need—eventually.

The MOS code book lists the following requirements for the Tank Commander (MOS Code 131.6):

> "Must be able to command and control light, medium, or heavy land tank. Must know tank-infantry tactics applicable in dual role of tank employment. Must know tank tactics involved in armored reconnaissance operations. Must know scope and techniques of crew maintenance of tanks. Must know principles of camouflage. Must demonstrate qualities of initiative and resourcefulness."

If we interpret the MOS code system literally, however, the Tank Commander must possess all the skills and qualifications identified in each of the lower levels of MOS 131 as well. These would include:

> "Must know scope and techniques of organizational maintenance of turrets and tank gun. Must know construction, lubrication and nomenclature of turrets and tank gun. Must know use of technical and supply publications in organizational maintenance of turrets and tank gun. Must know organizational maintenance procedures for small arms. Must know how to install, orient, and operate tank direct fire sights and auxiliary fire control equipment such as the aiming circle and gunner's quadrant. Must know use of turret traverse and elevation controls. Must know how to operate tank gun breech and firing mechanisms. Must know characteristics of effects of various types of tank ammunition. Must know techniques of range determination, including use of mil relation formula and optical instruments. Must know techniques of clearing misfires. Must know tech-

niques of fire adjustment."

The Tank Commander is responsible not only for his own requirements, but also for those of the Turret Mechanic (131.1), Gunner (131.2), Ammunition Section Leader (131.6), and Instructor (131.6), and the duties prescribed for the Armor Basic MOS Code 130.0 as well. Clearly it is the objective of the Army to prepare men to carry out a great variety of duties, with the specific job families or career fields providing increased diversity of qualification, greater mobility in placement, and greater value to the service.

The possibility exists, however, that these advantages are gained only at the expense of a loss of skill and ability in the particular, very important job of the Tank Commander. Specialization in everything is, in the last analysis, specialization in nothing. This possibility, as well as the need for a careful re-evaluation of the Tank Commander's activities in the light of new equipment and changes in tactical concepts, led CONARC to establish a research requirement for Armor Human Research Unit at Fort Knox to make a detailed study of the job duties and requirements for Tank Commanders. After a study of Armor literature, a research team visited TOE units at home and in Europe and interviewed and tested more than 170 Tank Commanders. In addition, Platoon Leaders and Company and Battalion Commanders were interviewed about the duties of their TC's. A master list of the activities, duties and requirements for the Tank Commander's job was then completed and staffed by members of the Command & Staff Department, The Armor School. The requirements they approved are listed in *Table 1.* *(See pages 8 and 9.)*

It is evident from the table that in order to carry out all these duties, the TC must be not only well grounded in the fundamental Armor skills but be also an excellent leader.

But what do we mean by "leadership and command"? Here it is much easier to identify than to define. We recognize leaders when we see them, often pride ourselves on our ability to select and place them, and usually answer the issue of definition with the remark, "Leaders are born, not made." Though this adage contains some truth, experience shows that potential for leadership lies in almost everyone, but that both training and experience are required to develop it. Leadership is also a function of the situation in which the leader finds himself. In Armor, the increasing complexity of the tank and its supporting matériel demands more mental capacities and abilities. Thus both the number of decisions and the degree of their difficulty increase. In fact, a parallel exists between the number and kinds of decisions faced by a bomber pilot in a combat mission and a Tank Commander in combat. Leadership and command responsibility are of paramount importance to both, and long and intensive training is equally required by both men. As General John E. Dahlquist, former CG, CONARC, noted here a few months ago (*Leadership, 1956:* ARMOR—January-February, 1956) every advancement in modern arms increases the need for leadership:

> "Today the need for leadership extends also to lower levels more than it ever did before. . . . We have learned many things, but probably the most widely applicable lesson is the need for dispersion and the resulting need for leadership. Dispersion creates more smaller units. Each must have a leader and his chain of subordinate leaders. And any of these subordinate leaders in view of the sudden mass destruction potential of the atomic weapon, may be faced with the task of reorganizing and commanding a unit several rungs up the command ladder from his normal assignment. . . . What can we do to ensure that our leaders, whether they command a tank or a division will react promptly and properly to the rigors of atomic war? The answer, of course, lies in a soldier's training. . . . During mobilization, the men in uniform at the beginning can expect soon to be functioning two levels higher than their peacetime assignments. The quality of our wartime leadership, then, depends to a very great degree upon the leadership training we give our officers and men in peacetime."

Granted that training in leadership is essential, it is also essential to answer the questions, *How shall such training be given? What should we actually do in order to train men to be leaders?* Answers are not so simple that we can merely say, "Get ATP 17-777 and Lesson Plan No. 299 and do what they say." An editorial in the July-August 1955 issue of this magazine pointed out that the best advice on becoming a successful commander still seems to be ". . . gain experience in *command, command,* and more *command!*" It is doubtful, however, that we are giving the tank crewman a full opportunity to exercise the privilege of command during his training.

Although we have now specified



U. S. Army

Adjusting fire—his own or of supporting units—is another tank commander job.

TABLE 1

SUMMARY OF THE JOB DUTIES OF THE TANK COMMANDER

1. Commands and controls light (M41, M41A1) or medium (M48) tank and tank crew.

a. Controls movements and activities of other crew members; *i.e.*, Gunner, Driver and Loader, both in garrison and in combat, by giving commands and orders.

b. Assigns specific tasks to the crew members.

c. Supervises the work of the crew and ensures that the work is satisfactorily completed.

d. Makes whatever decisions are necessary, at the time they are necessary, with regard to the employment and operation of the individual tank and the tank crew.

e. Relays verbal or written information and orders from the Platoon Sergeant and/or Platoon Leader and explains the mission to the other crew members.

f. Conducts dismounted crew drill including mounting and dismounting the crew, closing and opening the hatches, preparation for firing, firing, securing the guns, and all dismounted action.

g. Reports information to the Platoon Sergeant or Platoon Leader and requests orders whenever and wherever necessary.

h. Supervises and assists in the evacuation of casualties from the tank. Reports occurrence of casualties to Platoon Sergeant or Platoon Leader.

i. Makes visual and manual checks of the tank, tank weapons, OVM and the crew members to ensure that safety precautions are taken and observed at all times.

j. Maintains level of supply in the tank by anticipating consumption and reporting shortages of rations, ammunition, fuel, etc., as they occur to the Platoon Sergeant or Platoon Leader.

k. Supervises the use and care of any and all special equipment issued to the tank or the tank crew.

2. Prepares, instructs and disseminates training materials and information to crew members.

a. Instructs and/or assists company officers in instructing other members of the tank crew in all subjects and phases of the individual and unit training program.

b. Will, on occasion, be called upon to prepare a lesson outline for some subject or phase of the unit or individual training program.

c. Obtains and uses training aids such as the actual equipment, models, charts, films, etc., to present the instructional material most effectively.

d. Supervises practice sessions and field work in all phases of operating the tank and armor equipment in garrison or in the field.

e. Disseminates orally or physically to his crew all orders, instructions, bulletins, etc., given him by his superiors.

3. Uses principles of intelligence and counter-intelligence in combat operations.

a. Collects any and all information about the enemy that is available and reports it to his immediate superior, *i.e.*, the Section Leader, Platoon Leader or Company Commander.

b. Captures, searches, segregates and secures any and all enemy personnel whenever and wherever it is safely possible to do so.

c. Makes verbal reports of activities observed including filling out *Ground Observer's Report* forms and SHELLREP forms when feasible.

d. Camouflages or supervises the camouflage of his tank and matériel.

e. Utilizes cover and concealment whenever required by the situation.

f. Is able to identify the various armored vehicles employed by the aggressor army and to discriminate these from friendly vehicles of similar design characteristics.

4. Establishes, maintains and is responsible for all communication within the tank, and between his tank and other tanks in the platoon.

a. Uses RT voice procedures in communicating with the crew and other tanks.

b. Changes frequencies when necessary, or when directed to do so.

c. Gives arm and hand, flag and flashlight signals whenever appropriate to communicate with his crew members, other TC's, Platoon Leaders, Platoon Sergeants, Section Leaders and Company Commander.

d. Uses external interphone to communicate with troops outside the tank.

e. Uses standard interphone language within his own tank to communicate with the crew.

f. Conforms to the SOI when communicating with other tanks or agencies.

g. Makes daily and weekly maintenance checks of all signal equipment and completes DA Form 11-238.

h. Operates his own interphone and interphone control box to transmit and monitor set No. 1, set No. 2 and to monitor the auxiliary receiver.

i. Requests authentication and authenticates messages.

5. Commands light or medium tank in all armor combat missions.

a. Prepares his vehicle for road marches and issues warning order to the crew.

b. Maintains position and distance of his tank in the march column, etc., *i.e.*, observes and enforces march discipline and security for his tank.

c. Conducts and supervises At Halt inspections including posting of traffic control personnel, security guards etc.

d. Uses cover, concealment and defilade wherever possible during movement in combat operations.

e. Conducts all reconnaissance by fire for his individual tank.

f. Selects targets in his area of responsibility unless previously ordered to do otherwise by his superiors.

g. Requests supporting fire in situations wherein he is acting as an FO or in emergency situations in combat wherein his position forces him into the role of an FO and adjusts supporting fire once it is obtained.

h. Uses smoke whenever it is necessary to do so or when ordered to by his superiors.

i. Camouflages his tank whenever appropriate or necessary.

j. Recognizes and identifies enemy tanks on sight.

k. Attacks enemy antitank and artillery gun positions in the best tactical manner.

l. Prepares his tank for combat.

m. Briefs his tank crew on the attack plan after receiving the oral attack order from his superiors.

n. Reports all personnel losses, ammunition expenditures, fuel status and vehicle condition to the platoon leader during reorganization on the objective.

o. Prepares or supervises the preparation of range cards whenever necessary.

p. Directs and controls all fire from his tank onto the enemy in accord with orders received from his superiors.

q. Prepares his individual tank and crew for all night operations.

r. Takes precautionary measures against the effects of atomic or nuclear explosions and checks the crew's combat readiness following an explosion.

s. Uses military maps and map substitutes and supplements such as aerial photographs, operations overlays and sketches in cross-country travel, in individual or in segregated operations.

6. Commands and supervises all firing of the tank weapons.

a. Uses power traverse and power elevation control handle to make the initial lay of the 76 or 90mm gun.

b. Uses TC override fire control or trigger to fire the 76 or 90mm guns and the coaxial caliber .30 machine gun.

c. Alerts the crew whenever putting the turret into power operation.

d. Uses the M20 periscope and vision blocks to observe and lay gun for direction.

e. Installs, removes, assembles, disassembles, adjusts timing and headspace, applies immediate action, maintains and fires the caliber .50 machine gun.

f. Selects and designates targets and type of ammunition and gives initial and subsequent fire commands to the crew.

g. Determines the range to targets by estimation, use of the binoculars, intersection, registration or operates the T46E1 range finder, and turns computer on or off as desired, on the M48 tank.

h. Controls volume of fire and supervises and assists gunner in adjusting fire.

i. Supervises the handling, care and stowage of all ammunition stowed or carried on the tank.

j. Evaluates terrain and action of the enemy through general observation with or without the binoculars.

k. Senses rounds in relation to the particular target and announces the results to the gunner in the event the gunner loses the round.

l. Conducts and adjusts indirect fire when necessary, supervises the gunner in determining angle of site and minimum elevation.

m. Supervises and assists the gunner in the preparation and use of range cards.

n. Supervises and assists the crew in removing and clearing misfires and stuck rounds.

o. Calls for and adjusts artillery and mortar fire according to standard observed fire procedure whenever necessary.

7. Conducts and is responsible for all required inspections of the tank, the tank crew and armor matériel both in garrison and in the field.

a. Systematically inspects tank at intervals during each day of use.

b. Supervises driver maintenance or other services performed at periodic intervals from day to day.

c. Delegates responsibility for maintenance, etc., to the crew members as necessary.

d. Conducts and supervises before operation, during operation, at halt, and after operation, inspections and checks.

e. Checks crew members to see that each crew member has all of his equipment present and that this equipment is properly stowed.

f. Conducts the crew drills that stress stowage and restowage of all vehicular and personal equipment.

g. Supervises and checks the loading of tank ammunition and its safe and proper stowage in the tank.

h. Conducts or assists the Platoon Sergeant, Platoon Leader or Company Commander in the inspection of personnel, billets, living area and in the field.

8. Supervises and assists in the performance of crew maintenance on the M41, M41A1, or M48 tanks and their OVM.

a. Supervises and works with the crew in the performance of first echelon maintenance on the tank and its OVM.

b. Assists in the conduct of command, spot check and technical inspections.

c. Checks to see that all proper maintenance steps have been taken by the crew and all deficiencies are remedied.

d. Checks the trip ticket (when used) filled out by the driver to insure accuracy and accomplishment of needed services.

e. Fills out and signs the A (daily) and B (weekly) maintenance checks sheets, if these are employed by the unit.

his job duties and recognized the importance of leadership and command responsibility, we still need to determine the characteristics of TC's on hand, and to see how they spend their time. Knowing who they are and what they are like will give us clues about how to build others like them.

Utilizing a total of 175 TC's in ten typical TOE Tank Battalions in Europe and the U. S., we have made a composite picture of the average Tank Commander. First, the average TC is a Regular Army man, who has a rank of E-6, has been in the Army seven years, has had 30 months on-the-job experience as a TC, is 27 years old, has gone through the tenth grade and plans to reenlist. Forty-two percent of these 175 TC's have had combat experience in Armor, either in World War II or in Korea. Forty-five percent of them have completed the Advanced NCO School at Fort Knox or one or more of the Tank Leader's courses. Their average GT score is 97.7; MM score, 101.9; GM score, 100.5; Combat A score, 99.1; and Combat B score, 102.1. The typical TC prefers Armor to any other branch of the service, and thinks his superiors are doing a good job. Though he has considerable confidence in his crew, he also thinks they need further training before going into combat. He has some difficulty using the fire control instruments—especially the rangefinder—which he believes, after experience on the M48 tank, should be given back to the Gunner.

In every 24-hour day, he spends only an hour and a half, on the average, in giving instruction and only half an hour in receiving instruction. On the other hand, he spends five hours a day in maintenance and cleaning his equipment and the area for which he is responsible. The ways in which he spends the rest of his time are shown in *Figure 1*. One fact should be noted—his working day is eleven, not eight, hours.

In a series of interviews with battalion officers about the requirements for a Tank Commander, the key word, the word most often mentioned was *responsibility*, so often that *responsibility* and *Tank Commander* would seem to be synonymous terms—with good reason. For the Tank Commander is responsible to the ex-

Enlistment Status: RA

Rank: E-6

Age: 27

Time in Service: 7 Years

Formal Education: 10th Grade

Experience as a Tank Commander: 2½ Years

GT Score: 97.7

Advanced NCO Training: 45%

Combat Experience: 42%



U. S. Army

The average tank commander.

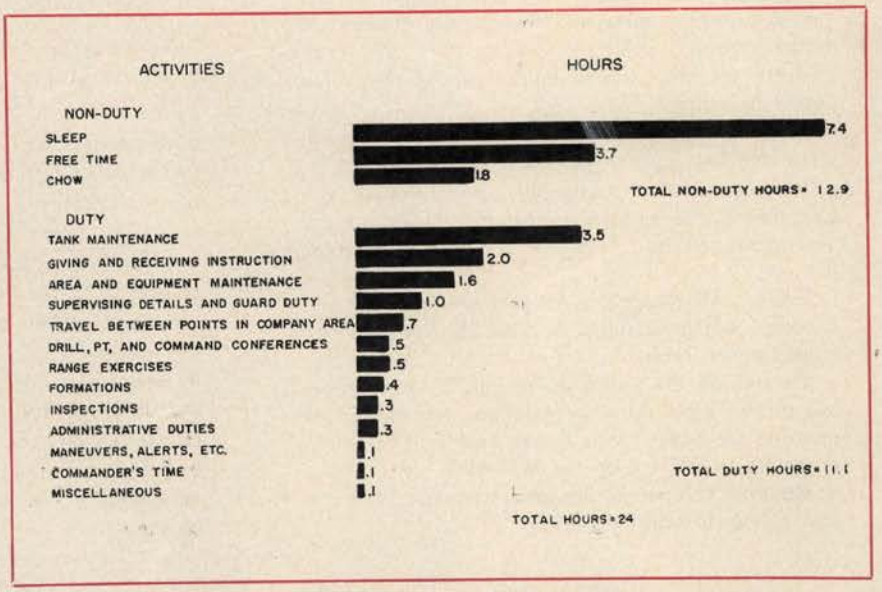


Figure 1. Typical 24 hour day of a TOE tank commander.

tent that he personally signs for the tank and its OVM. He is responsible for fighting the tank, and he is responsible for the crew. He is the lowest of the Armor commanders, but by no means the least important. Throughout our study we were told over and over that the success or failure of an Armor mission depends, finally, on the performance of the tank crew—who but the Tank Commander is responsible for their performance? If the ability of the individual Tank Commander is crucial, it is surprising that he is not a commissioned officer. He must be intensively trained, and his training is imperative if he is to acquire the essential skills in the degree formally specified in *Table 1*.

What do these facts about the average TC imply? First, we know that in any future war we will not have 30 months in which to give on-the-job training in the TC's duties even to every crewman in service, much less to recruits.

Second, we will not be able to use "job shred-out" techniques to reduce the requirements, responsibilities and level of skill for the Tank Commander's job. Job simplification is not feasible here. To accept a lower standard of performance for Tank Commanders would make the tactical and weapons systems ineffective, increase disproportionately the repair and loss of Armor matériel due to improper utilization and inadequate maintenance and undoubtedly increase the number of casualties beyond reason. Therefore, to settle for poor leadership and command is a poor solution. And we certainly are not able to simplify the TC's job by shifting some of his responsibilities to the Platoon Leader, who is already a Tank Commander as well as a leader of four other tanks. To increase his work load is out of the question.

Third, we must face the fact that in an emergency the men entering the Army and eventually serving in Armor will hardly be physically and mentally perfect. Of the small proportion of enlisted personnel in the higher brackets of the Army General Classification Test, many men are not physically fit for combat duty. It it doubtful also that in the scramble for highly skilled men, Armor will obtain more than any other branch of the Army. (See Editorial pp. 22-23, January-February 1955, ARMOR. Ed. NOTE). Therefore, we should immediately institute a major talent search and even award citations and medals to every officer able to build a working model or discover a reasonable facsimile of a potential Tank Commander. We must begin now to produce as many Tank Commanders as we can, to prevent having to produce thousands in a very short time. Though it is no doubt possible that we could mobilize enough TC's for combat come what may, it is wiser to prepare for the emergency. Are there legitimate reasons for not doing so? Is it justifiable to contend that instituting a program for training Tank Commanders would be too expensive, too extensive or too wasteful to carry out, even if they are not needed right now? It might be argued that such a program is unnecessary because the other tank crew members eventually, through some sort of experiential osmosis, will soak up enough know-how to command a tank. None of these arguments is valid. The production of more TC's right now is not necessarily expensive, time-consuming or wasteful of manpower. For example, at the unit level crew personnel could be assessed and those most likely to succeed as TC's could be trained by the present TC to be effective. In every crew, one man—the best qualified—would take over the Tank Commander's duties for one week per month. The TC himself would supervise. At the end of the week he would submit a report on the crewman's performance. During the following weeks, deficiencies could be corrected by refresher training. Later the novice would command again. The advantages of such a system would be:

1. That the best men would be given on-the-job instruction.
2. That the reports would give the company commander information about who is ready to take over a tank if necessary.
3. That a much larger supply of TC's who have actually had some on-the-job experience will become available.
4. That creating a large TC replacement pool in the unit would free many older TC's for duty at a TC school without damage to the unit's efficiency, and
5. That qualified TC's would be available for a shooting war.

Such measures, however, solve the problem only partially. Another step, positive and feasible, would be to select top US personnel after Advanced Individual Training for special instruction. Instead of assigning them to a TOE unit where they would be Loaders or Drivers, they could be sent directly to the Advanced NCO Course, to a special program for Tank Commanders, or to one of the TC academies. After graduation they would receive private, first class stripes and either be returned to the USATCA or assigned directly to a TOE unit as Tank Commanders. Those who are returned to the reserve components would continue to be of great value as instructors and tank leaders. In addition, an increase in personal motivation to make the Army a career would probably result.

Similarly, qualified RA personnel could follow the same career pattern except that after completing Tank Commander training they would be available for normal assignment in MOS and grade.

It has been objected that assigning new, unranked, enlisted men to the same schools and courses now attended only by senior, experienced noncoms would lower the morale of the older, more experienced men. This, however, need not occur. Within the classes and schools themselves, novices can be segregated, and senior NCO's can receive advanced or additional training in separate classes. Nor is there any need to exclude the current line-company tank crewmen. They too can be given a chance to attend such schools provided they are able to qualify on the basis of raw merit and ability.

No one is so naive as to assume that he can design a perfect, infallible plan or that putting any plan into effect would eliminate all the difficulties inherent in any modification of the present system of training. There are undoubtedly better plans of action for producing an adequate reserve supply of Tank Commanders. Decidedly, the suggestions stated here do not exhaust the universe of effective actions to increase both the quantity and quality of the Tank Commander population.

But increase it we must or the day may come when "Too little and too late" will be the Number One tune on Armor's hit parade.

The Association's first journal was published in March 1888. Since that time countless articles on "command" have appeared within its pages. The following editorial, reprinted here by the kind permission of the editors of The Infantry School Quarterly and its author, Lieutenant General Bruce C. Clarke, is one of the finest we have ever read on the subject. It is of the utmost importance to the junior officer who aspires to command troops to put time and thought into the questions to see how many answers he comes up with in the affirmative. . . . The Editor

We hear many officers say, "I'd do anything to get a command." If you are one of these, do you really mean it? Are you suited for command? Have your really considered what having a command entails? What are your answers to the following questions?

- Are you willing to devote all hours of the day and night, seven days a week, to your command?

- Is your wife willing to do likewise when needed in order to make a happy "Army community" in your unit area?

- Is your family willing to be secondary, if necessary, to the "Company," "Battalion," "Group," "Regiment," "Combat Command," "Brigade," or "Division"?

- Are you willing to learn, teach, stress and live with the "basic fundamentals" necessary to make your unit good and still believe that your great talents for "bigger things" are not being wasted?

- Do you like to be with young people? Can you live with their energy, points of view, and the problems they create?

- Are you willing to take the hard knocks that come from carrying responsibility for the failure of your subordinates?

- Can you juggle, at the same time, all the balls of training, maintenance, tests, administration, inspections, communications, messes, supply, athletics, marksmanship, discipline, public relations, without dropping any of them?

So You Want a Command

- Are you able to do many things "concurrently," or are you a "consecutive" doer? Can you manage a complex job?

- Can you receive and carry out orders? Are you a good "follower" as well as a "leader"?

- Can you stand tough competition from like units in your outfit and still retain a spirit of cooperation and teamwork with them?

- Are you physically and emotionally fit to carry the load?

- Do you have the courage to make and stand by tough decisions?

- Are you and your family willing to "live in a goldfish bowl" where your actions are closely observed by both subordinates and superiors?

- Are you still enthusiastic and cheerful when confronted with seemingly impossible tasks to be performed with inadequate means?

- Are you willing to take responsibility yourself when things go wrong in your unit and correct a bad situation rather than blame it on the staff or a higher headquarters or a subordinate?

- Are you willing to do your best with "what you have" even though it apparently is inadequate?

- Are you confident you can produce a superior unit with the ordinary run of manpower? Can you inspire personnel to produce outstanding accomplishments?

- Are you willing to take a chance on being relieved for attaining only mediocre results?

- Do you really want "command" or do you just want "to get command on your record"?

If your answers to these questions are "Yes," you should fight to get a command. And, if you hear an officer say "I want a command," you should confront him with these questions. If his answers are "Yes," he is undoubtedly sincere and you should make every effort to see that he gets a command. No assignment will ever give greater satisfaction or enable an officer to contribute more to the Army and our Country.



U. S. Army

L to R. General Williston B. Palmer, Vice Chief of Staff, USA, Major General John L. Ryan, Jr., Commanding General, US Army Armor Center, and General Willard G. Wyman, Commanding General, Continental Army Command.

The Sixty-eighth Annual Meeting of The United States Armor Association

Armor personnel, represented by all components, gathered at The United States Army Armor Center at Fort Knox during the period 4-5 April for a memorable concentration of members of the mobile arm—the 68th Annual Meeting of the United States Armor Association. As in the past, the program was replete with subjects of vital concern to the Armor branch. Papers were presented on "Armor on the Atomic Battlefield," "Mobile Defense by Armor" and many other related subjects listed on the opposite page. The program highlight was the principal address to the membership, delivered by General Willard G. Wyman, Commanding General, United States Continental Army Command, on "The Leadership of Armor."

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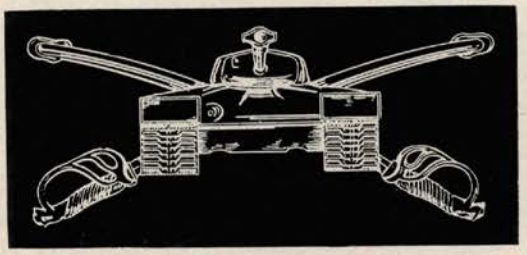
U. S. Army

L to R. Lt. General William H. Morris, Ret., Brig. Gen. Sidney R. Hinds, Ret., and General Jacob L. Devers, Ret.



U. S. Army

L to R. Maj. Gen. Donald W. McGowan, National Guard Bureau, and Brig. Gen. C. P. Kerr, Texas National Guard.



SECRETARY'S

personalities in attendance . . .

THE 68th Annual Meeting of the United States Armor Association now joins its predecessors in the annals of military history. Despite inclement weather which materially affected the off-post attendance, our hosts at Fort Knox headed by the Post and Center Commander, Major General John L. Ryan, Jr., outdid themselves in making this memorable occasion enlightening, professionally and socially.

The following outstanding personalities were present: General Charles L. Bolte, Retired; General Jacob L. Devers, Retired; General Williston B. Palmer, Vice Chief of Staff of the Army and Retiring President of the Association; General Willard G. Wyman, Commanding General, CONARC, and newly elected President of the Association; Lieutenant General Charles E. Hart, Commanding General, Second US Army; Lieutenant General William H. H. Morris, Retired; Major General L. L. Doan, Chief, Armor Section, CONARC; Major General J. H. Hinrichs, Deputy Chief of Ordnance, Department of the Army; Major General Hamilton H. Howze, Director, Army Aviation, DCS/OPS, Department of the Army; Major General Nelson M. Lynde, Jr., Commanding General, Ordnance Tank-Automotive Command, Detroit, Michigan; Major General Donald W. McGowan, Chief, Army Division, National Guard Bureau; Major General Andrew P. O'Meara, Deputy Chief, Research and Development, Department of the Army; Brigadier General Creighton W. Abrams, Deputy Assistant Chief of Staff for Reserve Components, Department of the Army; Brigadier General Charles P. Bixel, Special Assistant to the Deputy Commanding General, Second U. S. Army; Brigadier General Frank H. Britton, Chief, Armor Branch, Career Management Division, TAG, Department of the Army; Brigadier General Bogardus S. Cairns, US Army Aviation Center, Fort Rucker, Alabama; Brigadier General C. G. Dodge, Chief, Army Advisory Group, Air University, Maxwell Air Force Base, Alabama; Brigadier General Paul A. Gavan, Assistant Commandant, US Army Artillery and Guided Missile School, Fort Sill, Oklahoma; Brigadier General Sidney R. Hinds, Retired; Brigadier General W. A. Holbrook, Retired; Brigadier General Paul G. Hollister, Deputy Commanding General, US Army Antiaircraft and Guided Missile Center, Fort Bliss, Texas; Brigadier General Joseph A. Holly, Retired; Brigadier General Clayton P. Kerr, Commanding General, Division Artillery, 49th Armored Division, Texas National Guard; Brigadier General George R. Mather, Deputy Director of Personnel Plans, DCS/Personnel, Department of the Army; Brigadier General Paul M. Robinett, Retired; and Brigadier General Harry H. Semmes, Retired.

In addition to these off-post personnel, and our genial host, the following General Officers stationed at Fort Knox were present: Major General Raymond W. Curtis, Assistant Commandant, The US Army Armor School; Major General Paul A. Disney, Commanding General, US Army Training Center, Armor; Brigadier General James I. King, The US Army Armor School; and Brigadier General Sherburne Whipple, Jr., Deputy Commanding General, US Army Training Center, Armor.

Distinguished members of the press included: Brigadier General A. Robert Ginsburgh, *U. S. News and World Report;* Colonel Stephen F. Tillman, *Army-Navy-Air Force Register;* Colonel Robert S. Allen, *The Hall Syndicate;* Mr. Hanson W. Baldwin, *New York Times;* Mr. Monte Bourjailly, Jr., *Army Times;* Mr. William Carver, *Louisville Times;* and Mr. Tom White, *Indianapolis News.*

Several Armored Division Associations were represented: Colonel R. F. Perry, Secretary, 2d Armored Division Association; Mr. Ernest J. DeSoto, President, 3d Armored Division Association; Mr. A. J. Passanante, Executive Secretary, 4th Armored Division Association; Mr. Amos Stone, Past President, 5th Armored Division Association; and Mr. Dale Harrell, 7th Armored Division Association.

Members of industry were also present. A large group headed by Mr. L. F. Marsh, Jr., from the *Cleveland Cadillac Ordnance Plant,* attended. Other smaller groups were likewise there.

All in all, and taking the weather into consideration, the turnout (approximately 150 off-post people) was indeed favorable and proved the intense interest in our Army, our Branch and our Association.

REPORT ON THE MEETING

business meeting activities . . .

THE first presentation on Thursday morning entitled "Armor on the Atomic Battlefield" was given by Lieutenant Colonel William L. Boylston *(See page 24)*. The Artillery portion was presented by Lieutenant John R. Henderson, Chief, Artillery Section, C & S Department, The U. S. Army Armor School. After luncheon at Sadowski Field House, we returned to Gaffey Hall where we were brought up to date on Mobile Defense by Armor. This lecture was presented by Lieutenant Colonel William Y. Van Hook. The initial presentation in our previous Annual Meeting spelled out the School's concept. This year's presentation gave the combined agreed doctrine of the Command and General Staff College and The US Army Armor School. *(See page 30.)*

A repeat from last year's meeting followed. A *Forum on Armor* moderated by General Doan opened up a discussion in many problem areas peculiar to Armor. *(See page 35.)* The questions and answers are presented in this issue. However, comments from the floor are not included. Actually, the questions and answers as presented serve as points of departure for further discussion and could be easily adapted to any group of military professionals.

This interesting and instructive forum concluded the first day's activities.

Honors for all General Officers started off a full schedule on Friday. We moved to Gaffey Hall where the host welcomed all who were present and introduced the Second Army Commander, General Hart, who honored us with a few remarks. General Ryan then introduced our President, General Williston B. Palmer, who conducted the first portion of the business meeting with the help of the Executive Council and the Secretary-Treasurer.

311 members attended the business meeting in person, and 1324 more stationed around the world, whose duties prevented attendance, were represented by absentee ballots. Thus a quorum, as required by the constitution, was met.

The reading of the minutes of the 67th Annual Meeting, held at Fort Knox in April 1956, was duly dispensed with in view of the fact that they had been published in the May-June 1956 issue of *ARMOR*.

The President noted that the Annual Report of the Secretary-Treasurer for the calendar year 1956 was approved by the Auditing Committee and published on pages 4 and 5 of the March-April 1957 issue of *ARMOR*. He asked the Secretary to give a short summary for the first quarter of 1957:

The first three months of 1957 saw several changes in the Association which we believe have materially increased the benefits to our members and unit subscribers.

In January we published our first *Newsletter*. Subsequently, *ARMOR* and the U. S. Armor Association *Newsletter* will be published in alternate months. This gives us contact with the membership through the medium of a magazine or a newsletter each month. The *Newsletter* is a combination of the news from the U. S. Army Armor School and News Notes pages as they now appear in the magazine. In addition, we will publish items from other sources considered newsworthy. Examples of these are: school lists, National Guard items, articles of interest from Armored Division newspapers, and the like.

We started the year with an 80-page issue and hope to publish a minimum of 72 pages in each issue. This, of course, depends on your continued support financially through your subscriptions.

Receipts far exceeded a like period for last year. This is attributed to several factors. (1) During the last quarter of 1956, your four-man office force (three sergeants and your editor) put on an intensive promotional drive whereby we contacted more than 12,000 persons who had been associated with armor units during World War II. Utilizing our process cover from the September-October issue, which had been supplied by General I. D. White, the results to date have been most gratifying. (2) In the European Theater, Lieutenant General Bruce C. Clarke put on an extensive drive. This included supplying the bulk of the material for the January-February issue of *ARMOR* and obtaining many additional members and practically every Armored unit in Seventh Army as a subscriber. This has made our paid membership (unit as well as individual) exceed any paid total since the middle of World War II. (3) Major General D. W. McGowan, Chief of the Army Division of the National Guard Bureau, has continued to gain support from our National Guard Armor units. During the past six months this has been extended to all Armored Cavalry Regiments, Armor Groups and many tank

battalions in addition to the six National Guard Armored divisions.

In order to continue the enlarged size of the magazine and the *Newsletter*, we ask each and every one of you to continue the encouraging of individual memberships of all Armor officers and officers assigned to Armor units. In addition, we feel that unit subscriptions are a *must* in order to make the magazine and the *Newsletter* available in the dayrooms for use by the enlisted personnel.

Because ROTC institutions, instructing in Armor, have decreased to six in number, we stated in the March-April issue of *ARMOR* that we would entertain the receiving of names of top winners of institutions instructing in General Military Subjects courses of instruction at ROTC colleges. One-year memberships and book awards are being presented to the winners in the name of the U. S. Armor Association. To date the response has been fairly high.

In summary, it is our contention that we are on a firm base, both financially and editorially. The material published in the magazine represents the thoughts of all our members. We do not intend to voice the opinions of a selected few. We select the material as it is received on the following basis: Will it stimulate thought? Will it encourage others to submit additional material? The follow-up articles do not have to be in line with the initial expressions. Diversified views are always welcome. Continuation of the gratis submission of material to be disseminated to our members, and concerted efforts by all to insure membership growth, will assure us that we will be able to publish a magazine and a newsletter which will be in consonance with our professional purpose as indicated at this Annual Meeting of distinguished people gathered here today.

The next order of business was consideration of the proposed change to the constitution which had been circulated to all members, at the same time announcing the dates for the 68th Annual Meeting. The proposed change increased the size of the Executive Council from 18 members to 24 members. The proposal was deemed necessary in order to give greater representation on the Council. It was felt that with the increased interest in Armor the Association needed more Council members in Washington and at various Armor units. The change was passed with only 38 dissenting votes. The amendment is now incorporated in the constitution. *(See page 52.)*

election of officers . . .

ELECTION of officers followed. Due to the inclement weather, our able Chairman of the Nominating Committee and Past President, Lieutenant General Willis D. Crittenberger, was unable to attend, thus missing his first meeting in years. Major General D. W. McGowan, Acting Chairman of the Nominating Committee, assumed the chair. He gave reasons for selections of the proposed slate. In order to conduct business without loss of time it is necessary to have sufficient members residing in the Washington area due to the location of the Association's headquarters. Some members on the old slate are soon due to depart the area; hence, they were omitted from the proposed slate. At the request of Lieutenant General Bruce C. Clarke, Commanding General, Seventh U. S. Army, several Council members were proposed from that area. Although they are not available for Council meetings, it is believed feasible, due to the preponderance of Armor in that area, to include the Armored Division Commanders stationed in Europe. He then read the proposed slate headed by General Willard G. Wyman, who was nominated for the Presidency. The slate was unanimously carried.

General Wyman assumed the chair and expressed his gratitude upon being elected to the Association's Presidency. He next read greetings from the President of the United States, the Chief of Staff of the Army and the names of others who, although unable to attend, had sent messages. The messages were posted at the evening banquet and were enjoyed by all. These messages are reproduced elsewhere in this folio.

As stated on the preceding page, the Overseas Theater Advisors have been most helpful. Our new President, General Wyman, has asked the following to act in the same capacity again:

General Henry I. Hodes, CinC, USAREUR

General I. D. White, CG, AFFE-Eighth Army

Lt. General Clovis E. Byers, Comdt., NATO Defense College

Lt. General Bruce C. Clarke, CG, Seventh Army

Maj. General Thomas L. Harrold, CG, USARCARIB.

a resolution . . .

BRIGADIER GENERAL Clayton P. Kerr, 49th Armored Division, discussed unit *esprit* and morale. He took note of an article appearing on page 54 of the March-April 1957 issue of *ARMOR* wherein it is proposed to wear the Garrison cap on the left side of the head as did Armor personnel during World War II. He proposed a resolution to the effect that this be accomplished in the interest of building *esprit* and morale. The resolution, as proposed and unanimously passed, appears in the box on this page.

In view of the two years of able guidance rendered the Association by the outgoing President, General Williston B. Palmer, it was proposed and passed to give General Palmer a standing ovation in gratitude for a job well done.

There being no further business, this portion of the meeting was adjourned.

Moving to Sadowski Field House, we were fortunate to hear our newly elected President deliver the principal address entitled: "The Leadership of Armor." General Wyman's address appears on page 20.

Subsequent to lunch at the Country Club, we moved to OP6 where the USCONARC Board Nr. 2 demonstrated and explained new and developmental equipment. Picture coverage of this event commences on page 39. Colonel John C. Welborn, President of the Board, was ably assisted by Colonel Jasper Wilson, Major Norman Lewis and Captain John M. Cushing in explaining the various items of equipment as they were publicly demonstrated.

The concluding demonstration for the afternoon consisted of an aero-cavalry concept in support of Armor which is purely in the experimental stage. Lieutenant Colonel James S. Greene and Major Robert F. Tugman narrated this portion. For the narration see page 44.

In the evening, a reception and banquet was held at Sadowski Field House. General Ryan introduced members at the head table. Then General Wyman officially closed the 68th Annual Meeting.

Not only did the officers stationed at Knox do everything in their power to make this meeting a huge success, but everywhere we went we were treated royally. The Project Officer, Colonel Leslie D. Goodall, G3 of Fort Knox, and his entire committee deserve a vote of thanks for their splendid efforts. They made us feel at home and made the trip through inclement weather worthwhile.

RESOLUTION

WHEREAS, that one of the aims and purposes of the United States Armor Association is to preserve and foster the spirit, the tradition and the solidarity of Armor in the Army of the United States, and

WHEREAS, The wearing of the Garrison cap (overseas) tilted on the left side of the head has been a mark of distinction of an officer or enlisted man assigned to an Armor unit, and

WHEREAS, it is advantageous to be so able to distinguish an Armor man in fostering *esprit* within an Armor unit, and

WHEREAS, the said wearing of the Garrison cap (overseas) will assist the Armor leaders in building *esprit* within their units,

IT IS HEREIN RESOLVED that the United States Armor Association at its 68th Annual Meeting go on record as advocating the return to this practice and so notify the Chief of Staff of the United States Army of said recommendation.

CARDED

before the United States Armor Association



Address of General Willard G. Wyman

THE LEADERSHIP OF ARMOR

AN invitation to talk about Armor to this audience is more than an honor and a pleasure; it is a dilemma! The dilemma was apparent to me the moment I began to think about what I would say today. What can anyone say about the history of Armor to people like the top Armor people gathered here who lived some of its most glorious chapters on the battlefields of Europe! On the other hand, what can anyone say about the future of Armor to people who are writing the next chapter now on the mapboards and maneuver grounds of Fort Knox?

To seize the horns of the dilemma, I decided to discuss Armor's contribution to the Army's adaptability for atomic battle. My purpose in choosing this subject is two-fold: First, to acknowledge the Army's past evolutionary debts to Armor. Secondly—and principally—to point out ways that Armor can help the Army to incur new ones.

At the outset I wish to emphasize that whenever I speak of the atomic battlefield, I refer to current conditions of battle imposed upon all ground forces by the advent of atomic firepower. Regardless of whether atomic firepower is employed initially or held in temporary abeyance for reasons of political or military expediency, the change in our military environment imposed by its existence has already taken place. At this very moment tactical units of the Soviet Army, armed with atomic weapons, are conducting field maneuvers behind the Iron Curtain. Our own Army's measures of adaptation for atomic battle cannot *lag* until the first Soviet mushroom appears in the sky over our troops. This compelling truth applies to any kind of war—large or localized. The pages of military history are littered with skeletons attesting to the fact that the life of the laggard is short.

Looking at the tanks, armored personnel carriers, bulldozers, bridging and many other items of Armored equipment now in use by all arms of the Army, a layman might

think of Armor's past contribution to the Army in terms of metal. But we cavalrymen—past and present—know better. The paramount contribution of our mobile arm to the rest of the Army has always been *mental*. The distinction is particularly significant at a time when the Army must depend so much upon mental adaptability to overcome stringent material limitations imposed by defense budgeting.

If war with our obvious enemy came any time within the next three years, there is little hope that we could match him in weight of metal on the ground. To overmatch him, we will need superior patterns of firepower and mobility. To achieve these patterns, we must employ superior mental adaptability now in integrating mobility and weaponry—using the tools at hand and on the way.

The challenge is formidable, but certainly not new in essence to the spiritual descendants of Stuart, Sheridan and Forrest. Historically, an integral relationship between mobility and weaponry has always been the dominant characteristic of our Arm. Long before Guderian was combining mobile artillery with tanks to form panzer units, Jeb Stuart was increasing the mobility of his artillery so that it would maneuver with his cavalry as a combined-arms team. In fact, he was a great cavalryman because he used his artillery properly. In our armored cavalry regiment of today, the integration has been advanced to a degree that might seem more radical to some present day officers of other arms than it would to Stuart or Sheridan.

I consider it no digression from the topic of mental adaptability to pay tribute at this point to that beloved former member of our Arm—the *horse!* George Patton himself would be the first to acknowledge that the horse was a great *teacher* for future leaders of Armor. Recalling some of those mounts we had at Fort Riley back in the 20's and 30's, I am sure that other officers here today will agree with me. If a cavalryman didn't keep his mind as well as his muscles *loose* in those days, he wouldn't finish his ride!! . . . Thanks to the teaching of the horse and the speed of such later steeds as the Patton tank, Armor could not develop that *rigor mortis* of the military profession known as "mental rigidity."

Today, the entire Army is moving along paths in doctrine, organization, tactics and techniques that were blazed by cavalry and armor long before the sudden acceleration in firepower by nuclear fission made such movement a matter of life or death. Back in 1952 when the need for accelerating this trend was not quite so obvious as it is now, I devoted considerable thought to the evolutionary response demanded of the Army by the on-coming era of tactical atomic firepower. When I left Korea to assume command of NATO Ground Forces in Turkey, I passed the problem on to my staff for study and recommendation. Although my planning people were principally Engineer and Infantry—very combat experienced, too—I was careful not to influence them with my own views other than through broad guide lines toward recognizable objectives. I wanted the benefit of their initiative and independent creative thinking.

After considerable time and study, they arrived at what they considered the ideal tactical organization for atomic battle and presented it to me. Among other things, it emphasized that mental flexibility is by no means exclusive to Armor. The organization that my staff, experienced infantrymen, arrived at looked very much like the organization of our current Armored Cavalry regiment!

In 1954, Major General Bob Sink, a violent airborne doughboy with the 44th, and later the 2nd Infantry Division, picked up the ball with his usual enthusiasm and, using our Turkish experience, initiated in the U. S. Army what we now call the "Mobile Forces Concept." Since last Summer, every Infantry Division in the United States has been training to field mobile tactical combinations of weapons and men curiously flavored with armored cavalry organizational trends. Under this "Mobile Forces Concept," the same emphasis upon a high ratio of firepower to manpower and speed of maneuver that is so familiar to Armor is being made familiar to the rest of the Army in ready-to-fight form.

In acknowledging Armor's pioneer role in the Army, however, I must also flag an urgent warning. Complacency is the father and mother of immobility. Whenever a pioneer becomes complacent, he stops moving; and when he stops moving he ceases to be a pioneer. So we must not be complacent about Armor's present position in the van of military progress. Armor must go on in the direction it thus far has led—toward the highest possible ratio of firepower to manpower at every point of contact with the enemy within the battle area.

The azimuth for Armor is plain to read. Organization-wise, it points to units in which the mobility and weaponry to achieve tactical *self-sufficiency* are integrated at the lowest possible echelon, provided with the means for controllability, and given protective skins. We must not be complacent about the degree to which we have already achieved this within our Armored Division. Under the conditions of dispersal and fluidity of situation which we must anticipate in atomic battle, there won't be *time* to shuffle tactical combinations together to meet the exigencies of the fleeting moment as we have in the past.

Quite appropriate to its original reconnaissance role, the Armored Cavalry Regiment is, I believe, farther advanced along our evolutionary azimuth than other organizations in the Army today. Even at the platoon level, its organization provides a high degree of tactical self-sufficiency with tank, scout, armored infantry, and support elements integrated into a tightly knit team having both direct and indirect firepower. It is logical as well as appropriate that Armor with its Armored Cavalry should be so advanced. The very role which shaped the organization of our current cavalry regiment called for a capability to operate responsively under conditions of widely dispersed deployment in situations of great fluidity. These are precisely the same conditions we now must be prepared to meet throughout the entire atomic battle area!

Please note that I have been speaking of the organization of Armored-Cavalry—not its present tools. Certainly, its means of firepower, communication, cross-country mobility and protection must be improved as rapidly as the advance of our technology will permit. By improved protection, I do not necessarily mean steel armor-plate and especially I do not mean heavier armor-plate. The time may soon come when we will think of our present armor-

plate primarily in terms of protection against the radiation, blast and thermal effects of nuclear weapons. As for protection against the guns of the enemy's tanks, nothing has ever beaten a faster first shot that kills!

As this audience well knows, a faster first shot that kills is much more than a matter of superior guns or even superior gunnery. It is the end result of superior training in every skill that Armored men learn. But above all, it is the end result of superior *leadership!*

In precisely the same position to the other factors in the Army's adaptability for atomic battle—*above all*—stands leadership! Sometimes I call it the "I" factor in war to distinguish the decisive quality of military leadership from the "committee" concept of responsibility which is too often mistaken for leadership these days.

When Lieutenant General Willard Paul was G-1 of the Army, he once asked me this question: "Do you know why so many cavalrymen won stars during World War II?" Since General Paul was an infantryman himself, I was interested in hearing his answer to the question. So I told him no, I didn't know. . . . He said: "Because the Cavalry brought up its young officers on responsibility! Cavalry lieutenants had to make decisions on their own at the gallop! The whole cavalry doctrine with its teaching and training placed heavy responsibility on the junior leader."

On the atomic battlefield, no commander is going to have the time and proximity to make all the crucial decisions. No matter how much we increase the span and speed of our communications, it will be impossible for an Army or a Corps or a Division Commander to discern and exploit points of decisions with speed equal to the fluidity of situation. We must have leaders at every echelon in the chain of command with the professional competence and imagination to recognize opportunity and with the initiative to act upon it without orders. In short, we must have *leaders* like the young lieutenant who seized the Remagen bridge that glorious March day in 1945.

Where will we find them? That question poses the gravest problem in the Army today.

Without a corresponding increase in the ability of leaders to use the capabilities of their units decisively in atomic battle, it doesn't matter a tinker's damn how much we increase their firepower and mobility. More firepower would merely mean more rounds expended in empty space or left on the racks. More mobility could merely mean distances at a faster pace!

In my opinion, we cannot solve this leadership problem merely by adopting more efficient coordinating procedures such as the Battalion Fire Support Coordination Center. While an effective staff tool, it is no substitute for a leader who knows how, when and where to use every facility at his command. On the atomic battlefield, every tactical unit leader must have the old cavalry leader's ability to keep his operation map in his head, his CP in his hip pocket, and a range card in the pupil of his eye.

Nor do I think that the Army can solve the problem merely by offering higher pay incentives to leaders—however long overdue more financial compensation may be. While more money will ease the conscience of every dedicated soldier whose family now suffers financial hardship because of his devotion to his country, money never motivated a leader to take an objective or die trying.

Nor do I think that improved efficiency reports, integration and promotion procedures can do the job—however desirable improved standards for assessing leadership may be. Our problem is not so much a matter of assessing leadership as it is of *developing* it.

Nevertheless, in our efforts to improve our leadership development program, the Department of the Army and the Continental Army Command are considering every facet of the problem. In the near future, you may expect to see more changes in the curriculum of our combat arms schools, designed to increase the scope of professional competence. Since no school of command can ever replace the exercise of command, however, senior officers throughout the Army are strongly encouraging outstanding young subordinates to seek command assignments. By our mobile forces training program for the pentagonal and current Infantry Division, we are giving junior officers of all arms greater responsibility and more practice in handling combined-arms teams. A more vigorous motivation element is being introduced into the ROTC training program. We are even dipping into the ranks to challenge young selectees of outstanding potential to study for active Army and Reserve commissions. I had five of them in my office for a chat at Fort Monroe the other day—young privates with masters degrees and mental aptitude scores from 139 to 148. A similar personal effort is being made by post Commanders throughout the Continental Army Command.

My reason for dwelling upon our efforts to cope with the problem is simply to highlight this paramount truth: *The big effort, the immediate effort, to improve the leadership factor in the Army's adaptability for atomic battle must come from the person of every officer in the Army.*

Recognizing that the demands upon his professional competence have been accelerated in direct ratio to the acceleration in firepower affected by nuclear fission, every officer in the Army must accelerate his military education accordingly! This cannot be accomplished within the framework of the Army's facilities for formal schooling alone. Nor can it be done within the easy routine of an 8-hour day. The officer who stops learning his profession when the retreat gun goes off is wasting his time. If his superior officers let him be satisfied with so limited an effort, they are accessories before the fact. Unless an officer is a genius, he can't possibly learn all that he will need to know about atomic-battle in an 8-hour day. But if he is a genius, he is already thinking 20 hours a day because that is how a genius learns what he knows.

I am reminded of a statement recently made by Lieutenant General Bruce Clarke. Although it was directed toward the Class of 1957 at West Point, it is applicable to all officers in the Army. He said as follows:

"I would like to speak to you briefly on 'Growth.' . . .

"This growth, of course, is not physical, but it is mental, moral and professional. Some members of your class have already stopped 'growing.' Some may stop on graduation; some when they are captains, some as majors, colonels, etc. Some will never stop.

"It is easy to tell when you stop growing. Just ask yourself if you are more interested in what your country owes you than in what you owe your country. If the answer is 'Yes,' you have stopped growing in the Service."

To General Clarke's words, I add this additional admonition: If any officer is looking for a soft berth, he should get out of uniform and vegetate at his own expense. Our responsibilities to our country are too great to permit the extravagant inclusion of "free loaders" within our ranks.

To officers of Armor, the Army's need for leaders qualified to cope with the professional, mental and moral demands of atomic battle is both an opportunity and a challenge. Many of the professional skills and techniques required are already SOP in Armor. Many of the mental habits are already yours by training. But above all, you have a moral tradition that provides the spark to lead in atomic battle!

It is the spark that ignited Patton's columns for their flaming thrusts through Normandy and to the Ennes. It is the spark that has lighted the way for the entire Army in developing tactics and techniques for atomic warfare. It is the spark that motivates this fraternity of arms. It is that brightest spark of the warrior heart—bequeathed by ten generations of American cavalrymen—the blazing spirit of Armor!

As Ardant du Picq once said, "the art of war begins and ends with the human heart." So there is nothing left for me to say but this: If ever the time comes when you are concerned with the problem of what to do next, look in your hearts and go on!

UNITED STATES ARMY
THE CHIEF OF STAFF

TO THE MEMBERS OF
THE UNITED STATES ARMOR ASSOCIATION

On the occasion of your 68th Annual Meeting I wish to extend greetings to the members of the United States Armor Association.

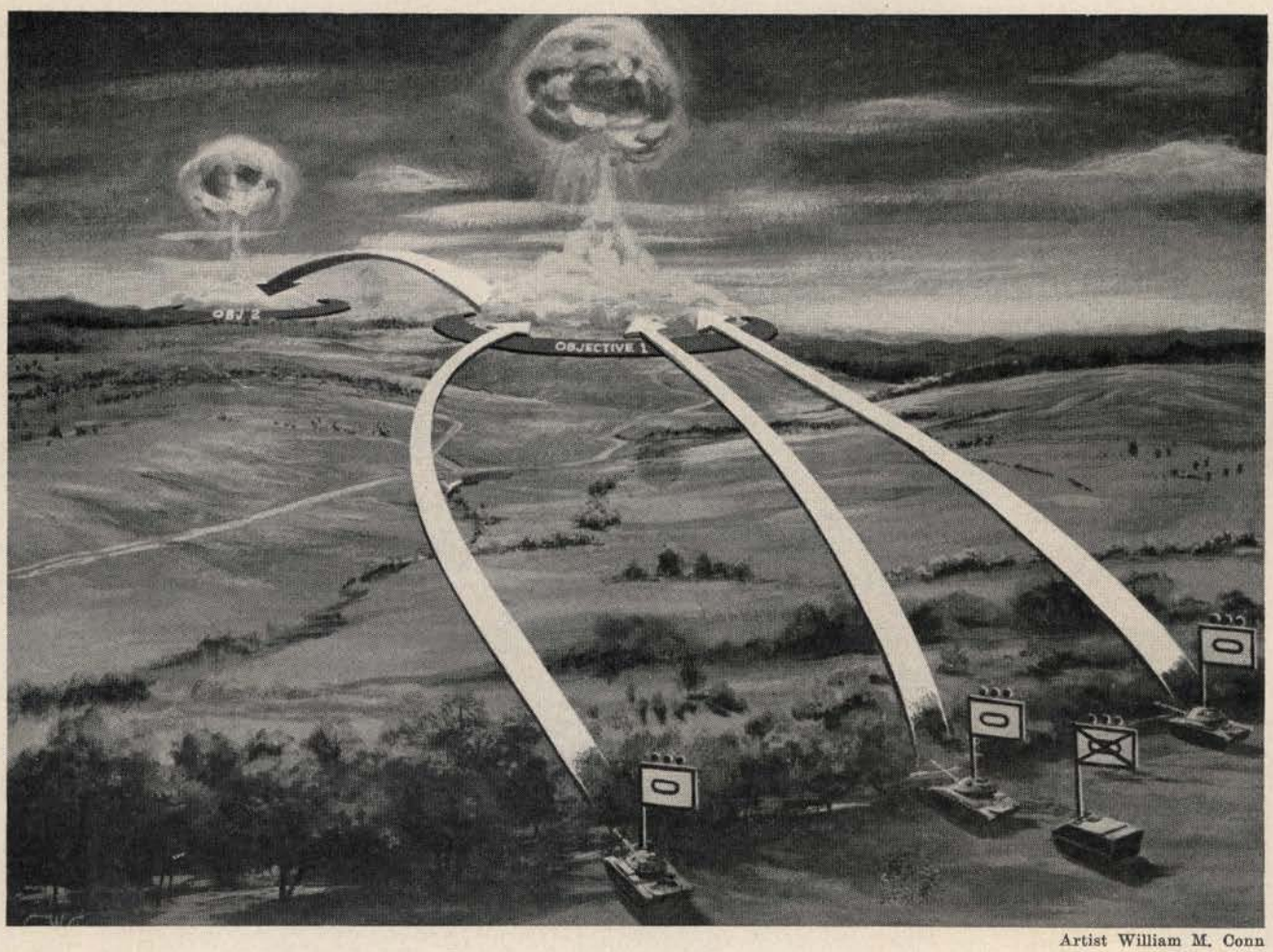
By fostering interest and pride in your arm and by focussing professional discussion on the art of armored warfare, your Association serves the Army and national security.

In this vital period of changing weapons and concepts of warfare it is imperative that our minds and efforts focus on the indicated demands of the future. I am confident that the Armor Association will direct the attention of its members toward this objective. Best wishes for a successful meeting.

Maxwell D. Taylor

MAXWELL D. TAYLOR
General, United States Army
Chief of Staff

CARDED



Artist William M. Conn

ARMOR ON THE ATOMIC BATTLEFIELD

By LIEUTENANT COLONEL WILLIAM L. BOYLSTON

WE have all read and heard much in recent years about what an atomic battlefield will be like. We in Armor are faced with the very real problem of determining, without experience, just as are the other arms and branches of the service, what effect the use of atomic weapons will have on the organization and the tactics and techniques of employment of Armor. The keynote to proper employment of any forces in an atomic battle zone will more than ever involve correct and timely application of two principles of war—the principle of mass and the principle of security—mass to accomplish the mission, and the security from atomic weapons provided by dispersion. In order to reconcile these two extremes, mass and dispersion, it is necessary to inject the importance of a third principle of war—maneuver. The principle of maneuver, translated of course, in terms of mobility and flexibility, thereby permits the concentration of forces to accomplish the mission and dispersion of these same forces to provide protection against atomic destruction. Heretofore, massing of troops has in itself provided a high degree of security from enemy

LIEUTENANT COLONEL WILLIAM L. BOYLSTON, Armor, graduated from Clemson College in 1941. During World War II he served in Europe with the 820th TD Battalion. Subsequent to the War he went to the Pacific and served as a Regimental S2. Returning to the States he was assigned in D/A. Attending school at Fort Knox he was next assigned to the 510th Tank Battalion and went to Europe with that outfit. He returned to the States to his present position as instructor in the US Army Armor School.

forces. This is no longer a truism.

Before we discuss the effects of this type warfare on the armored division, let us consider some of the conditions under which any type unit, Armor or otherwise, will have to fight.

Dispersion and depth on the battlefield are salient features of future ground warfare. Large massed troop concentrations must not be permitted to remain in an area for an extended period of time or they will invite atomic disaster by presenting an extremely lucrative target to the enemy. Battalion sized task forces, tactically and administratively self sufficient, are considered to be the basic fighting unit under atomic conditions. In order to reduce vulnerability to atomic weapons, dispersion will be between these task forces. In addition the population density of the battlefield must be reduced. Those elements which are not habitually needed at each echelon of organization will be located at a higher echelon.

From these dispersed conditions commanders will be required to mass rapidly sufficient forces for an attack and then quickly disperse their units for protection. These forces would be of sufficient size to gain a victory in the shortest possible time. In all the actions on this battlefield there will exist the requirement for massing supporting fires. In order to successfully and rapidly mass either for an attack or to repel an attack there must be a limitation to the dispersion. Perhaps the criterion for the degree of dispersion should be the capability of the unit to accomplish the mission and not the extent of the yield of enemy atomic weapons.

Problems of command and control will be increased on this battlefield by extended frontages and great depth. Speed of execution and responsiveness to command are essential to successful operations.

Security measures will be paramount. Both friendly and enemy units will employ increased counter-reconnaissance measures. Deception, cover and concealment as well as movement will be utilized as measures of defense. Night operations will be emphasized in order to increase this security and deception.

Increased distances, rapidity of movement and the actual dispersal of logistical installations will increase resupply problems.

The enemy will not mass of his own free will and provide us with a lucrative atomic target. Maneuvers will be designed to cause the enemy to mass, thus providing us with an atomic target. Atomic targets of opportunity created by our action against the enemy may well be a fleeting target at the most. Therefore, the time lag between target acquisition and actual delivery of the weapon must be reduced to a minimum.

Combat on this atomic field of battle will be characterized by fluidity of actions requiring a high degree of battlefield mobility and armor protection.

What are the characteristics of a unit to fight under these conditions?

It must be inherently flexible in organization in order to tailor its subordinate units to a specific task. It must provide armor-protected, mobile task forces of battalion size that are tactically and administratively self sufficient and employ a mounted weapons system.

A communications system that is extensive and versatile and will retain its effectiveness even though portions of it have been disrupted is essential for control of these forces and for the establishment of a warning system for friendly atomic fires. Responsiveness to command and speed of execution is dependent upon reliable communications. Once the order is given to concentrate it must be executed with speed so that the time taken to mass units will be held to a minimum.

A means of pinpointing targets, once they are generated by action against the enemy, must be available even during periods of poor visibility. A requirement exists for increased security, from a surveillance system to detect enemy penetrations between our dispersed formations to local security for individual units.

The logistical support system must be adequate and flexible. It must be simplified to insure rapid support of the combat elements during periods of great stress. Increased importance is placed on aerial resupply. Logistical installations must be able to function while dispersed laterally and in depth.

If we look back over the years, to the early part of World War II, and then trace the trends in organization of the armored division through these years, we see that the changes have been evolutionary rather than revolutionary. The characteristics of mobility, flexibility, firepower, armor protection and multiple communications so essential for the atomic battlefield were inherent then as they are now. But it was evident that we could not rest on our laurels. The organization of the armored division has been under constant study directed towards improvements. The Reorganized Current Armored Division (ROCAD) is the first step toward further enhancing these necessary characteristics. When we look at the rather drastic changes made, not only in organization but employment, of the infantry and airborne divisions, we realize more than ever that the advent of atomic warfare has affected the organization of the armored division in a minor way only. Perhaps this can best be summed up by a statement made by General Wyman in May 1956 "—The Armored Division appears more readily adaptable to the atomic battlefield than the infantry division as presently organized and equipped. Not only does the Armored Division have a highly flexible combat command structure, but it possesses the firepower, the communications and the mobility with a protective skin so essential to our projected pattern of operation."

The Reorganized Current Armored Division (ROCAD) meets these requirements of the atomic battlefield. As you know we have retained the basic structure of the current division. That is, three combat commands, four tank battalions, four armored infantry battalions, and an armored cavalry battalion, supported by armored combat engineers, armored artillery and unfortunately thin-skinned logistical elements. The division has some new units such as the combat aviation company thereby increasing the number of aircraft available, a signal battalion which gives us the increased communications necessary, and an atomic capability has been added to the division artillery. Although the logistical system has been simplified to some degree, there is still much work to be done. Continuous study is being directed toward improving the logistical support system of the division. As you can see, in the overall, we have made few changes. Most of the reorganization has amounted to internal improvements within the units such as the inclusion of reconnaissance and surveillance units in the new armored

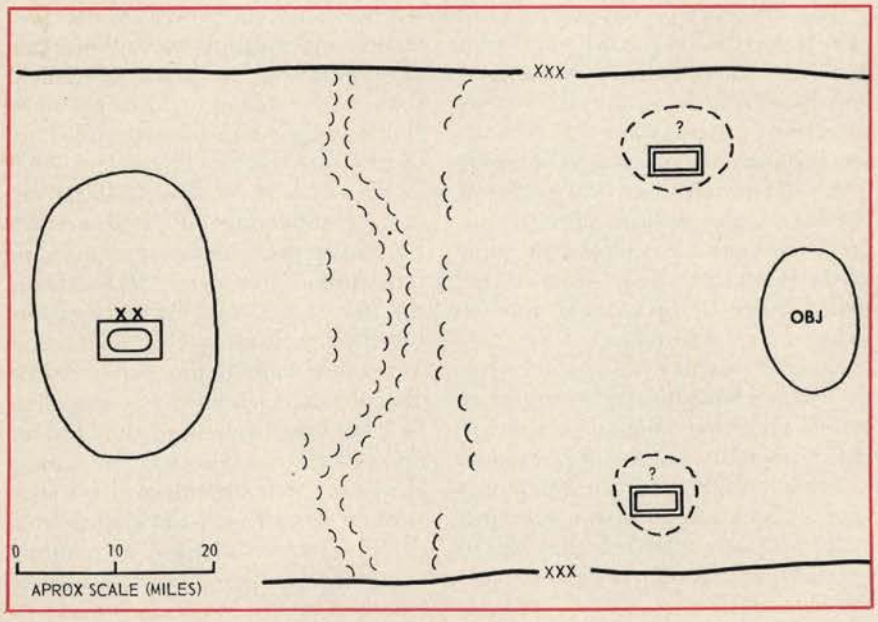


Figure 1

cavalry battalion. This will give the division the organic means of target acquisition and increased battlefield surveillance.

In discussing the effects of atomic weapons on the tactics of the Armored Division, we have selected a hypothetical offensive situation as a means of further discussion of some of these points.

You will note in *Figure 1* that there is depicted a corps spread along a general line approximately fifty miles in length. We might well visualize a line such as this in atomic warfare to be fluid in nature and consisting for the most part of battalion size enemy strongpoints, guarding the critical avenues of approach. Let us assume that the corps commander has assigned the armored division an objective in rear of the enemy defenses in the corps zone of action. You will note that the seizure of this objective will require maneuver for approximately sixty miles forward from the present infantry held line.

As to the enemy, he will undoubtedly be deployed in depth with strong reserves, and this might well result in a comparatively easy initial penetration with the bulk of the heavy fighting when we meet his reserves. This of course means that in addition to the preparatory atomic fires which we will initially exploit, provisions must be made for sufficient "on call" fires and for fires on targets of opportunity created by our action. Naturally if we are able to locate definitely the enemy's reserves, preplanned atomic fires will be delivered against them. However, with the fluid battle conditions that will exist, a good many of his reserves will be reacting to our penetration and will be located through their reaction to our attack.

In this example we assume that the enemy has an atomic capability equal to our own.

Based on this assumed situation, let us discuss the plan of maneuver of the division. First, there must be complete integration of the scheme of maneuver and the employment of atomic fires. Gaps must be created in the enemy's defensive zone through which we can move. If sufficient preparatory atomic fires are available they should not only be used to create these gaps, but also to destroy the enemy's tactical atomic delivery means. If the availability of atomic fires is limited then perhaps a priority should be placed on those fires designed to neutralize the delivery means of the enemy. In this case, we would force the gaps in the enemy's widely dispersed positions using conventional fire and maneuver. In any case these fires should be then exploited as rapidly as possible with mobile forces. Speed will be essential on the atomic battlefield. All measures possible must be taken to minimize the concentration of forces in this initial phase. Extended frontages as shown permit more dispersion between attacking units, thereby reducing the vulnerability to atomic attack.

Another means of reducing the vulnerability is through the use of multiple penetrations as shown in *Figure 2*. Here the division is attacking along three parallel axes. Each axis contains a combat command in a column formation, or at least a formation in depth. The formations of each battalion or task force within the combat command will naturally vary. However, the battalion or task forces of

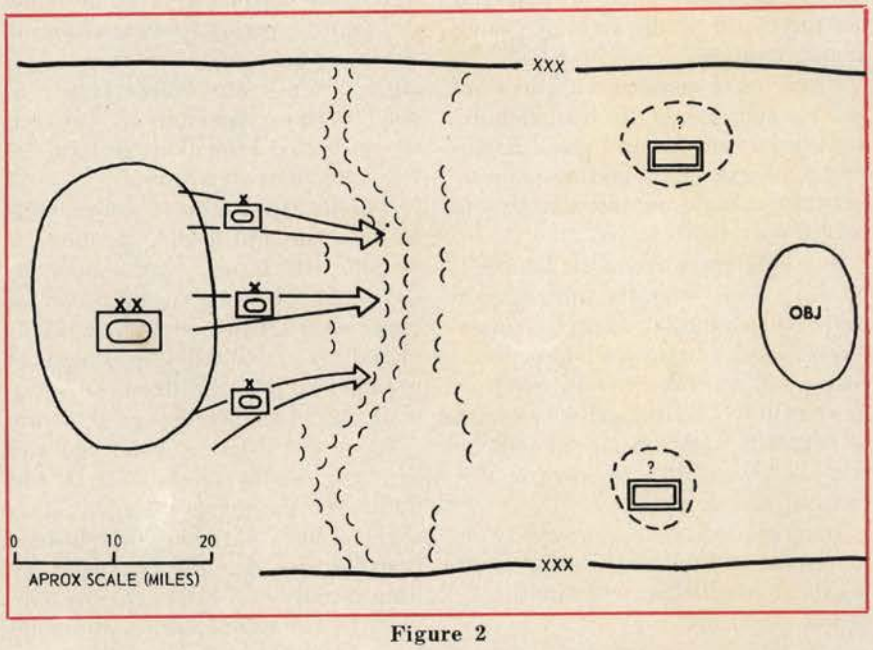


Figure 2

battalion size are considered to be the basic fighting unit under atomic conditions. In order to reduce to a minimum our vulnerability we must disperse between these battalion sized forces.

Let us examine for a few minutes the pros and cons of an attack, as in this instance, with three combat commands abreast versus an attack in this same situation with two combat commands abreast and one following or in reserve.

For three combat commands abreast: Here the advantage lies in being able to move rapidly to the objective and close on it in the shortest time with all our forces. Further it presents more opportunities for forcing the enemy to mass permitting us to inflict maximum casualties. Our capability for massing the great destructive power of atomic artillery lessens the requirement for retaining large reserves of troops. This formation will also enable the division immediately to follow up the massive destructive effects of the atomic fires. Advancing on such a broad front reduces our atomic vulnerability. *See Figure* 3. This is particularly true since we must think in terms of length of time we will be passing through a critical area. Admittedly this division formation reduces in some degree flexibility in the attack. However, in a situation such as this perhaps the need for speed and dispersion outweighs division flexibility. And of course we have to assume that the terrain will support such a formation. In this instance we rely on our mobility and capability for massing fires for mutual support. As this formation extends into the battle zone it will present a multiple front to the enemy. We can assume that the enemy will probably adopt a mobile defense similar to ours. He will attempt to canalize us, force us to mass, and hit us with his striking force or atomic weapons, or both. However, this formation penetrating his zone simultaneously on three fronts will complicate his problem. He may commit his striking force against one of our forces. In this case, at least one, perhaps both, of our other combat commands can, by maneuver, reinforce the one being attacked. Another alternative would be for the other two forces to speed on to the objective. This type formation may cause the enemy to prematurely commit his striking force, giving us an advantage in time and space to maneuver against him. Throughout all of this action, atomic and conventional fire support would be employed to the maximum. Our best defense is our speed, mobility and continuous fire and air support, in conjunction with adequate aerial reconnaissance.

Attacking with two combat commands abreast in this situation is following a tried and true division formation. The division will have depth and flexibility to its attack. However, the space of time for the division to move through any critical area will be greater. Dispersion will have to be attained through depth, particularly on the axis that supports two combat commands. In effect, this depth will be so great that considerable time would be consumed in moving the reserve or following command into action.

These are some considerations and problems facing a division commander in such an action. Both schemes of maneuver will undoubtedly accomplish the mission. The factors of "METT" would apply in this instance. But it certainly gives us food for thought in moving armored formations through an atomic battle zone.

For the purpose of this discussion let us assume that the division will attack with three combat commands abreast. No intermediate objectives have been assigned the armored division as such objectives would only delay the operation to seize the deep corps objective.

The Artillery Considerations*

Before discussing the employment of artillery in support of armor offensive operations, let's consider for a moment the ROCAD artillery organization and its firepower capabilities as compared to the current armored division artillery.

The general structure of the field artillery organization in ROCAD division artillery, when compared with the current organization, shows little change. Three armored field artillery battalions (105mm How) are included, and the medium battalion previously found in division artillery has been replaced by a general support battalion (composite).

In this composite battalion is found the most significant change in the firepower capabilities of the division —the addition of two organic atomic delivery units, the 8 inch howitzer battery and the 762mm rocket battery. The composite battalion also includes two 155mm howizter batteries.

In sum, the light artillery firepower

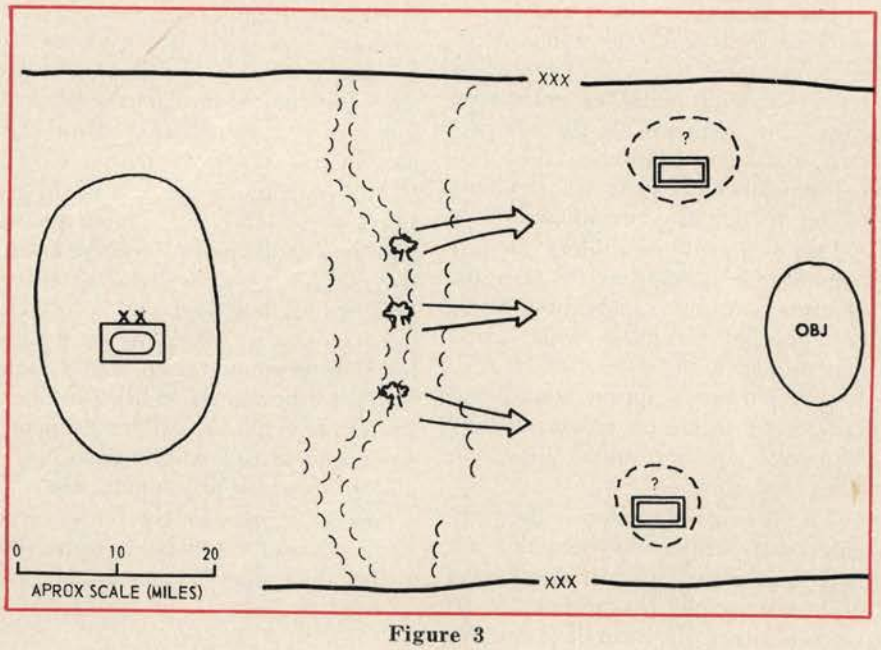


Figure 3

*Artillery presented by Lieutenant Colonel John R. Henderson, Chief, Artillery Branch, Command and Staff Department.

organic to the ROCAD division is the same as that in the current division. Compare the new composite to the old medium battalion: one medium artillery battery has been deleted; a heavy artillery battery, with greater range and far greater lethality, has been added, as has a very heavy rocket battery with even greater range and lethality. These increased capabilities are particularly important, because increased dispersion in width and depth on the atomic battlefield compounds the problem of massing artillery fires. The effective use of atomic firepower serves to compensate for reduction in the density of nonatomic artillery fires brought about by dispersing artillery units.

The absence of a light antiaircraft battalion in ROCAD division artillery is compensated for by an increase in light antiaircraft battalions in the type corps. The requirement for AA protection of armor continues, and habitual attachment of light AA elements to the division is contemplated.

Little change in artillery tactical employment is expected as a result of the increased capabilities. With one possible exception, time tested and combat tested principles of artillery employment appear sound and well suited to ensure proper artillery support for armor under all conditions of warfare.

The possible exception is the principle that artillery is normally not held in reserve. In past application of that principle, the artillery of an uncommitted division has usually been positioned well forward so as to permit employment of its fires in support of committed elements of the corps. Under conditions of atomic warfare, this practice must be reexamined carefully.

Remember that reduction of vulnerability by maintaining adequate dispersion of units is a prime consideration in atomic warfare. If in the situation depicted we position the armored division artillery so as to support the elements of the corps initially in contact, we have increased to some degree the troop density in the forward area and we may prematurely expose armored division artillery units to loss by enemy action.

For these reasons, it may well be that the armored division artillery in this situation should be positioned well to the rear initially and prepared for integration into combat command columns as the division moves out from its rear position.

Still valid is the principle that firepower organic to division artillery is minimal, and must be augmented for most combat missions. In this situation a reasonable augmentation might be attachment of a field artillery group from corps artillery, to include two medium battalions (SP) and a heavy battalion (8 inch howitzer (SP)). Additional reinforcing fires from corps artillery should be made available to the armored division during the initial phase of the attack.

Self-propelled light antiaircraft artillery should be attached to the armored division for this operation. An AA battalion group of two light AA battalions can well be employed to provide protection for division artillery, particularly the atomic delivery units, and to protect any critical defiles on the axes of advance.

In organizing the division's field artillery for combat, the augmentation portrayed will permit formation of battalion groups (one light battalion, one medium battalion, and an 8 inch howitzer platoon) from the composite battalion to support each of the flank combat commands. This provides strong conventional artillery support and an atomic capability directly available to these combat commands.

Similar support for the center combat command could be provided by a battalion group composed of one light battalion and the composite battalion minus (two medium batteries and an 8 inch battery from the attached corps battalion).

Under division artillery control, and moving on the center axis, would remain the corps field artillery groups headquarters, the corps 8 inch howitzer battalion minus, and the long-range 762mm rocket battery from the composite battalion. The group headquarters would assist division artillery as a control agency and can function as an alternate division artillery FDC.

Artillery under division artillery control would be employed in general support. The question as to attachment of artillery to combat commands on placement of artillery in direct support of combat commands requires, of course, a command decision. The decision should be predicated upon the physical capability of massing the fires of artillery units moving along separate axes, and upon the capability of division artillery to exercise effective control and fire direction under the conditions of rapid movement.

The artillery elements organic to ROCAD, when adequately augmented from corps artillery, provide the mobile and flexible firepower, conventional and atomic, directly responsive to the armored division commander, which is essential to effective artillery support of armor offensive operations.

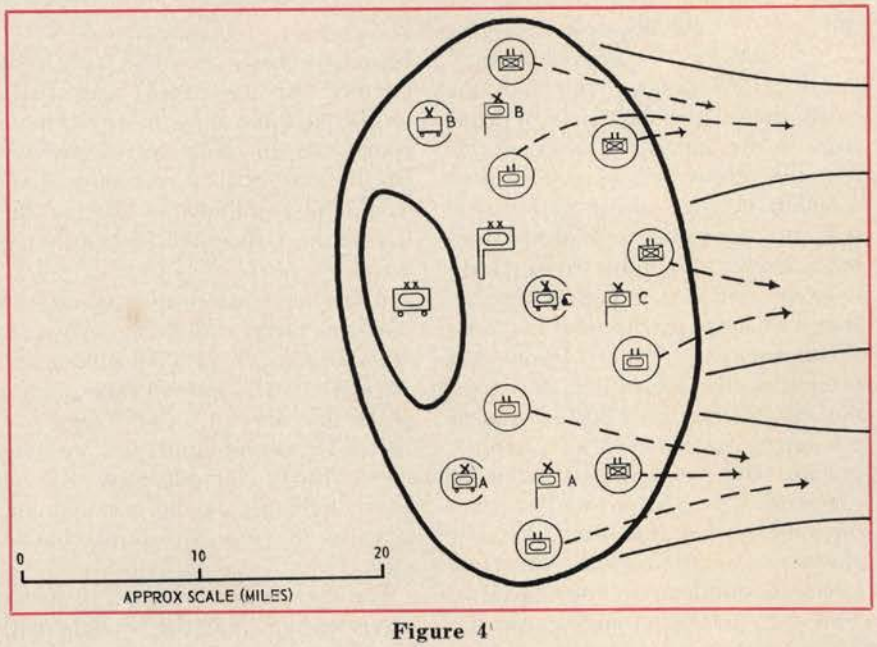


Figure 4

Rear Area Dispersion

Now, let us go back and see how this armored division might be dispersed in the rear area during the planning phase of this attack. *See Figure 4.* You will note first that the division elements occupy an area of roughly 600 square miles. While this may appear to be great, it is only an area 30 miles long and 20 miles deep and no unit will have to move more than 10 to 12 miles to clear the area. At the same time, we are maintaining the required 4,000 yards between battalion task force perimeters and 6000 yards between battalion task force centers of mass. This should reduce the vulnerability of the division during this more or less static planning phase.

The normal divisional support elements would be with their respective combat commands ready to provide resupply, medical evacuation and maintenance support. Reserves of fuel, always a critical item of supply, will be located in the division trains, the division logistical operations center, and the combat command trains, ready to start flowing to the combat elements as the requirements arise. The dispersion of logistical support in depth is achieved by echelonment four deep (combat trains, combat command trains, DLOC, division trains) and laterally by positioning these support elements with the three combat commands.

If possible, battalion task forces would be so located as to facilitate the division moving into its multiple column for the attack as indicated. A major consideration involved here is the control of the movement of these forces from their dispersed assembly areas forward and into the enemy defensive zone. Their movement forward should be in multiple, dispersed column formations, perhaps under the cover of darkness, phased so that these forces arrive in the area of atomic preparation at the time best suited for their arrival based on the anticipated weapons effects, and without halting at a line of departure or attack position. During this phase of comparative concentration the vulnerability to atomic attack is most critical. Therefore, this concentration must be minimized in point of time.

The discussion thus far has been related primarily to the initial phase of penetration. Let us now examine some considerations with respect to the exploitation phase. During this exploitation phase, forces will be confronted with the difficult task of employing atomic weapons against targets created by the enemy's reaction to our movement. Therefore, the commander must have an atomic delivery means responsive to his command that will permit rapid engagement of these targets. The organic delivery means now available in the Armored Division and improved communication facilities have done much to reduce this difficulty.

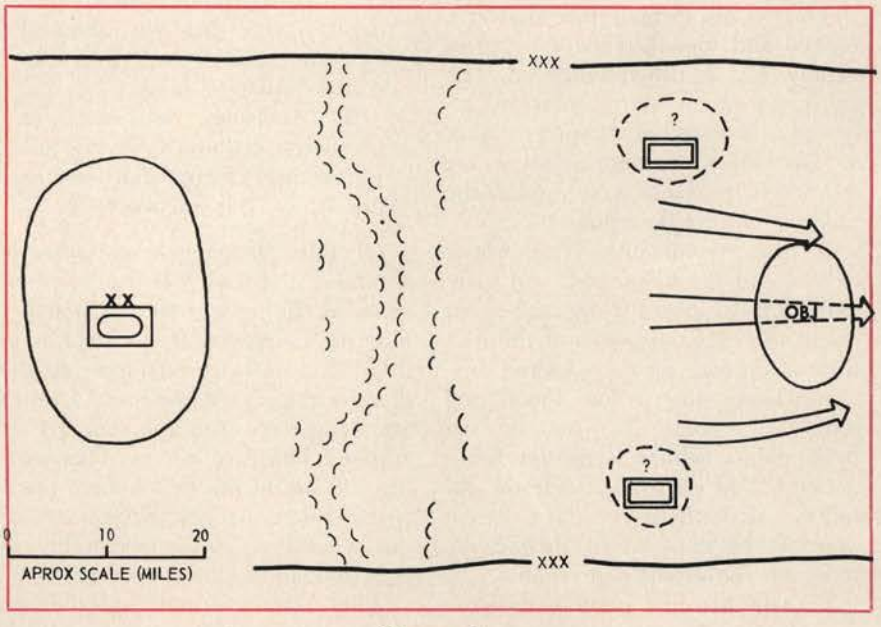


Figure 5

Another critical area from the standpoint of vulnerability to enemy atomic fire is the objective. In the past we have been guilty of seizing an objective, for example, a town or city, and immediately filling the streets with combat and supply vehicles. Naturally, this type concentration would be fatal in atomic warfare. If the terrain around and beyond our objective permits, perhaps we will have to move to positions on the flanks and beyond and thus control the objective. *See Figure 5.* This is particularly true if occupation of the objective itself presents too lucrative a target. The actions we may take upon reaching the objective also depend to a great extent upon the missions assigned the division. If we are to defend in the area we will attempt to immediately set up a mobile defense; if we are to continue the attack we will have to consolidate and reorganize while dispersed, and at the same time be prepared to repel any enemy counterattack.

Throughout all this action, beginning with the planning phase, army aviation will have a major role. It will be performing battlefield surveillance and target acquisition missions, thereby assisting the commander in preventing the enemy from "shooting the gaps" in our dispersed formations. It will give the commander an elevated platform for reconnaissance and control and the artillery the means of accurate fire adjustment. In addition to all of this we may be air lifting small forces and emergency supplies. However, all these additional reconnaissance and security means do not in any way lessen the requirement for adequate ground reconnaissance and security down to and including local security of the individual unit.

In summary the atomic battlefield more than ever emphasizes the imperative need for the correct application of the principles of mass, security and maneuver. Units operating on this fluid battlefield must be able to mass rapidly sufficient forces to defeat the enemy and also be able to rapidly disperse them for protection, meanwhile maintaining continuous control and responsiveness to command. To accomplish this a unit must have the inherent characteristics of mobility and flexibility.

The armored division is the unit best suited for this type warfare.

At last year's Armor conference a concept of defense by an armored division was one of the subjects presented. Since that time a large number of opinions have been received on the subject. At this year's conference the subject was again presented to show the results of a year's work on the concept.

CARDED

MOBILE DEFENSE BY ARMOR

By LIEUTENANT COLONEL WILLIAM Y. VAN HOOK

WE proudly think of the Armored Division as an offensive type organization, which is organized, trained, equipped and employed offensively. However, the basic precepts of our democratic system preclude our being the initial aggressor in any armed conflict. Therefore, in any future war, as military history has repeatedly shown in the past, we will, of necessity, be forced initially to conduct defensive operations, pending our build-up and initiation of the offensive. The understanding of Defense by Armor is therefore important when it is apparent that the opening phase of any war of the future, in which forces of this country are involved, will undoubtedly be defensive in nature.

Many of you were here last year when a concept of defense by the armored division was presented to this conference. During the last year, there have been a large number of opinions received on this subject. We thought that you would like to hear the result of a year's work on this concept of defense by the armored division.

The Armor School has analyzed, revised and reworked the concept of defense by the armored division. The criticism and recommendations received as a result of the presentation at last year's conference were extremely helpful and were used in the revision of this doctrine.

At the present time, The Armor School and the Command and General Staff College are in agreement on all the essential points of the doctrine of defense for the armored division. During this period, I will present you a short discussion on the basic points which form the foundation for the doctrine of defense and follow this with a very short discussion of the conduct of mobile defense by the armored division.

Perhaps the first point to be covered is the role of the armored division in the corps defense. The armored division when acting as a member of the corps fighting team may be used:

1. Initially to perform a covering force mission forward of the battle position.
2. As corps reserve to add depth to the battle positions and to counterattack as required to destroy enemy forces.
3. To occupy that sector of the battle position covering major avenues of approach for enemy armor. *See Figure 1.*

Of these three general tasks the second listed—that of the corps reserve—is the most preferred as it permits the employment of the armored division as an integrated force against decisive targets. As the corps counterattacking force, the armored division employs offensive action, thus making full use of the well known offensive characteristics of the armored division and its unique mobility to fight mobile mounted warfare.

The Armor School believes in, teaches, and emphasizes three basic

LIEUTENANT COLONEL WILLIAM Y. VAN HOOK, Armor, graduated from the University of Georgia in 1940. He served in Europe during World War II with the 6th Cavalry Regiment. Reverting to civilian status he was recalled in 1951 and assigned to Seventh Army NCO Academy. Returning Stateside, he attended the Advanced Class at The US Army Armor School prior to his assignment there as an instructor.



U. S. Army

points of doctrine for all types of defense. This basic doctrine is:

1. The use of security forces to detect the time, direction and size of the enemy attack and to delay and disorganize the enemy.
2. The selection and organization of a battle area to repel, contain or canalize the enemy.
3. The use of reserves to repulse or destroy the enemy by counteroffensive action.

With due regard for the size of the force involved, this doctrine is a sound and valid foundation for defensive operations by any level unit from the field army to the platoon.

There are two basic types of defense for the armored division. These two types, as you know, are the mobile and position defense.

The mobile defense is the defense of an area or position in which maneuver is used with organization of fire and utilization of terrain, to seize the initiative from the enemy. In this type defense, a large portion of the force is employed as a mobile striking force, with the minimum necessary forces located in the main defensive area to slow, fix and punish the enemy. The striking force serves as a counterattacking force to destroy the enemy at the most favorable tactical location and time. In mobile defense the objective is the destruction of the enemy forces rather than the mere holding of terrain.

Position defense, on the other hand, relies upon disposing the bulk of the defending force in selected tactical locations to maintain their positions and control the ground between them. The reserve is smaller than the striking force in the mobile defense and is used to add depth, to block or to restore the position by counterattack. The objective is primarily to deny terrain to the enemy.

The type defense selected in any situation depends upon the mission of the defender, the terrain and weather, the air situation, the composition and strength of the opposing forces, the enemy's atomic capabilities to include delivery means, and the availability of reserve to higher echelons.

The position defense is a less desirable type of defense for the armored division because it emphasizes the organization of specific terrain and fails to utilize fully the division's offensive combat power. This type defense is employed when ordered by a higher commander or when the mission and terrain will not permit the use of the mobile defense.

The overall doctrine of mobile defense may be applied at Corps and Army level.

The army commander might form an armored heavy corps of two or more armored divisions and one or more infantry divisions to cover a major avenue of enemy armor approach. Such a corps would employ the techniques we will discuss. However, in order to increase their effectiveness the infantry elements would have to be provided with sufficient APC's to make them completely battlefield mobile.

However, in event we are rich enough in armor to afford a corps of this type, it is to be expected that we will be able to employ it more frequently on the offensive than on the defensive.

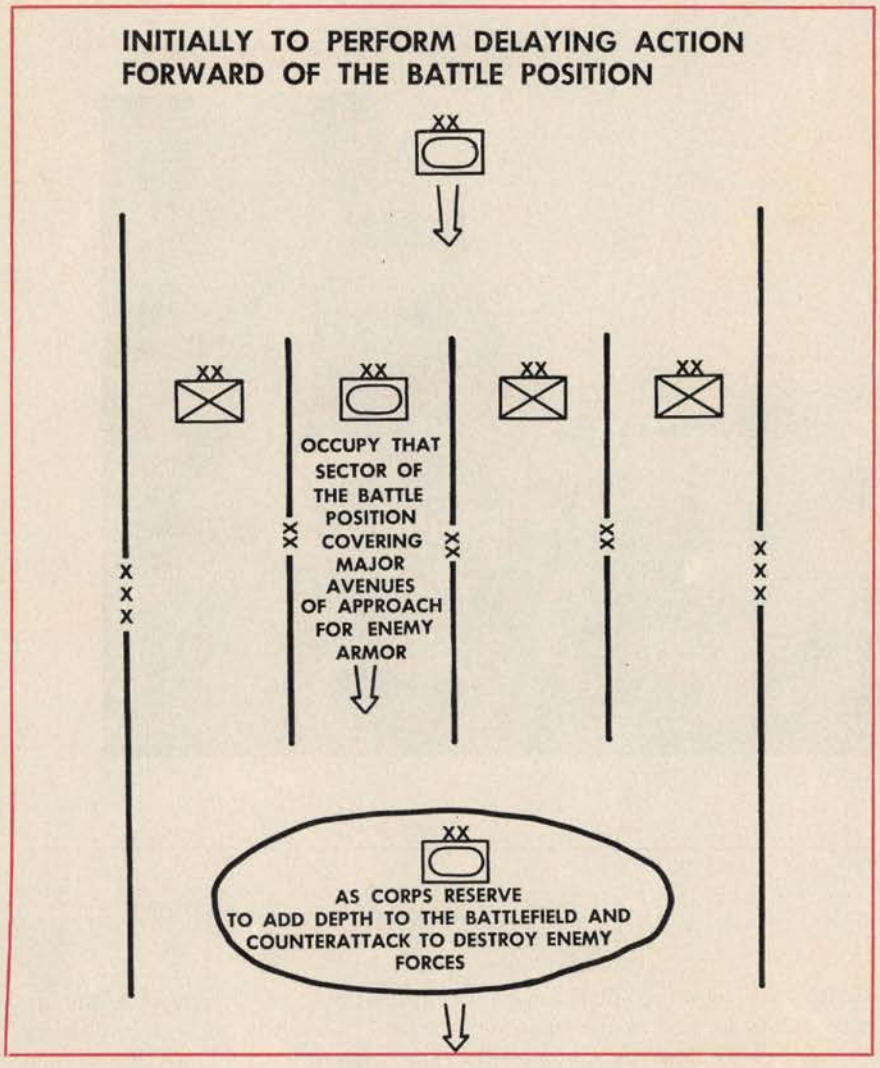


Figure 1.

Normally the armored division is the smallest element to execute the mobile defense because of the requirement for employing a powerful striking force capable of delivering a decisive blow against the enemy. This same thought was covered with you last year; however, since then The Armor School and the Command and General Staff College are in agreement that units smaller than the division, usually on independent or semi-independent missions, may frequently employ the techniques of mobile defense.

The commander organizes his forces in the mobile defense into three elements.

These elements are security forces, fixing forces (forces in the forward defensive area), and the striking force. You will note that the nomenclature of the elements in mobile defense is in functional terms. In the case of fixing forces, the old mobile defense doctrine used the term strong points or strong point system. However, we feel that fixing forces more accurately describes the actions performed by this force. Recently The Armor School and the Command and General Staff College agreed that the term strong-point and the term forces in the forward defensive area, were undesirable. The Armor School recommended the use of the term fixing forces. Currently, Leavenworth is using forces in the forward defensive area, and The Armor School is using fixing forces. Leavenworth has agreed to the use of both terms until they can promulgate a better term which will be as accurate, as functional, and as understandable as security forces and striking forces.

First of the elements in mobile defense are the security forces. The major security force employed by the armored division in the mobile defense is the division covering force. Other security forces are employed by the fixing forces such as observation posts and listening posts, patrols, and rear area defense forces.

The basic difference between the old doctrine of mobile defense and our present concept is in the employment of the fixing forces in the forward defensive area. The present concept allows more flexibility and mobility in the employment of these forces. *See Figure* 2. Fixing forces in the armored division usually consist of one or two combat commands. Their mission is to warn of impending attack, to delay, disorganize and inflict maximum destruction upon the enemy, and to canalize him into preselected killing grounds suitable for attack by the striking force, and atomic weapons. A killing ground is an area selected for the offensive employment of units in a mobile defense to destroy the enemy force, either with or without the use of mass destruction weapons. Fixing forces accomplish their mission by the establishment of observation and listening posts, occupation and defense of strong points or other positions, and by offensive, and delaying action. Their employment is limited only by their mission and restrictions of the higher commander.

Strong points may be organized by units varying in size from a few tanks and armored infantry to a battalion task force. They are initially located across the forward edge of the battle area (FEBA) covering avenues of approach into the area. Forces occupying a strong point do not necessarily hold their initial position, but may fight to the front or they may fight offensively within the forward defensive area as shown in red on *Figure* 2. They may conduct a delaying action planned to force the enemy to mass and present a lucrative atomic target and to afford sufficient time for the employment of the striking force. (Note broken Red Arrows on *Figure* 2.)

The division commander assigns tank and armored infantry elements to the fixing forces in the proportion best suited for the accomplishment of the mission. Generally the bulk of the armored infantry is so assigned, but sufficient tanks must be assigned to provide the fixing force commander

with adequate mobile striking power. Otherwise he will be forced into position defense.

The final element in the mobile defense is the striking force. The mission of this force is the destruction of the enemy at the most opportune time and place. Counterattacks may be launched during the enemy's approach to the defensive position, while he is in an attack position, or after the enemy attack has been slowed or canalized by the fixing forces. The striking force should be tank heavy for maximum striking power. It is organized to destroy the enemy by offensive action in front of, within or behind the forward defensive area. Maximum combat power consistent with requirements for the fixing force and security force is assigned to this force. This combat power includes maximum fire support, with atomic weapons if available. The striking force commander prepares counterattack plans for the destruction of the enemy anywhere within his area of responsibility. Killing grounds may be created by enemy action; therefore, the striking force must be prepared to conduct a counterattack wherever the enemy presents a target. Ideally, the striking force is employed following an atomic strike against enemy forces previously canalized into preselected killing grounds; however, the idea of preselection must not be allowed to affect the flexibility of employment of the striking force. If forced by enemy successes the striking force must be prepared to perform the missions of fixing force, such as blocking enemy penetrations and canalizing the enemy into preselected killing grounds.

While on the subject of the striking force it might be well to discuss reserves in mobile defense.

The basic function of a reserve is to provide the commander with the means to influence an action after it has started. Traditionally *reserves* have been associated with troops withheld from action and used to exploit success or to counter an unexpected enemy development during the course of the action. The Armor School presently teaches that these functions of a reserve can be performed in part or wholly by any one or combinations of:

1. Combat units designated formally as reserves.
2. Firepower including, but not limited to, atomic weapons.
3. Unengaged forces.

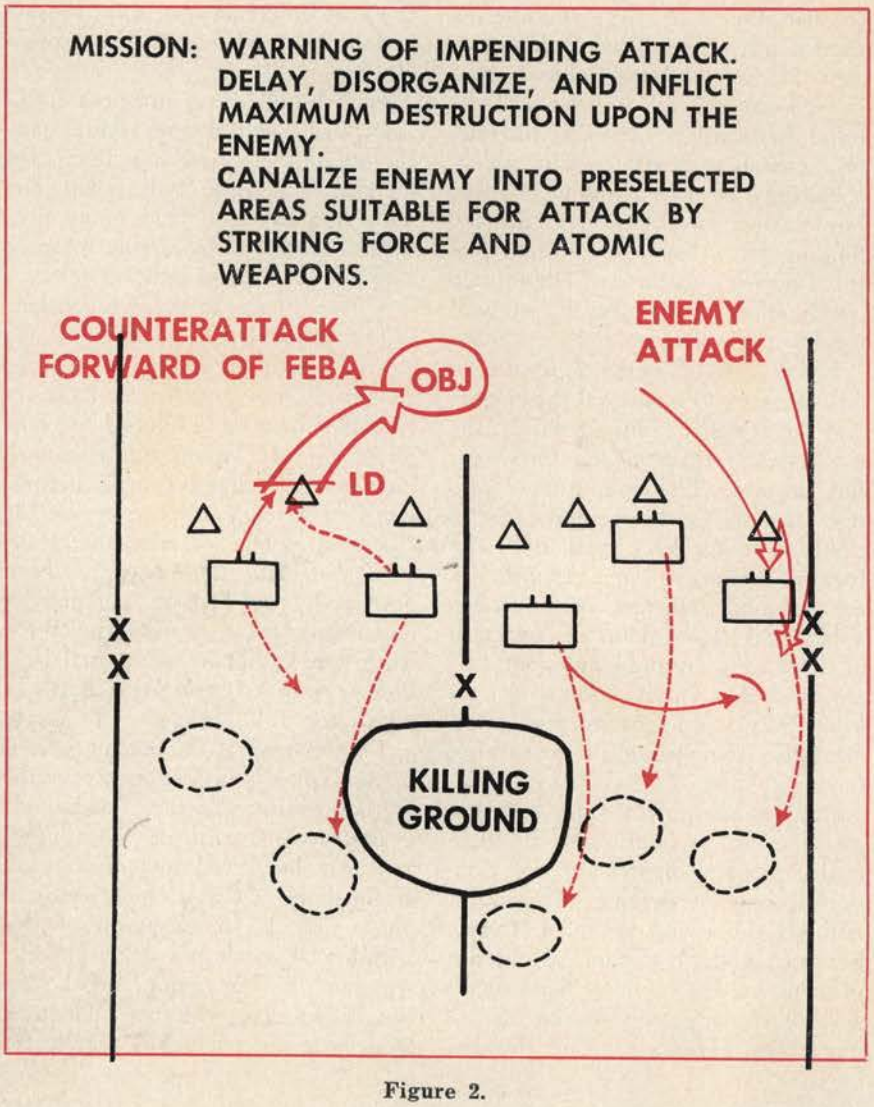


Figure 2.

The battlefield mobility of armor units permits the armor commander to use these three elements in various combinations to execute the functions of the reserve. Therefore, in addition to the formally constituted striking force in mobile defense, unengaged units in the fixing forces are prepared to execute reserve functions either individually, collectively, or as part of the striking force.

Because of the complexity of a mobile defense, careful planning assumes more importance than ever.

The organization of the mobile defense differs in scope and nature from the organization of the position defense. In the mobile defense, the defending force is oriented on the enemy and his destruction rather than on holding terrain. The commander is therefore concerned with the possibilities afforded by the terrain for offensive and delaying action and with fire and movement in the best utilization of the troops available to him. He must determine the likely avenues of enemy approach into his area. He must select a forward defensive area and select likely killing grounds with the idea of offensive action in mind.

The commander designates a covering force and other security forces to provide early warning of the enemy and to cover deployment, organization and preparation of the defense. The size and composition of the division covering force will depend upon the front to be covered and the amount of delay desired.

The commander studies the terrain where the defense is to be conducted, and establishes the forward edge of

the battle area (FEBA) and the desired depth of the forward defensive area. He selects terrain that is considered essential to his scheme of defense that must be denied to the enemy. This is normally terrain which, if occupied by the enemy, would give him tactical advantage over the defending force. Such key terrain features must be indicated to subordinate commanders so that their plans will include their defense.

Based upon the critical terrain or areas that are to be denied the enemy, and the selected killing grounds, the commander organizes his forces for the mission. The minimum forces necessary to fix the enemy are assigned a fixing force mission in the forward defensive area. Boundaries are assigned and task organizations announced. Based upon the selection of the killing grounds, and routes of approach thereto, the commander selects the general location and determines the composition of his striking force.

Perhaps many points may be made clearer if we walk through an illustrative problem on the armored division in mobile defense. The 301st Armored Division, part of L Corps, has been given a mission of defense in sector on L Corps left flank along a favorable approach for enemy armor. *(See Figure 3.)* The division commander visualizes this mission will be accomplished in three possible phases:

First, by disposing sufficient forces along FEBA to inflict maximum damage upon the approaching enemy, the division will slow him down and force him to mass. The enemy then will be destroyed by atomic weapons and/or the division striking force.

Second Phase. In event the enemy is not stopped, turned back or destroyed north of FEBA he will be canalized into preselected KGs, or KGs that may be developed north of phase line 1. When the enemy is canalized the division striking force will then be committed to exploit the effects of atomic weapons and to destroy him. After the enemy has been destroyed, the division commander will restore the forward edge of the battle area either in its original location or some other location north of phase line 1.

Third Phase. If the enemy force is particularly strong and aggressive the division commander may not be able to destroy him north of phase line 1 and may be forced to withdraw all or the bulk of the division south of phase line 1. In execution of this withdrawal maximum delay and destruction of the enemy will be accomplished. He will then maneuver to destroy the enemy in preselected killing grounds or killing grounds that may be developed by enemy action between phase line 1 and phase line 2.

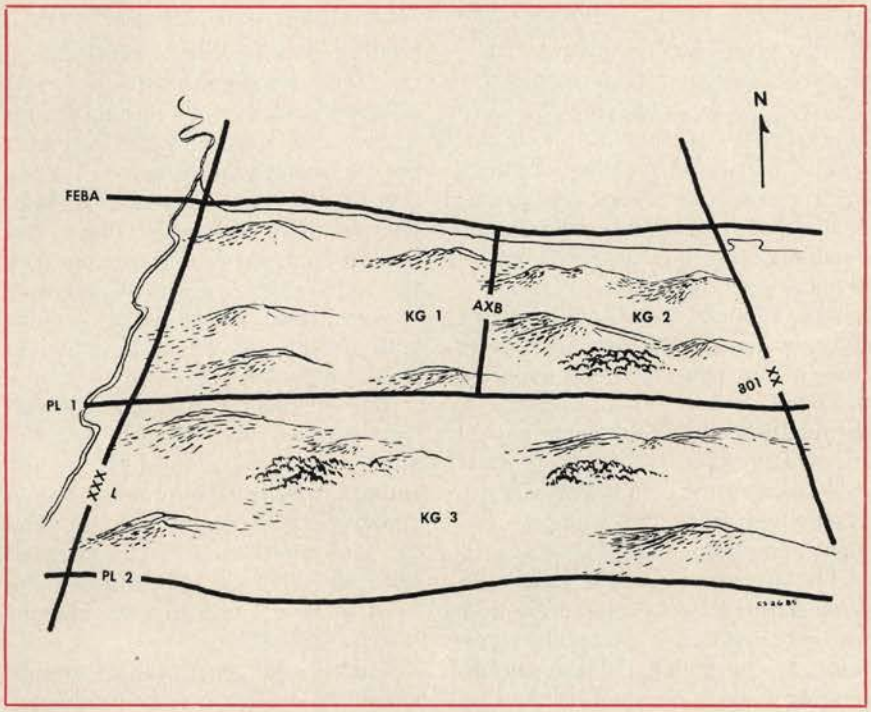


Figure 3.

In summary I want to emphasize certain points which apply particularly to the maneuver of the fixing force and the striking force in the mobile defense.

The strength of the enemy and the direction of his attack may preclude the canalization of the enemy into the desired killing ground. In this case the division commander maneuvers his forces so as to set up a new and more favorable killing ground. Selection of killing grounds does not confine the armored division to those areas. The enemy may by his own actions present a lucrative target, thus providing us with a ready made killing ground.

Depending upon the direction and strength of the enemy attack, the division commander may shift his forces. The changing situation may require the designation of new killing areas and the rapid shifting of units within the division. Rapidity of action and combat superiority at the vital point are essential if the defense commander is to seize and maintain the initiative, which he must do if he is to succeed in confusing, delaying, stopping and destroying the enemy.

If the defending force is faced with more than one enemy threat, the enemy force presenting the greatest threat to the accomplishment of the division mission is selected as the primary objective. The minimum portion of the division and/or supporting combat power deals with the lesser threats while the division concentrates on the destruction of the primary threat.

We have dealt more with the concept at the armored division level; however, units larger, particularly at Corps and Army level, or smaller than the division may employ the techniques of mobile defense.

It is fully realized that this concept of a truly mobile defense requires careful planning and control. The application of our mobility, flexibility and firepower, together with the mental mobility installed in our armor commanders, makes armor ideally suited for such an undertaking. This concept makes full use of these characteristics of our own arm.

CARDED

The questions and answers, as posed herein, were the basis for a most interesting and productive forum. In general, the thoughts expressed as published here represent School and CONARC views on these subjects. However, they merely served as a starting point on which many comments were given from the floor. We were fortunate to have the other Service Schools represented. Their comments were most constructive. We would like to publish all the remarks from the floor. Nevertheless we feel that this set of questions and answers can serve as the starting point for a forum for any assembled group of Armor professionals.

FORUM ON ARMOR

QUESTION: What are the major changes in organization and items of equipment between the current division and the ROCAD armored division?

The basic organizational structure remains the same. Minor changes have been made in the organization of combat units. Of significance is the substitution of a scout platoon for the reconnaissance platoon in the headquarters, headquarters and service company of each tank and armored infantry battalion. The companies of the armored cavalry battalion have been organized into integrated companies; that is, "pure" platoon has been made organic to the headquarters, headquarters and service company. This platoon is equipped with electronic battle surveillance equipment primarily airborne.

The only changes in the engineer battalion occur in the type of bridging made organic to the battalion. The M4T6 hand erected aluminum high deck bulk bridging has been substituted for the wider steel treadway bridging. Total bridge length has been decreased from 576 feet to 425 feet. The battalion does not have an assault bridging.

A major change in organization occurs in the division artillery. The division artillery retains its three light armored field artillery battalions. The medium artillery battalion has been changed to a General Support Composite field artillery battalion. This battalion consists of a headquarters, headquarters battery and a service battery, two 155mm Howitzer batteries, an 8 inch Howitzer battery (4 pieces), and a 762mm Rocket (HONEST JOHN) battery (2 launchers). Another major change in the division artillery organization is the deletion of the antiaircraft battalion.

The armored signal company has been increased to an armored signal battalion and includes the capability of establishing an area communications system.

All aircraft within the division has been centralized at divisional level by the organization of a combat aviation company. The number of aircraft has been increased by approximately 80 percent, or a total of 50 aircraft in the ROCAD division as compared to 28 aircraft in the current division.

The division trains organization remains generally the same, and an administrative services company has been added to the division trains. The replacement company has been deleted and a replacement section added to the administrative services company.

The armored ordnance battalion, the armored quartermaster battalion and the armored medical battalion have minor internal organizational changes.

QUESTION: What are the effects of changes in organizational and operational procedures of the logistical elements of the armored division (ROCAD)?

The changes in organizational and operational procedures of the logistical elements of the armored division (ROCAD) provide a more flexible and efficient logistical system and an increased logistical support capability in resupply, medical evacuation and ordnance maintenance.

The creation of a Division Logistics Operation Center (DLOC) designed to regulate, coordinate, and expedite logistical and administrative support to the combat elements. This concept provides a nerve center for logistical operations in the division and thereby reduces the effort required of the tactical elements in resupply, aero-medical evacuation and some personnel services such as recovery

CHAIRMAN: Major General L. L. Doan, Chief, Armor Section, USCONARC

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Lt. Colonel C. K. Graydon, Command and Staff Department, US Army Armor School

Lt. Colonel J. R. Spurrier, Command and Staff Department, US Army Armor School

and disposition of the dead as well as the mail service.

The implementation of modified UNIT Distribution of supplies (except ammunition) to the organizations in the division reduces the distance the tactical unit must go for resupply.

The air lift capability is increased from 5.6 tons to 23.4 tons.

The increase in Class III resupply capacity of the tank, armored infantry, and armored cavalry battalions; and the increase in the division's reserve (30,000 to 111,000 gal) are reflected in extending the range of the armored division approximately 90 miles.

The use of larger tonnage supply vehicles—5-ton replacing 2½-ton increases the resupply capability of the tactical units.

The provision of medical support to provide four clearing stations increases the flexibility and capability of medical support to all elements of the division.

The increase in flexibility of ordnance maintenance by use of cellular maintenance units (7 Mech Maint Teams, 4 Arty Maint Teams). The supporting ordnance company can now be tailored by the attachment of these teams to fit the task organization of the combat command, thus ensuring more adequate and flexible ordnance maintenance for the tactical units.

QUESTION: Has the operational range of the Armored Division (ROCAD) been increased?

The operational range of the Armored Division (ROCAD) has been increased approximately 90 miles on roads over that of the current armored division. This increased range is achieved through the increased resupply capability in the combat battalions and the division operational reserve of fuel. When the M48A2 tank is issued to the field, the range of the ROCAD division will increase approximately 150 miles on roads over the current armored division.

QUESTION: Has the advent of the A-bomb as a battlefield weapon necessitated any change in our doctrine?

No. The basic doctrine for the employment of armored units remains unchanged. The employment of tactical atomic weapons, however, has necessitated changes in techniques. One of the major changes in techniques is the dispersion of task force size units on the battlefield. Dispersion will require armored units to attack from widely dispersed locations, massing briefly at the decisive time and place, and to disperse rapidly. The penetration and envelopment will still be a desirable type of offensive action. The wide fronts and dispersion will make the mobile defense a more desirable type of action. Dispersion on the battlefield will require the employment of battalion-size task forces in a semi-independent role. Although the action is decentralized at battalion task force level, there will be a greater requirement for centralized control.

QUESTION: What is the organizational trend in the future for the armored division; toward a larger or smaller division? Would the adoption of either larger or smaller divisions allow the elimination of either corps or army headquarters?

The trend at present is toward a smaller division. Our position is that the division should be large enough to en-

able it to carry out the type of missions which are suitable for today's armored division. A reduction in strength of the armored division is unjustifiable until certain developmental weapons prove themselves. We connot sacrifice any part of the armored division's capability for hard-hitting sustained combat. Therefore, we are opposed in principle, for the near future, to a reduction in the size of the armored division. We must realize, however, in view of the trend toward smaller divisions and the increased lethality of weapons becoming available, that there is little likelihood of the armored division becoming larger. In the final analysis it is combat effectiveness which should determine the size of the division, not numbers of men, weapons or echelons of command.

There is a requirement for both the corps and the field army headquarters. The elimination of one headquarters would require that the other take over its functions. For example, if the field army headquarters were eliminated, the corps would have to assume the administrative functions of the field army. The corps headquarters would thus become an army headquarters in all but name. It is extremely doubtful that such an arrangement would be practicable. Rather than eliminate one of these headquarters, it is probably more profitable to investigate the possibility of increasing the span of command at each echelon. If this can be accomplished without sacrificing tactical effectiveness it would improve the combat-to-service ratio.

QUESTION: What should we look for in the way of airborne armored units for future warfare?

First, let me point out Department of the Army policy on this subject. General Ridgway's letter of 28 June 1955 on the subject of air-transportability has indicated the requirement for two types of units. One type would be capable of sustained combat, the other would be capable of moving into combat by air. This policy has been further amplified by Department of the Army during recent months. Of course, it would be highly desirable to have armored units which are capable of sustained combat and also capable of participating in airborne operations. This is not feasible within the foreseeable future. At the present state of the art it is not possible to design a tank which is capable of engaging in sustained combat and is also light enough to be transported in present or near future aircraft. Accordingly, we believe that it is mandatory, at least for the foreseeable future, to have armored units which are capable of sustained ground combat and also light airborne armored units which, although lacking the sustained combat capability, will be able to move into combat by air.

QUESTION: What is Project MASS, its function, and relation to Armor?

MASS–(Modern Army Supply System) is the project designed to field test the Army Field Supply Control System. It is a project initiated in 1956 by DA to test the concept of substituting SERVICE for STOCKAGE, in which rapid communication and expedited Transport plus a stockage list of repair items are utilized to improve maintenance support and reduce the stock level of repair items at all echelons.

QUESTION: I understand that ROCAD armored cavalry units have SKY CAV capability. How will these capabilities affect the employment of armored cavalry units?

The ROCAD armored cavalry units have an organic reconnaissance and surveillance platoon which is a SKY CAV type unit. The reconnaissance and surveillance platoon contains airborne infrared, airborne television, and airborne and ground radar, aerial and ground photographic equipment, and a limited aerial visual reconnaissance capability. This platoon should increase the reconnaissance and surveillance capability of armored cavalry units. The US Army Armor School, however, believes that visual air reconnaissance is inadequate. It believes that organic fixed-wing and helicopter type Army aviation would greatly increase the capability of armored cavalry units. In addition, armored cavalry units are being trained in helicopter-borne patrols behind the enemy front lines and the employment of stay-behind patrols that are flown out by helicopter.

The effect of the SKY CAV capability is to permit ground armored cavalry commanders to retain a greater portion of their units centrally located in either moving or a static situation. It also increases the width and depth of reconnaissance and security operations, and increases the speed at which armored cavalry units operate.

QUESTION: Is the present organic intelligence operations system satisfactory at battalion, combat command and division levels?

Under the ROCAD armored division organization, it is believed that the intelligence and operations section should be consolidated at the battalion and combat command level. At this level the functions of intelligence and operation are not readily separated. The improvement of communications equipment should improve the intelligence operations system by rapid dissemination of intelligence information.

At the division level, the intelligence operations system has been greatly improved by the provisions of the Military Intelligence Service Platoon which is attached from Army. This platoon should provide greater flexibility in the organization of the division G2 section. The increased capability of the armored cavalry battalion to conduct reconnaissance, utilizing electronic surveillance equipment, should greatly improve the intelligence operations system.

There is a requirement to streamline reporting of information of atomic targets. There should be a minimum

time from the acquisition of the target until it reaches the level of command authorized to employ atomic weapons.

QUESTION: In the current organization artillery communications are conducted in the armor band of radio frequencies. This has resulted in the past in considerable communications overloads. Has ROCAD organization been modified to correct this deficiency?

Yes, the ROCAD organization provides for artillery units to operate on artillery band radio frequencies. However, light artillery battalion liaison officers, light artillery battalion fire direction centers and the division artillery FDC have armor band radios to facilitate communications with armor units.

QUESTION: The current armored division does not provide sufficient forward observers for each combat company in the division. Has the ROCAD division corrected this deficiency?

Yes, the ROCAD artillery TOE provides for 39 forward observers. We now have enough TOE forward observer sections to provide one to each tank company and each armored infantry company with seven left over. These seven may be used as replacements for those with the tank and infantry units or to operate with the armored cavalry or engineer companies if the situation requires.

QUESTION: Has the acceptance of the M59 with overhead cover and limited visibility changed the doctrine for employment of armored infantry fighting with tanks?

The basic doctrine for employment of armored infantry within the armored division has not materially changed by the replacement of the M59 armored personnel carrier for the half-track. Techniques, however, have changed to take maximum advantage of the overhead cover of the M59. The major change in techniques is the employment of the overhead air bursts as the tank-infantry team approaches the objective. This technique permits the armored infantry to move close to the objective and in some situations will permit them to arrive on the objective before dismounting. One of the disadvantages of the M59 is the lack of vision by members of the armored infantry squad. The armored infantry squad is enclosed within the vehicle and loses contact with the situation. This requires additional training in crew drill and dismounting from the vehicle. The crew must be trained to grasp the situation quickly once they dismount and be oriented as to the direction of movement.

QUESTION: Would an armored division operate efficiently if composed of integrated size battle groups to include tanks, armored infantry, artillery, engineers, organic signal and service elements?

The Armor School has given this problem careful consideration and has analyzed and reanalyzed the pros and cons. Virtually every argument in favor of either integrated or the pure group structure has a convincing counterargument whether it be applied to the atomic or the non-atomic battlefield. The surprising unanimity of opinion here in favor of retention of the pure group structure is based primarily upon the conviction that it provides a greater degree of flexibility than does the integrated group structure. The integrated group structure will result in reduced flexibility, particularly at the division level. The decentralization of the combat means to a regimental, combat command or battle group level will result in a strong and difficult to overcome tendency to fight these groups as they are organized since they are already tailored to meet the so-called average situation. This will reduce the ability of the division commander to readily form task forces weighted to a particular task in the event the situation requires a different ratio of tanks and infantry than that provided by the integrated group. This will mean that some tanks may be disposed over very inferior tank terrain while insufficient tanks are disposed over terrain favorable to the employment of armor. The fragmentation of artillery and engineer elements in these battle groups will destroy the capability of massing artillery fires and concentrating engineer elements for the most effective general support of the division. We do not foresee for the near future the basic combat unit operating independently of, or widely separated from, the influence of the division echelon for any extended period of time. Therefore, we should continue to have the capability of adapting the composition of our battalions to the requirements imposed by the enemy, terrain and mission. We are convinced that this flexibility requirement is most effectively provided by and incidentally is the greatest advantage of, our current pure battalion organizational structure.

QUESTION: What is the new armored cavalry regiment organization?

The new armored cavalry regimental organization has not been approved by CONARC or the Department of the Army. It was recommended that the armored cavalry regiment consist of three armored cavalry battalions, each battalion would be a self-sufficient tactical and administrative unit, consisting of four integrated companies and a howitzer company. Each battalion headquarters would have an organic reconnaissance and surveillance platoon. It was also recommended that dart units would be organic to the armored cavalry regiment. The size and location of the DART unit is not yet determined. The armored cavalry regiment contains only a headquarters and headquarters company, the service company has been deleted. Consistent with the concept of centralizing Army aviation at the highest usable level, all aircraft have been pooled in a regimental Army aviation company.



The T92 is a light gun tank used for research. It is armed with a 76mm gun mounted in a cleft turret. Machine guns on the sides are .50 and .30 caliber. It weighs 18 tons and is designed for air transport.



The Lacrosse, a highly accurate field artillery guided missile. It is a surface to surface type missile with a truck-mounted launcher on a standard Army truck.

NEW EQUIPMENT

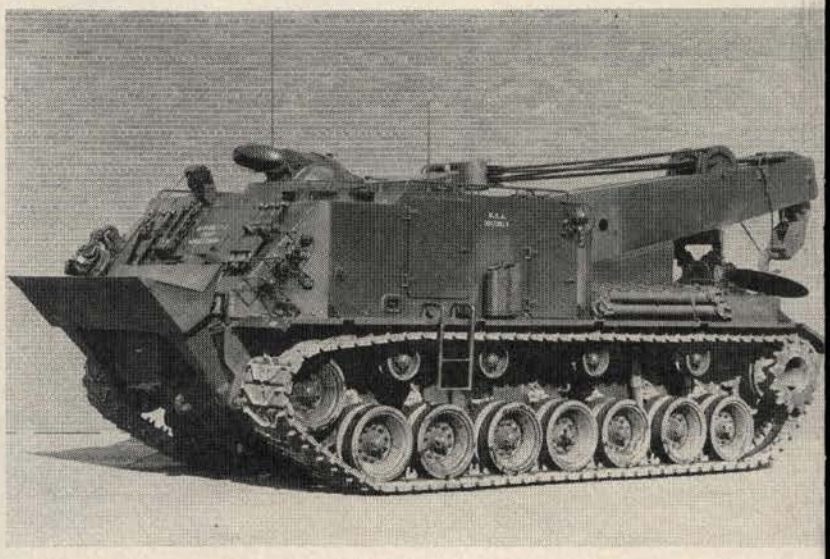
All Photos U. S. Army

On this and the following three pages are photographs of some new and developmental equipment which was shown at our 68th Annual Armor Meeting.



A new vehicle shown was this mechanical minelayer that automatically digs a shallow trench, plants antitank mines and then proceeds to cover them.





This is the DART. It is an antitank guided missile, designed to destroy, or render inoperable, the heaviest tank known to date. It may also be used against any heavily reinforced concrete fortification. It may be fired and guided from the ground or from a vehicle which is either stationary or moving.



This is the Cargo or Personnel Carrier, Pneumatic Roller, XM357. It is the first pilot model of the "Rolligon" or "Teracruzer" type vehicles designed to provide mobility in adverse terrain.



The M48A2 is our current production model medium tank. It mounts a 90mm gun and has, in addition, a dual-purpose .50 caliber machine gun and a .30 caliber coaxial machine gun. It weighs approximately 52 tons combat loaded; is powered by an 810 horsepower Continental VO12 air-cooled engine and has a cruising range of about 150 miles.

The M51 Heavy Recovery Vehicle. It has the M103 Tank Suspension system, a winch housing mounted forward, and a crane that rotates 30 degrees to the left and right on rear deck.



A Vehicular Mounted Mine Detector AN/VRS2 of the audio frequency, mutual inductance bridge type used for detection of metallic mines. Weight approximately 700 pounds and is mounted on a truck, ¼ ton, 4 x 4, M38.



This is the T93E1. It is an amphibious, full-tracked unarmored prime mover for medium and heavy artillery. It is designed to carry 12,000 pounds and to tow a 13,000 to 33,000 pound towed load.

A treadway-type armored vehicle-launched, mobile assault bridge is shown being launched over a dry gap. The launcher is the chassis of a medium tank with hydraulic launching system in lieu of turret and gun. Bridges of 50 ton capacity are available in lengths of either 40 feet or 60 feet. The launcher can retrieve as well as launch from either end of the bridge.



The M102 is an engineer vehicle which provides armor protection during construction or demolition missions under hostile fire. Mounted on an M47 tank modified by winches and booms, a dozer blade and a demolition gun.





This is Little David. It is remotely controlled from this platform. It is small, low and extremely mobile. Capable of direction against enemy moving or fixed targets. Its low cost makes it an extremely interesting vehicle for many tactical uses.

Larruping Lou—a light mine clearing roller. It is tank propelled, for rapid route clearance of mines and breaching of minefields. The roller weighs approximately 20 tons, stands about 7 feet, 6 inches high, and is 14 feet, 8 inches in width.



The United States Armor Association's Distinguished Governing Body for 1957

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CARDED

The concept demonstrated by these aero-cavalry methods, as of this date, is not approved



AN AERO-CAVALRY CONCEPT

by

MAJOR ROBERT F. TUGMAN

and

LIEUTENANT COLONEL JAMES S. GREENE, JR.

IN 1947 the allocation of army aircraft was increased so that, in addition to the field artillery, all combat arms and several of the technical services would have organic army aviation to assist them in their combat roles. Concurrent with this increase of army aircraft, the Department of the Army established guidelines for the role of army aviation. Subsequent equipment development within both the rotary-wing and the fixed-wing fields has necessitated several organizational changes. However, the guidelines established in 1947 continue to be sound and valid. The various organizational applications have merely broadened the scope of army aviation employment within the missions as outlined by the Department of the Army.

Discussion of the Concept

Army aircraft due to their mobility and flexibility are ideally suited to assist ground units in reconnaissance or security roles. In order to facilitate this ground reconnaissance mission, various army aviation organizational concepts have been developed. The sky cavalry concept marked the first major change in the organization and employment of army aviation to facilitate the missions of armored cavalry. Sky cavalry organizations continued to perform the various aviation missions such as area reconnaissance, flank security and battlefield surveillance. A new capability was added when sky cavalry, through the use of transport type helicopters, was able to airlift small reconnaissance elements, thus extending both the depth of the operations and the speed with which the mission is accomplished. The aero-cavalry concept is an extension of sky cavalry.

The purpose of this discussion and demonstration is to illustrate a typical tactical mission for aero-cavalry employed in conjunction with armored cavalry elements. The aero-cavalry concept has been semi-independently developed by the US Army Aviation School, the US Army Armor School and the Office of the Director of Army Aviation, Department of the Army, Washington. While I have indicated various United States Army agencies that have contributed to the aero-cavalry concept, by no means do I infer that this is established doctrine or represents the official position taken by any army agencies. Aero-cavalry is in the experimental and exploratory phase, thus represents

MAJOR ROBERT F. TUGMAN, Armor, served in a Tank Destroyer unit during World War II. Attending the Army Aviation School he next served in the Pacific in the 99th FA Battalion. Returning Stateside, he was assigned to the Ground General School. He was then assigned to the 2d Armored Division. He has been the Army Aviation Officer at the US Army Armor School since June 1955.

LIEUTENANT COLONEL JAMES S. GREENE, JR., Armor, a 1940 USMA graduate, served in Europe during World War II with the 91st Reconnaissance Squadron. Returning Stateside, he held several assignments at Fort Riley, Fort Knox and 2d Army Headquarters. After attending the Advanced Course at Knox he was assigned to the MAAG in Iran prior to his present assignment as tactics instructor at the US Army Armor School in 1954.

doctrine. However it does make the Army-air-Armor team appear as a compatible pair and

only the thoughts of individuals as to how this unit could be employed in conjunction with armored cavalry. The Armor School feels that aero-cavalry should be organic to armored cavalry units. In developing an organization for aero-cavalry we must consider all six elements. *(See Figure 1.)* Any organization, including aero-cavalry, must contain the usual command, administrative and maintenance elements required by any combat element. The aero-cavalry agency must provide the army aircraft support for the normal requirements of long-range reconnaissance, flank security and battlefield surveillance; we include for this purpose, an aerial observation and reconnaissance element within our concept. Sky cavalry increases the capability for battlefield surveillance by utilizing various electronic surveillance devices. Aero-cavalry must also include this capability. Sky cavalry contains an organic airlift capability so that armored cavalry scout elements can be displaced vertically to facilitate the accomplishment of reconnaissance missions. Likewise, the aero-cavalry concept must include sufficient organic utility or transport type helicopters in order to lift small ground combat elements quickly to their objectives. It is at this point that aero-cavalry differs from sky cavalry. Whereas sky cavalry scouts and armored infantry elements are not organic to the armored cavalry companies, the aero-cavalry organization contains its own ground combat element. By placing riflemen with the aero-cavalry organization we avoid the delays and reorganizations necessary when sky cavalry was committed to airlift elements of armored cavalry. During a helicopter-borne operation the most critical phase occurs when the helicopters are air landing at their objective. There is a short period of vulnerability when the enemy could react and nullify the effects of our vertical envelopment. Fire support must be provided during the actual air landing phase of army helicopter operation. Within the sky cavalry organization, this fire support was obtained from the parent armored cavalry unit and its supporting agencies. Range limitations and fields of fire often limited the depth of sky cavalry employment. Aero-cavalry contains a helicopter-borne weapons system so that fire support can accompany the assault elements and support them during their landing. Various weapons systems have been tested. Essentially, they consist of light machine guns and aerial rockets. The rockets contain only a high explosive warhead since the helicopter has not yet developed the capability to fire at point targets with any degree of accuracy. I wish to make it clear at this point that these armed helicopters in no way represent an encroachment on the Air Force functions of providing close air support. Armed helicopters serve merely as weapons platforms which provide the commander with a far greater degree of mobility within his support weapons system than now possible. We do not visualize armed helicopters actually diving at targets in the execution of an attack but rather that they will approach by a defiladed route, rise from cover positions and place fire on the target just a few seconds prior to the arrival of the troop transport helicopters. If the helicopter firing positions should become untenable the helicopter has the capability of rapidly displacing to another location and still placing fire on the objective area in support of the helicopter landings.

With these basic functional characteristics of aero-cavalry in mind, this demonstration will portray the employment of aerial observation elements, air transported combat elements and a supporting weapons system. For this purpose we have utilized the H13 reconnaissance helicopter, H19 utility helicopter and the L19 observation airplane. A type rifle platoon consisting of one officer and 42 enlisted men is airborne in seven H19 helicopters. A weapons section consisting of three H13 helicopters, and aerial observation elements containing fixed-wing airplanes, is now skylined on the horizon. Note that the weapons section is leading in a V formation so that it can be rapidly diverted to either flank. The larger helicopters containing the rifle platoon are flying in a diamond formation for rapid deployment in any direction. The other army aircraft are assisting ground units by performing in the usual roles of reconnaissance and aerial observation. Critics of the sky cavalry and aero-cavalry concepts have stated that the helicopter is extremely vulnerable to ground fire. They say the helicopter can be easily shot down by a ground machine gunner or automatic rifleman. I would like to dispel at once this myth of the helicopter "sitting-duck." First of all, let us consider this ground gunner. He has been trained to adjust his fire on targets of unknown range by the strike of the bullet. When he suddenly changes his fire to an aerial target he then is forced to estimate lead on a moving target and to adjust fire by what he can see of the tracer trajectory. This type of fire is completely ineffective since the tracers will indicate a strike on the target whereas the actual trajectory, being much like water from a garden hose, is curved and the bullets are passing below and behind the helicopter. Aero-cavalry elements, like sky cavalry, take full advantage of the terrain. In most cases, they will be able to move in defilade until close

AERO-CAVALRY ELEMENTS

1. Command, Administration and Maintenance.
2. Aerial Observation & Reconnaissance.
3. Battlefield Surveillance.
4. Organic Aerial Troop Transport.
5. Air-Transported Combat Elements.
6. Highly Mobile Supporting Fires.

Figure 1

to the objective area. The aero-cavalry elements to your front will now move by defiladed routes to attack positions where they could assault this position. Watch the helicopters. See if you can detect their movement or could bring accurate counter-fire on them during their approach. When helicopters fly directly over enemy positions that position cannot bring effective fire upon them. Consider the speed of flight. The helicopter is over a position for only a fraction of a second. Field tests have indicated that the noise of the helicopter is so deceiving that a ground observer cannot tell from which direction the helicopter is approaching until it is directly overhead. We feel that helicopter losses in battle will be at an acceptable minimum.

The aero-cavalry elements are in their final assault positions. In order to support the helicopter landing the rifle platoon would place fire upon this area from the weapons section helicopters. The helicopters would rise vertically, firing short bursts, and then displace in defilade to new positions. Intense fire of this type would deny the enemy any opportunity to man his weapons until too late to counteract the troop air landing.

Each helicopter in the air reconnaissance section contains a pilot and an aerial observer. There are no helicopter-mounted weapons within this section. However, these helicopters are not without a fire support. By only utilizing the microphone, they are able to place adequate ground fire on targets. This section provides the commander with accurate and timely information of hostile activities on his front or flank.

The fire support element of the aero-cavalry type organization contains a flexible weapons system mounted on the reconnaissance type helicopter. We are presently utilizing the H13 helicopter for this purpose. Tests indicate that a combination of .30 caliber machine guns and aerial rockets is the most satisfactory weapons system for providing a large volume of fire upon area type targets. Each helicopter is equipped with two .30 caliber machine guns and four rocket rails that accommodate the 8 centimeter orlikon rocket. Please bear in mind that this equipment is of local manufacture. The payload capability of the H13 helicopter makes it entirely practicable to add two more machine guns and additional rocket rails and thus materially increase the firepower. The machine gun firing circuit is controlled by a button on the pilot's control stick. An intervalometer is an integral part of the rocket firing circuit. The intervalometer permits the pilot to preselect the method of rocket fire: either individually or in ripples at pre-set millisecond delay. An open type of gun sight is used and the pilot, in effect, aims the helicopter.

Rocket fire is placed upon targets in a similar manner. The amount of area coverage secured depends on the type rocket and warhead selected.

Aero-cavalry has consolidated the time-honored roles of army aviation and applied them to the modern battlefield. Within our normal mission capability, we have expanded our ability to move and support small units for the limited objective type missions that will speed up and assist the ground action. Aero-cavalry does not accomplish any mission that cannot be performed by ground elements. Aero-cavalry does perform a portion of those missions though, in much shorter spaces of time—thus materially assisting the ground unit's speedy accomplishment of its ground combat mission.

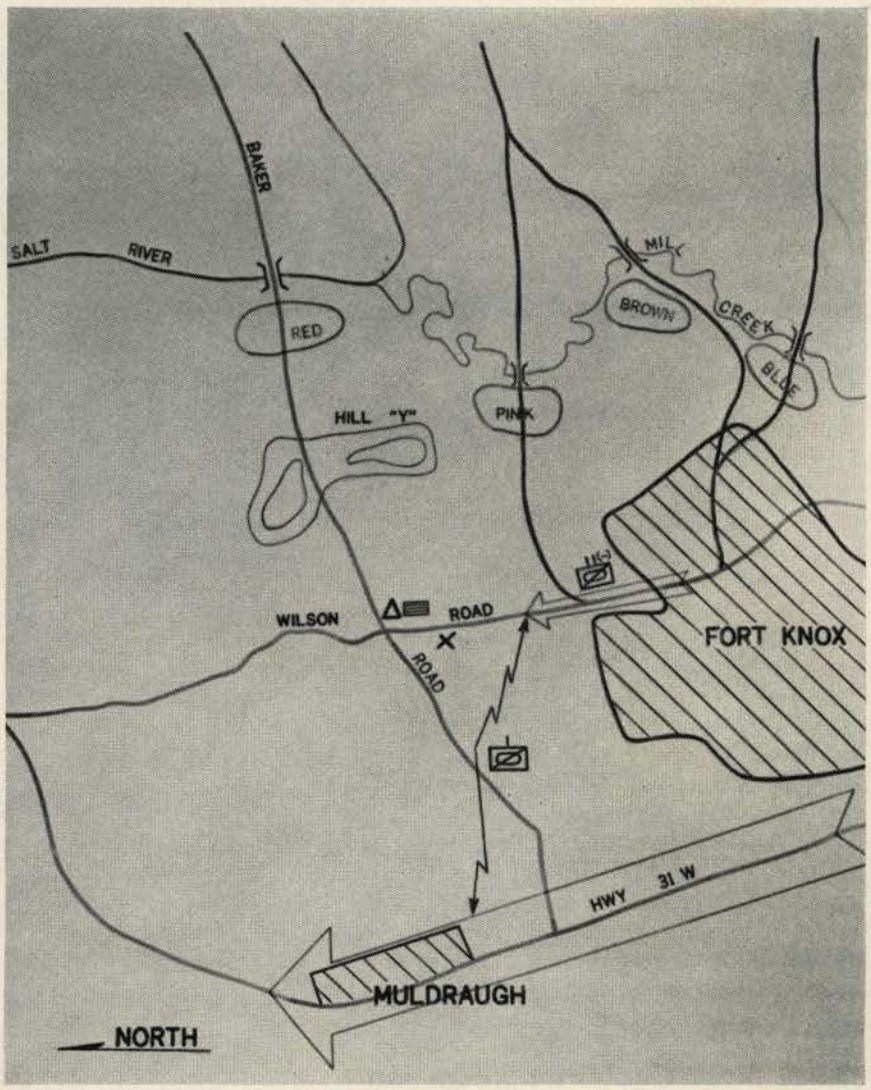


Figure 2

ability to continue sustained combat by the combined arms team which comprises our Army.

Demonstration of the Concept

The 301st Armored Division is attacking north along Highway 31W and at the present moment its leading task force has just cleared Muldraugh. *(See Figure 2.)*

The 301st Armored Cavalry Battalion, consisting of a Headquarters Company, three armored cavalry companies and one aero-cavalry company, has been protecting the right flank of the division.

It has been occupying blocking positions covering crossings over MILL Creek. At the present moment it is disposed with ALPHA company occupying BLUE and BRAVO company occupying both BROWN and PINK. CHARLIE company is maintaining contact with the main body of the armored division and the forward elements of the armored cavalry battalion. One platoon team of this company is moving north along Wilson road which is the route of advance for the armored cavalry battalion.

The battalion commander has just issued orders for ALPHA company, now occupying BLUE, to displace forward to occupy RED.

As the platoon team of CHARLIE company moving north on Wilson road reaches point X, it receives antitank fire from Hill Y. It immediately deploys off the road, returns fire, and reports. Just prior to receiving this report, the battalion commander has received information that an enemy armored column is moving west along Baker road with the head of the column approximately 15 miles east of SALT River. It is therefore imperative that he seize and occupy RED with all possible speed to block the defile represented by the bridge over SALT River. To gain this required time, he decides to attack the enemy on Hill Y with elements of his aero-cavalry company, thus assisting the movement of his ALPHA company to Objective RED. *(See Figure 3.)*

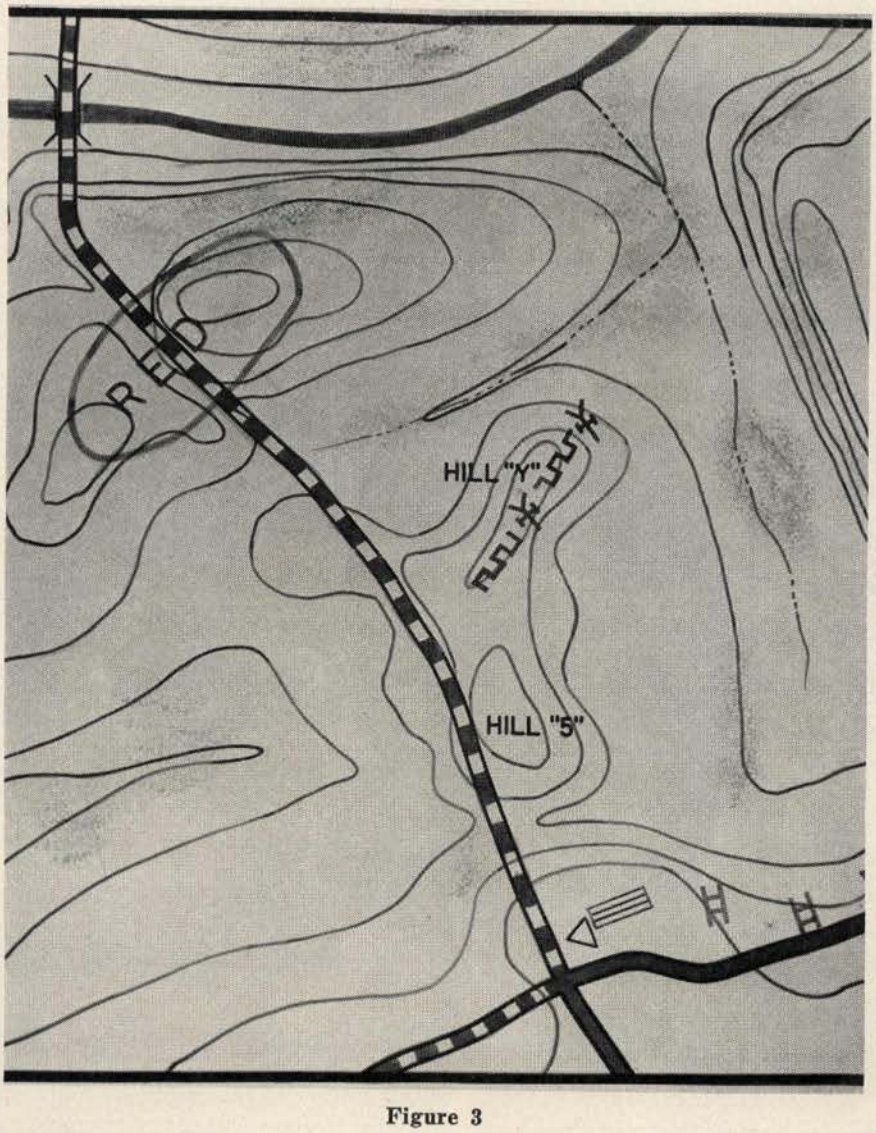


Figure 3

The aero-cavalry company commander makes a rapid aerial reconnaissance and decides to maneuver his assault helicopters up the draw, land his assault platoon on the north slope of Hill Y, and have them attack down the ridgeline to knock out the AT guns and defending infantry. He requests that artillery suppressive fires be placed on the enemy position to cover his approach. These fires will shift as the assault helicopters near the objective. To cover the launching of the assault platoon, after the artillery fire has shifted, the weapons section will fire its machine guns and rockets rising up from defiladed positions. As soon as the H19s have landed the assault platoon they will withdraw to a protected position. The armored cavalry battalion commander has ordered his ALPHA company to close rapidly on Hill Y in order to assist in the consolidation and to then proceed rapidly to occupy RED.

Under the protection of ALPHA company, the H19s will return to Hill Y, pick up the assault platoon and prepare for further missions.

Summary

From the dawn of military history, reconnaissance and security elements have had to have greater mobility than the main body. As the main body of today is moving on wheels and tracks, armored cavalry has lost a great deal of its required mobility differential. By the inclusion of aircraft with their characteristic advantages of extended observation, insensitivity to terrain and their ability to maneuver firepower quickly to the flanks and rear of the enemy, we will have gone far toward restoring speed of movement to our armored cavalry.

message from the President of the United States



The White House, Washington, D. C.

TO THE MEMBERS OF THE U. S. ARMOR ASSOCIATION:

To the members of the United States Armor Association assembled in their Sixty-Eighth Annual Meeting, I send greetings. The illustrious history of your association has been distinguished by a spirit of daring leadership. Augmented by key personnel from military and civil life, this conference affords another opportunity to pool experience and latest techniques for the common defense of our nation and the free world.

Best wishes to all members of the United States Armor Association gathered at Fort Knox and in active service in this land and overseas.

DWIGHT D. EISENHOWER

When the 68th Annual Meeting of the United States Armor Association was called to order, many of its members who were unable to attend were represented by salutes sent forward from posts around the world and the U. S. Unfortunately space does not permit us to publish all the warm wishes received and read to the membership.

SALUTES FROM AROUND THE WORLD

UNITED STATES ARMY, EUROPE

On behalf of both the U. S. Armor officers in Europe and myself, I am pleased to extend to each of you best wishes for a most interesting and profitable meeting and for continued success in the future.

The importance and value of Armor is becoming more thoroughly understood by all commanders. In operations today and in the future, improved vehicles and armament provide an increasing capability for employment of the basic principles of Armor, mobility, firepower and shock action. Unquestionably, Armor, employed soundly, will be a decisive factor in the success of any future operations.

Armor has a great heritage. The Cavalry had a long and distinguished record as the elite Arm. Cavalry officers were widely regarded as being capable of doing any job well. Armor, vastly more complex than the old cavalry, demands even higher standards of professional competence and devotion to duty. The attitude of self-confidence and *esprit* is something which each one of you should strive to develop in the armor officer and trooper of today.

I am confident that each of you will gain much professionally from this meeting. Further, I am sure that it will result in greater achievements by each of you, by Armor, and by the Army.

H. I. HODES
General, USA
Commander in Chief

★ ★ ★ ★ ★

U. S. ARMY FORCES, FAR EAST, & EIGHTH ARMY (REAR)

Although I regret I am unable to attend this year's annual meeting at Fort Knox, the "Home of Armor," I am pleased at least to have this opportunity to send my best wishes to all members of the U. S. Armor Association. I am certain that this 68th Annual Meeting will prove as informative, as stimulating and as successful as those in the past.

In your discussions of Armor's role as the mobile combat arm of decision, you may take justifiable pride in noting that the key principles of mobility, flexibility and firepower—principles that have long been exploited to the fullest by Armor—have been incorporated into the Army's Pentana concept.

Under the Pentomic reorganization, the infantry and airborne divisions are now adopting a version of the combat command concept that has been employed by the armored division since before World War II. While extensive reorganization of the infantry division is required by Pentana, the Pentomic armored division will need only minor revision, mostly in the support echelon.

Guided missiles, rockets and other weapons with atomic or non-atomic capability are playing an increasingly important role in ground warfare. Armor must be ready to accept and exploit such weapons in order to increase its firepower and mobility. By maintaining and improving its traditional capability for rapid concentration, it will remain the Army's best means of gaining quick, decisive control of vital areas.

I. D. WHITE
General, USA
Commanding

★ ★ ★ ★ ★

SEVENTH UNITED STATES ARMY

On this 68th Annual Meeting of the Association, the members in the Seventh United States Army join me in sending our best wishes to all the members gathered at Fort Knox. We are sorry that more of Seventh Army could not be present, but we do look to you to provide the clear thinking and inspiration that is so necessary for the Association to carry on the finest traditions of Armor.

I assure you that the Seventh United States Army—as the "Armor in The Shield of NATO"—continues to support the Association to the fullest.

BRUCE C. CLARKE
Lieutenant General, USA
Commanding

NATO DEFENSE COLLEGE

The task which the nations of the free world face today in preparing to withstand the nuclear impact taxes the imagination of our best minds. So long as ground must be controlled, and only limited numbers are available, I am convinced that in the mobility, firepower, communications and protection inherent in Armor, we find an answer which is without peer in the world today!

May your meeting be the most stimulating and productive one yet held.

C. E. BYERS
Lieutenant General, USA
Commandant

★ ★ ★ ★ ★

ALLIED LAND FORCES, SOUTHEASTERN EUROPE

I would like to extend my congratulations on the outstanding accomplishments of the Association during the past year. It has contributed significantly to the understanding of the vital role of armor on the battlefield of the future.

The year ahead of us will present new problems and perhaps greater challenges than encountered during the past year. However, I know that this 68th Annual Meeting will provide a background that will assist in meeting these challenges.

GEORGE W. READ, JR.
Lieutenant General, USA
Commanding

★ ★ ★ ★ ★

U. S. ARMY, CARIBBEAN

Modern warfare demands that our troops be well armed and mobile in order that we may exploit the potentialities of tactical atomic weapons. American industry can provide us with superior communications, weapons and vehicles required in the atomic era. It remains for our Army to continue to develop techniques and tactics and leadership capable of exploiting our mechanical and industrial advantage. By tradition, training and experience, the officers and men of Armor are particularly qualified to exploit these industrial and mechanical advantages.

We men of Armor have developed to a high degree the aggressiveness, the flexibility, the dash and the *esprit de corps* so necessary for effective leadership in this modern army, and can look forward to an increasingly dominant role in ground combat of the future.

THOMAS L. HARROLD
Major General, USA
Commanding

HEADQUARTERS I CORPS (GROUP)

While we recognize that the terrain in Korea places certain limitations on the employment of Armor on a large scale, nevertheless the importance of tanks among our forces here is a very real one and our training and plans for the active employment of Armor in emergencies envision maximum utilization in every way possible of the tremendous shock action, firepower and mobility inherent in our weapon.

I feel that there is a growing appreciation among officers of the other arms, particularly the Infantry, as to the importance of Armor on the modern battlefield and this is true at the present time primarily due to their increasing awareness of tank capabilities in atomic warfare.

While a clear view of future warfare is not within the grasp of any of us, at least the initial ability to meet the atomic challenge demands that we utilize to the fullest those weapons which are most capable of doing so. In this connection, the tank has no peer on the battlefield today.

The officers and men of the I Corps, particularly those in Armor, send our greetings to the members of the U. S. Armor Association assembling at Fort Knox and assure you of our constant support in seeking a solution to the serious tasks confronting us.

ARTHUR G. TRUDEAU
Lieutenant General, USA
Commanding

★ ★ ★ ★ ★

1ST CAVALRY DIVISION

The officers of the 1st Cavalry Division join me in extending heartiest congratulations on the occasion of the Sixty-eighth Annual Meeting of the United States Armor Association.

We follow with great interest and satisfaction the efforts of the Association, through *ARMOR* magazine, to promote the concept of mobility, firepower and shock action and its ever-increasing importance on the battlefield of the future. We are grateful that the Cavalry spirit is as much alive throughout the Armor branch as it is in the 1st Cavalry Division.

EDWIN H. J. CARNS
Major General, USA
Commanding

★ ★ ★ ★ ★

7TH INFANTRY DIVISION

The officers and men of the tank battalion, reconnaissance company, and regimental tank companies have earned the respect of the other members of the Bayonet Division by the soldierly manner in which they have taken their place as members of this fighting team.

The presence of Armor adds immeasurably to the combat effectiveness of our Infantry Divisions in Korea. Increased firepower and greater mobility are attributes of Armor that the Infantry Division today cannot do without.

As we look to the future, I am confident that, in keeping with the splendid traditions of their predecessors, the members of the Armor Branch will join with their comrades of the other arms and services in successfully meeting the challenge of this atomic age.

CARL H. JARK
Major General, USA
Commanding

★ ★ ★ ★ ★

24TH INFANTRY DIVISION

The 24th Infantry Division extends greetings to you and the United States Armor Association on the occasion of your 68th Annual Meeting. We wish you continued success in your undertakings, and for the future of Armor in its role as one of the combined combat arms in the United States Army.

Armor plays an important part in the organization, training and plans of the 24th Infantry Division for potential combat in Korea today. Our armor-infantry training has been carefully planned, and is being thoroughly integrated from the platoon level upwards. Tank platoons and companies participate with infantry companies and battalions of the Division in formal field exercises, each month. The strength of our Armor small unit training program stems from the high calibre replacements we are receiving from Armor training centers in the United States.

We of the 24th Infantry Division are proud of our Armor Soldiers, and confident that Armor will continue to play an important part, in any future conflict, regardless of terrain or locale, so long as it remains necessary for field armies to "move, shoot and communicate!"

R. L. VITTRUP
Major General, USA
Commanding

★ ★ ★ ★ ★

HEADQUARTERS III CORPS

I regret that I, along with all other members of III Corps Headquarters, will be unable to be present at the 68th Annual Meeting of the Armor Association.

We will be engaged in Exercise "King Cole" which will start 27 March and last through 17 April.

Please carry to the President and the members my best wishes for a most productive and interesting meeting.

W. N. GILLMORE
Major General, USA
Commanding

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4TH ARMORED DIVISION

I greatly regret that I could not attend this meeting personally, due to a directive to bring the 4th Armored Advance Planning Team to Europe at this time. However, there is some satisfaction in an ability to send several able representatives to the Association Meeting; extend a message of greetings; and briefly acquaint you with major 4th Armored Division activities at this moment.

I can best describe our specific activities by enumerating these three missions: (1) to provide 7500 trained packet replacements for the 3d Armored Division in Germany; (2) to conduct the field tests for the M103 tank, and (3) to plan and implement the training and movement of the 4th Armored Division to Europe by the end of the year. Needless to say, the 4th Armored Division is busy at Hood!

It may be of interest to know that the division will have gone to the ROCAD TO&E concept by 1 April. It is anticipated that this reorganization will further increase the flexibility and power of "The Arm of Decision."

In closing, the 4th Armored Division has every reason to expect that this year's Association Meeting will continue to accelerate required progress in its field, towards greatly furthering our National Defense.

VERDI B. BARNES
Major General, USA
Commanding

★ ★ ★ ★ ★

30TH ARMORED DIVISION

I regret that due to urgent business I will be unable to attend this year's meeting of the Armor Association.

The officers and men of the 30th Armored Division, Tennessee National Guard, who are unable to attend, join me in sending best wishes to the members gathered at Fort Knox for the 68th Meeting of the mobile arm.

I am sure that each of you in attendance will gain materially from the meeting. May it be the most successful of all.

PAUL H. JORDAN
Major General, NG
Commanding

CONSTITUTION & BY-LAWS OF THE UNITED STATES ARMOR ASSOCIATION*

CONSTITUTION

ARTICLE I. Name

The name of this Association is THE UNITED STATES ARMOR ASSOCIATION.

ARTICLE II. Headquarters.

The headquarters of this Association is Washington, D. C., or such other place as the Executive Council shall determine.

ARTICLE III. Object.

1. The aims and purposes of this Association are to disseminate knowledge of the military art and sciences, with special attention to mobility in ground warfare; to promote the professional improvement of its members; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States.

2. There shall be no capital stock, and no distribution of profits to any officer, member or other person, but the entire income of the Association from all sources shall be applied and used in the conduct of its activities and in furtherance of its object as set forth in Article III, subparagraph 1.

ARTICLE IV. Membership and Qualifications for Membership.

1. Members of the United States Armor Association are classified as follows:

a. Active Members.

b. Associate Memebers.

c. Honorary Members.

d. Junior Members.

2. The qualifications for membership are as follows:

a. Active members: All general officers of the Regular Army or Army of the United States; and all present and former officers and warrant officers of honorable record assigned to, detailed in, or who have served in Armor shall be eligible.

b. Associate members: All other present and former commissioned officers, warrant officers and non-commissioned officers of honorable record in the military, naval or air service, shall be eligible.

c. Honorary members: Persons distinguished in military, naval or air service or learning shall be eligible upon election by a majority vote of the Executive Council. Such members shall not be subject to the obligations of active or associate members nor entitled to the right either to vote or to hold office. Otherwise they shall have the privileges of members, including the privilege to attend meetings and to engage in discussions.

d. Junior members: Students of the Service Academies, Military Schools and ROTC institutions shall be eligible. Annual dues shall be at a reduced rate as determined by the Executive Council. Such members not to be entitled to vote or hold office; otherwise they shall have the privileges of members.

3. The ruling of the Executive Council on all applications for membership shall be final.

4. Membership in this Association may be terminated for cause at any regular or special meeting of the Association upon concurrence of three-fourths of the members attending said meeting; but only after the member concerned has been advised by written notice of said proposed action at least twenty days prior to such meeting, which written notice shall have been mailed to his address of record retained in the office of the Association, and only after said member has been given an opportunity to be heard at said meeting. Said member will be given an opportunity to be heard at said meeting if the member indicates his desire to the Secretary-Treasurer prior to said meeting.

5. Active members only shall be entitled to hold office and to vote. Each active member shall have one vote which may be cast either in person or by duly executed proxy.

ARTICLE V. Officers and Their Election.

1. The officers of the Association shall be as follows: President, First, Second and Third Vice-President, Secretary-Treasurer, Editor and twenty-four (24) elected members of the Executive Council.

2. The President, the three Vice-Presidents, and the twenty-four (24) elected members of the Executive Council shall be elected by secret written ballot at the annual meeting of the Association. A plurality of the votes cast shall be requisite for election.

3. The Executive Council which initially shall consist of the President, the three Vice-Presidents and twenty-four (24) elected members shall appoint the Secretary-Treasurer and the Editor before the close of the month in which the annual meeting is held. Upon appointment, the Secretary-Treasurer and the Editor shall become members of the Executive Council.

4. The terms of all officers shall begin immediately after their election or appointment and shall continue for one year or until their successors have been duly elected or appointed.

5. The Executive Council shall manage the business and property of the Association consistent with law and this constitution; shall have power to make and amend the by-laws for its own government, which by-laws shall not be inconsistent with law or this constitution; and shall have the power to provide in the by-laws for the appointment of such other officers, agents and/or employees as it

*As Amended 5 April 1957.

shall deem necessary and proper, and to prescribe their duties and compensation.

6. If a vacancy occurs in the office of the President, the unexpired term shall be filled by the First, Second or Third Vice-President, in order. If a vacancy occurs in any other elective office, it shall be filled by election at the next business meeting of the Association. The President may, however, make an interim appointment pending said election of a successor.

ARTICLE VI. Meetings.

1. The annual or regular meeting of the Association shall be held during the first half of each calendar year.

2. Special meetings may, and upon the written request of twenty (20) members, shall be called by the President at other times.

3. One month's notice of regular and special meetings shall be given. Such notice shall be deemed to have been given when published in an issue of ARMOR at least one month before such meeting, and a copy thereof mailed to each member at his address of record retained in the office of the Association.

4. Five per cent (5%) of the active membership of the Association, present in person or by proxy, shall constitute a quorum for the transaction of business, provided that at least ten (10) active members are present in person.

ARTICLE VII. Amendments.

1. This constitution may be amended or repealed by a vote of two thirds of the active members of the Association present in person or by proxy at a duly called meeting of the Association, provided that the notice of such meeting shall contain a notice of intent to amend or repeal as well as a copy of the proposed amendment or repeal. Recommendations for amendment or repeal shall be presented to the Secretary-Treasurer in writing signed by not less than ten (10) active members of the Association at least two months before the date of the meeting at which the proposed amendment or repeal is to be considered.

BY-LAWS

ARTICLE I. Object.

1. In furtherance of its aims and purposes, this Association shall publish with such frequency as may be determined from time to time by the Executive Council, a professional and scientific journal to be known as ARMOR, and shall conduct a book department for the sale of books, maps and periodicals to its members and to the general public.

2. The object of this Association may be further promoted by such other lawful means as the Association or its Executive Council from time to time shall deem appropriate.

ARTICLE II. Membership.

1. For the determination of eligibility for active membership in this Association, the designation "officers and warrant officers assigned to, detailed in, or serving with Armor" shall include the Regular Army, the National Guard and the Organized Reserve Corps.

2. Any person desiring to become an active or associate member shall make application to the Secretary, which application shall set forth facts establishing his eligibility and be accompanied by the payment of at least one year's dues, the amount of which shall be determined from time to time by the Executive Council. The applicant's eligibility appearing, the Secretary may grant the membership.

3. All active and associate members shall receive the Journal, ARMOR, without cost other than the annual dues. All honorary members shall receive the Journal, ARMOR, without charge. Junior members shall receive the Journal, ARMOR, at the special membership fee.

4. Any member may withdraw from the Association at the end of any current year by tendering his resignation; and membership shall lapse *ipso facto* upon failure to pay the annual dues; but such withdrawal or lapse shall not operate to relieve any such member from liabilities said member may have incurred prior thereto as a member of the Association.

5. Any person or organization may become a subscriber to the Journal, ARMOR, upon the payment of a subscription price equivalent to the annual dues of the Association, and all such persons who are not regularly admitted and entered as active, associate, junior or honorary members shall be considered merely as subscribers.

ARTICLE III. Officers.

1. The office of Secretary-Treasurer and Editor may be held by one and the same person.

2. The duties of the officers shall be such as usually pertain to their respective offices. The officers may receive such compensation for services performed as these by-laws may prescribe.

ARTICLE IV. Executive Council.

1. The President shall *ipso facto* be the chairman of the Executive Council, and in his absence the First, Second or Third Vice-President, in order.

2. In the event all four of the above officers are absent, the senior council member present shall act as chairman of an Executive Council meeting.

3. Two-thirds of the members of the Executive Council shall constitute a quorum for the transaction of business.

4. A majority vote will govern in all matters acted upon by the Council.

5. The chairman of the Executive Council will provide any or all of the following subcommittees when the Council deems them necessary to carry out the provisions of the Constitution and By-laws:

a. Nominating committee.
b. Auditing committee.
c. Editorial policy committee.
d. By-laws committee.

6. It is desirable that a number of the members of the Executive Council be residents of the vicinity of the headquarters of the Association.

ARTICLE V. Amendment.

These By-laws may be amended or repealed by a majority vote of the members of the Executive Council.

T. A. S., Jr.

By COLONEL ALBIN F. IRZYK

HALFWAY around the earth from Fort Knox, Kentucky and in a completely different world sits a replica of The U. S. Army Armor School. At first glance, particularly at the physical layout, the similarity between the image and the parent. It is an amazing similarity.

Upon entering the grounds, the visitor is first impressed with the neat, compact arrangement of the buildings within the compound; the meticulosity of the area; and the definite military atmosphere that prevails. From that moment on as he moves about the school listening and examining, his overriding impression is one of amazement, for mirrored before him and transplanted to this far-off place on the Asian mainland, a land which only a few years ago was known to many in the United States principally for its jungles, tigers and cobras, is The Armor School at Fort Knox, vintage 1948-49. Included here, as the visitor will soon see, are very many features of the Kentucky school except on a much smaller scale. As the visitor moves about, he will have to remind himself continually that he is not in close proximity to First Avenue but rather in a land, considered relatively primitive not too long ago, about 12,000 miles from Old Ironsides.

After passing through the main gate of the Thai Armored School (TAS), the visitor is guided to the nearby Academic Building where he is greeted by the Commandant, Brigadier General Chatichai Choonhavan, a young man of 34. The Commandant ushers his guest to a long conference table that faces a well lighted wall with a long array of attractive, green sliding panels. General Chatichai then launches into a very detailed, learned, interesting, enthusiastic and highly competent description of the organization of the school together with its objectives, accomplishments and future goals. Throughout his presentation the



This is the headquarters of The Thailand Armored School.



The Commandant, Brig. General Chatichai Choonhavan.

original is difficult to detect. However, should anyone who is familiar with The U. S. Army Armor School at Fort Knox have the privilege of driving through the gates of The Thailand Armored School, and of being shown through the school, he would be astonished at the resemblance between the offspring and the

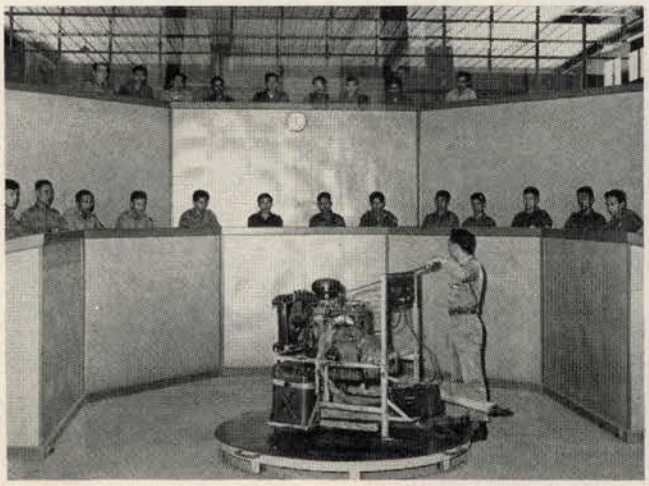
COLONEL ALBIN F. IRZYK, Armor, served in Europe during World War II in the 4th Armored Division. He received the Distinguished Service Cross. He served two tours on the Staff and Faculty at the U. S. Army Armor School and is now on the Joint Staff of the Commander in Chief of the Pacific. He will attend the National War College, Washington, D.C., this coming Fall.

In the March-April issue of **ARMOR** *we presented an article entitled "Making Friends Around the World." This story is of officers and enlisted men, from free countries, who attend The U. S. Army Armor School at Fort Knox, Kentucky. This article will attest to the fact that the effective training and good will they receive makes them friends of the United States of America, and the United States Army in particular.*

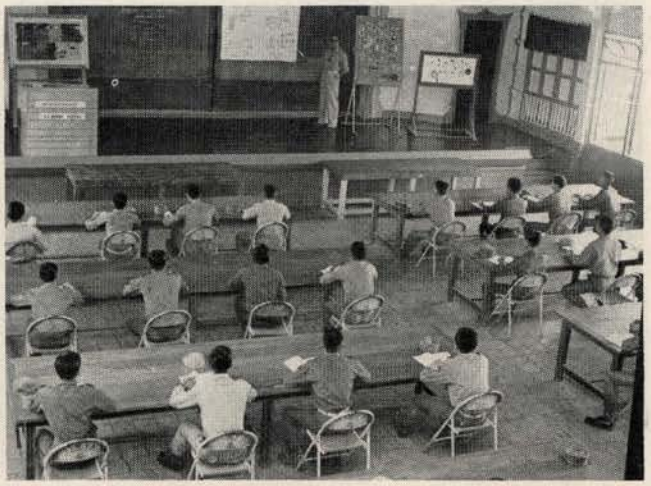
General refers to various charts, graphs and manning tables which he slides back and forth and which are concise and pertinent.

While listening to General Chatichai the visitor cannot help but be impressed. He learns that the school he, General Chatichai, is running it.

By this time, too, the visitor will have learned that the General is a graduate of the 1948-49 Advance Course at Fort Knox where he was familiarly and affectionately known as "Choo Choo." It is readily apparent too, that little escaped General Chatichai during the year he attended The School at Knox, that he has made a determined and studied effort to model his school after The U. S. Army Armor School and that he has been remarkably successful in building into his school the features of his former Armor Alma Mater.



Amphitheater type classroom similar to ones used at Knox.



The classrooms have everything conducive to good teaching.

is virtually identical with the U. S. Army Armor School and emulates in its operations insofar as possible the Kentucky Armor institution. Throughout the presentation he hears familiar names, terms, expressions and even colloquialisms. The briefing itself is virtually a page out of Colonel Henry C. Newton's book and sparkles with enthusiasm. Upon completion, the visitor is very much aware that the Commandant is extremely proud of his school; that he is competent and alert; that he knows all there is to know about the school and that there is no question but that

At this time the Commandant asks the visitor if he would like to see more of the school and upon receiving an affirmative reply guides his guest on a walking tour of the school area.

Upon leaving the Academic Building and crossing a roadway toward a nearby building, the General turns and with a sly, knowing, proud smile says, "I will now show you 'Mills Hall'." The visitor recalls that in 1948-49 Mills Hall was the showplace of The School at Knox. It was an innovation in classrooms and featured several revolutionary items. It was a source of great pride to its creator, The Assistant Commandant of The Armored School, the then Brigadier General Bruce C. Clarke. Upon entering the Thai "Mills Hall" one is immediately aware that this is the Thai Armored School's Commandant's pride and joy. It is small wonder, for it is a classroom of which to be proud—big, airy, well-lighted, attractive and containing some of the features and facilities which made Mills Hall such a progressive classroom when built. The color, "flash and dash" and the flexibility so char-

acteristic of Armor are present, too, for as one enters the hall sliding panels begin to move back across the stage, lights go on and off and other things happen. All this illustrates that here is a classroom that has everything built into it that is conducive to good teaching and good learning. Here, too, is a large colored mural showing elephants ridden by soldiers and surrounded by more armed soldiers in what appears to be a charge. Pointing to the mural General Chatichai smilingly announces, "The first tank-infantry team."

At this point the Commandant turns and beamingly announces, "Now I'd like to show you 'Elder Hall'." On entering this building one is struck by the great similarity between it and the one at Knox (now no longer a classroom) which in its day had been revolutionary and the forerunner of all Knox snake-pit type classrooms.

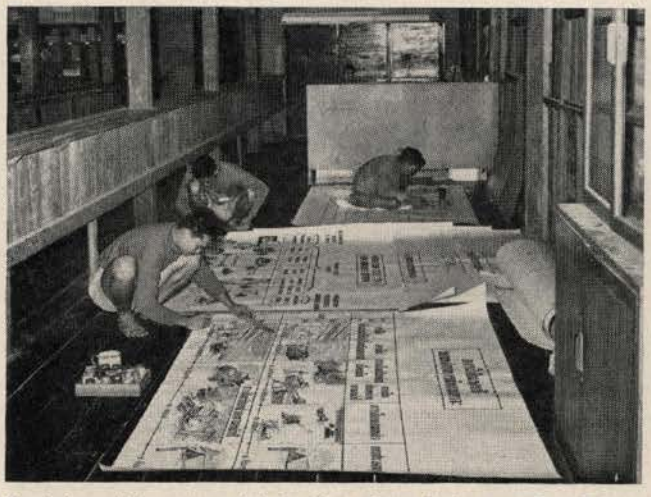
As the tour continues from one Department to another the visitor becomes continually more amazed to realize what a considered and often successful attempt has been made to recapture even though on a smaller and less ambitious scale the features of the Knox institution. At the Weapons Department, Automotive Department and Communications Department are classrooms reminiscent of those at Knox in similar Departments. Attractive and colorful training aids modeled after those at Knox are evident all over the school. At the Weapons Department is a clever combination terrain table and puff board for teaching sensings, cut-away models of weapons, and wooden models of weapons with movable parts. One finds at the Automotive Department cut-aways and models of all types with each part of each unit as at Knox painted a different color. Each of these is a duplicate of or has been copied from a similar aid at Knox.

As one enters the Communications Department a radio is softly playing. All types of panels, training aids and pieces of equipment are displayed. Except for a tiny speaker, no radio, however, is visible. Upon inquiring (and the question had apparently been anticipated) the visitor is quickly shown two prominently displayed, attractive wooden panels upon which a series of parts are mounted. One quickly learns that this is the radio and that the parts are connected by concealed wires. The two communicators who had developed the boards and neither of whom had been to a U. S. service school stand proudly by and with an air of triumph change stations by flipping the dial mounted on one of the boards.

Everywhere classrooms and buildings are clean and orderly. Equipment and training aids are attractive and neatly arranged. The entire establishment has an air of efficiency and competence. Personnel encountered everywhere are enthusiastic, alert and obviously very proud of their institution.

To an individual like this writer who has spent a total of 4½ years during two tours as a member of the Staff and Faculty at Fort Knox, a visit to the Thai Armored School is an inspiring and refreshing experience. The visit was particularly satisfying to the writer since he had had the privilege of presenting Armor tactical instruction from the platform of Mills Hall to General Chatichai, one of the Allied students in the 1948-49 Advance Class.

What are the lasting impressions left by this experience? The Thai Armored School has a fine physical plant. It is attractive, modern and has excellent facilities and equipment. Many of its features so closely resemble those at Fort Knox that it is startling. It is obvious that its Commandant as a student at Knox must have absorbed a tremendous amount of detail. Much of what he saw at Knox must have been indelibly stamped in his mind. This gives one food for thought. For at Knox, because of the language barrier, it has always been difficult to determine how much of the instruction the Allied students are understanding and



Training aids are modeled after those being used at Knox.



Here is a class being conducted in the Weapons Department.

absorbing. The answer to how much the General absorbed and retained was demonstrated graphically to the writer some 6½ years later. Here was tangible evidence to show that in his quiet, reticent and retiring way he certainly received an absolute maximum from his nine months attendance at The U. S. Army Armor School. It is obvious that he must have been motivated to a far greater degree than the average student.

During discouraging moments at Knox, personnel sometimes ask themselves, "Are we doing any good?" Here is an emphatic answer in the affirmative. The effects of the teachings are being felt not only at home but in various parts of the world.

One lesson learned is that the Allied students should not be taken for granted, for the impressions they gain from instructors, what they learn and the zeal with which they carry it away will determine the type of Armor missionaries they will become. It is conceivable that if motivated as was Gen. Chatichai their efforts will multiply many-fold the knowledge that they acquire.

One should not forget, in a discussion of the Thai Armored School, the tremendous role that has obviously been played by young U. S. Armor Officers who have been assigned to the school as advisors. They are members of the U. S. Military Assistance Advisory Group (MAAG) which has as one of its missions the development of the Thai Armed Forces as a whole. They, too, have been Knox-educated and the background and experience gained at that institution have enabled them to complement the efforts of the Thais in the development of their school. The Thai Armored School stands as a monument to their combined efforts.

The institution is extremely young. It was organized in 1952, and is located in Bangsue, a suburb of Bangkok. To date the Armored School has graduated 1,500 students. There are 15 different type courses offered ranging from two weeks for a voice radio operator to 29 weeks for an associate company officer. The courses include an officer candidate course and an NCO candidate course. In the planning stage, at the moment, is an associate officers' advance course.

The school, like other elements of the military, is being supported and advised by funds and personnel furnished by the U. S. under the Mutual Defense Assistance Program. There were some indications however that if certain items are desired and yet are not furnished by the U. S., the Commandant occasionally dips into his own pocket, if what he desires is obtainable.

Although the school has come a long way since it was first organized and has developed a fine physical plant, it is beset with growing pains. It is plagued with numerous weaknesses, many of them characteristic of similar institutions elsewhere, that will have to be overcome before it becomes a really top flight school.

Some of these difficulties are lack of training areas and firing areas at the school location; shortages of training aids and other equipment, shortages of FM's and TM's, especially in Siamese; shortage of qualified officer instructor personnel; and a critical shortage in assistant instructors qualified in their fields, especially on technical subjects.

Judging by the progress made since 1952 and with competent Thai leaders and U. S. advisory personnel cognizant of areas that need improvement, it is reasonable to assume that the school will continue to better itself and progress. That it exists in its present state is a tribute to all who had a hand in its development. To an "old hand" from Knox it was truly an inspiration to find this Armor oasis so very far from home—a place where names, terms, expressions, jargon, equipment, facilities all were so familiar and where from the first he felt not as a stranger but very much at home.



This is the Automotive Department, very clean and orderly.



The Communications Department has excellent facilities.

All photos
U. S. Information Agency

CANCELED

IMPROVED LOGISTICS
IN THE ARMORED DIVISION

By *MAJOR ROBERT L. WESTBROOK*

MILITARY successes and failures can be traced very frequently to the presence or absence of needed logistical support, despite the fact that the success of military commanders is often credited primarily to their strategy and tactics. Field Marshal Lord Wavell, former Viceroy of India, in a series of lectures on *Generals and Generalship* that he gave at Trinity College, Cambridge, quoted Socrates as follows:

"A general must know how to get his men their rations and every other kind of stores needed for war. He must have imagination to originate plans, practical sense and energy to carry them through. He must be observant, untiring, shrewd; kindly and cruel; simple and crafty; a watchman and a robber; lavish and miserly; generous and stingy; rash and conservative. All these and many other qualities, natural and acquired, he must have. He should also, as a matter of course, know his tactics; for a disorderly mob is no more an army than a heap of building materials is a house."

Lord Wavell added, "Now the first point that attracts me about that definition is the order in which it is arranged. It begins with the matter of administration, which is the real crux of generalship, to my mind; and places tactics, the handling of troops in battle, at the end of the qualifications instead of at the beginning, where most people place it."

The logistical needs of armored units have increased so greatly that

MAJOR ROBERT L. WESTBROOK, Armor, served in Europe during World War II with the 9th Armored Division. After a Stateside tour, he returned to Germany on occupation duty. Returning to the States, he served with the 3d Cavalry Regiment and attended the Advanced Armor Officers Course. He later attended the Canadian Army Staff College, then joined the Command and Staff Department of The Armor School. He is now attending the Armed Forces Staff College.



U. S. Army

Logistics for armored units has increased so greatly that our logistical support system needs revitalization.

"As war grows more complex and costly, the part played by logistics grows ever greater. Logistics lies close to the heart of victory; and a nation's military power, and hence its safety, rests largely on its ability and its willingness to create the goods and the means of transport that are required for war"

our logistical support system must be reviewed and studied with a view toward revitalization. The logistical support system in the armored division must keep pace with present or foreseeable technological advances.

Principles of Logistics

The ultimate objective of a logistical support system is the timely and effective support of troops in combat. Current doctrine expresses principles and concepts pertinent to the logistical support of combat units. These principles of logistics will remain valid under future concepts of land warfare. With our present logistical support system, we are paying only "lip service" to certain of these principles. For example, the principle, "Impetus of Supply is from Rear to Front," is virtually a meaningless term from the field army through the combat commands of an armored division. If a logistical support system is going to effectively support tactical operations, the system must be in consonance with the principles.

Capability to Support

The logistical support system in the armored division has not kept pace with present or foreseeable technological advances. Since World War II, the armored division TOEs have been changed or modified numerous times in an effort to keep abreast of current doctrine. Yet, in spite of these TOE changes and the development of new tactical doctrine for the employment of armor on the atomic battlefield, the logistical system has not been changed to provide the required capability for support.

Division G4 and Trains Commander

In the present armored division,



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The ultimate objective of a logistical support system is the timely and effective support of troops in combat.

the G4-division trains concept has continued to work in spite of some obvious deficiencies existing in the system. Under this concept the division G4 and the division trains commander perform duties as outlined in Field Manual 17-50. These duties are:

1. Division G4
   a. Formulation of logistical policy.
   b. Logistical planning.
   c. General staff coordination.
   d. Supervision of logistical plans and operations.
2. Division trains commander
   a. Tactical command and control of all elements of division trains.
   b. Organization, movement and protection of division trains.
   c. Supervision of nontechnical training of elements of division trains.
   d. Supervision of training of the division replacement company and the division band.
   e. Supervision of unit administration of elements of the division trains.
   f. Conduct of inspections to determine tactical fitness of division trains.
   g. Consolidation and dissemination of information to higher and lower headquarters.
   h. Preparation of tactical plans for movement, control and protection of division trains.

One has only to study and analyze the duties of the division G4 and trains commander to arrive at the obvious conclusion that there are a number of weaknesses in the command and staff relationship relative to these two officers. The division trains commander has tactical command and control over a group of heterogeneous units but does not have control over the technical function of these units. The primary mission of units organic to division trains is service support; thus, the trains commander has no authority over the primary mission of his command. While the division G4 endeavors to confine his functions to policy formation, planning, general staff coordination and supervision of the logistical plan, he is forced into the role of an operator and, to a degree, the technical commander of these service units. This condition has evolved from the division's top logistical officer, but not the commander. He coordinates the logistical efforts of the seven technical services through staff action—which means that he directs them with authority (that of the commanding general). It is the combination of this headless logistical support organization and the G4's supervisory powers which forces him into the role of an operator. The present policy does not provide for overall technical command and control of the division's logistical support organization.

To eliminate these weaknesses outlined in the preceding paragraph, the gap created by the absence of overall command of the logistical elements of the division must be closed. The G4's responsibilities are clearly defined and are adequate. The division trains commander's responsibilities, however, must be extended to include command responsibility and authority over the primary mission of his troops. To accomplish this, the following additional responsibilities should be given to the division trains commander:

1. Command, control and technical supervision of all units and facilities organic to the division trains.
2. Supervision of activities of ordnance, medical and quartermaster units providing third echelon support for the division.

If the division trains commander performs the additional duties as just outlined, the division G4 can confine his activities to the formulation of policy, logistical planning, general staff coordination and supervision of the logistical plan. The division G4 will have the same relation to logistical operations as the G3 has to tactical operations. The division trains commander will assume the role of an operator and perform the detailed logistical support. This concept will improve logistical support in the armored division by adherence to the principle of unity of command and by clarifying the problem of command and staff relationship.

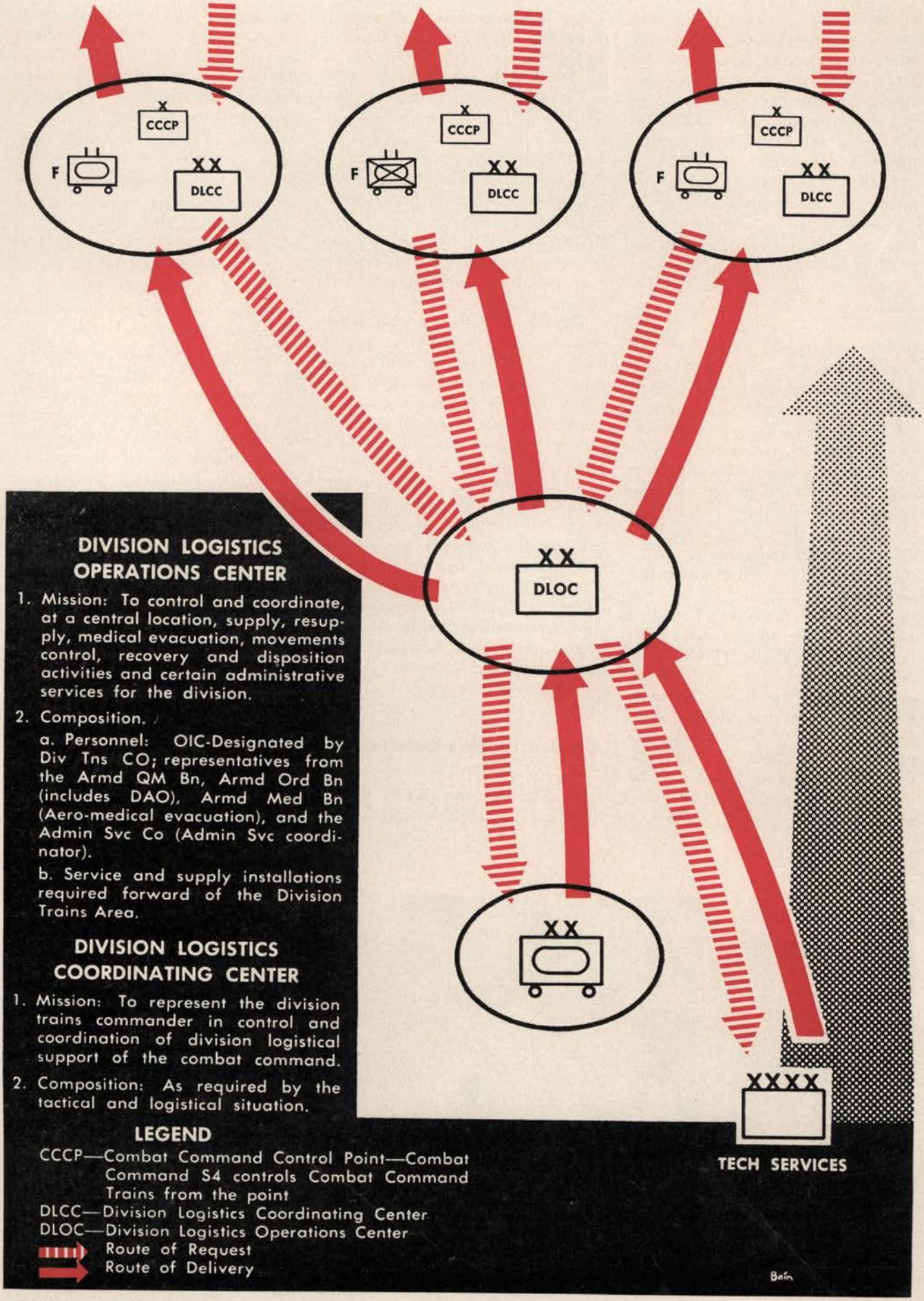
Control of Logistical Activities

The widely acknowledged need for positive command control throughout the division's logistical system can be met by making the division trains commander the logistical operator. This change in itself will not completely set the division logistical system in consonance with the principles of logistics. There is a definite need for a control organization capable of being broken down into teams that can be placed in support of the combat commands to ensure timely and adequate logistical support.

The division trains contain the necessary personnel and equipment to provide 3d echelon logistical support for the entire division (less engineer Class IV construction, camouflage and fortification materials). The division trains consist of the armored ordnance, quartermaster and medical battalions (less elements from these battalions in support of the combat commands) together with any service units attached to the division from higher headquarters. The division trains commander should have operational control over all elements assigned or attached to the division trains.

Division Logistics Operation Center

The division trains commander can more effectively exercise command and control over 3d echelon logistical support activities by establishing a division logistics operation center (DLOC). This DLOC will be a control activity and installation. Its mission will be to control and coordinate at a central location all logistical activities and certain administrative service functions of the division. The DLOC will centralize operations of the logistical activities for which the division trains commander is responsible. The division trains commander is in charge of operations at the DLOC; however, he will normally designate a member of his staff to operate this installation. This allows the trains commander freedom to perform his other responsibilities pertaining to command, control, technical supervision, training, coordination and administration of elements of the division trains. The establishment of the DLOC will eliminate separate administrative instructions being issued by various units within the trains. A consolidated logistical memorandum will include all logistical matters of the division. Technical advice on logistical and administrative matters will be available


X
CCCP
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DLCC
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CCCP
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DLCC
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DLOC
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TECH SERVICES
DIVISION LOGISTICS OPERATIONS CENTER
1. Mission: To control and coordinate, at a central location, supply, resupply, medical evacuation, movements control, recovery and disposition activities and certain administrative services for the division.
2. Composition.
a. Personnel: OIC-Designated by Div Tns CO; representatives from the Armd QM Bn, Armd Ord Bn (includes DAO), Armd Med Bn (Aero-medical evacuation), and the Admin Svc Co (Admin Svc coordinator).
b. Service and supply installations required forward of the Division Trains Area.
DIVISION LOGISTICS COORDINATING CENTER
1. Mission: To represent the division trains commander in control and coordination of division logistical support of the combat command.
2. Composition: As required by the tactical and logistical situation.
LEGEND
CCCP—Combat Command Control Point—Combat Command S4 controls Combat Command Trains from the point
DLCC—Division Logistics Coordinating Center
DLOC—Division Logistics Operations Center
Route of Request
Route of Delivery
Bain

at one location, and the DLOC can serve as an information center for the entire rear area. As visualized, the DLOC will operate in an area forward of the division trains.

The personnel and/or activities that should be represented at the DLOC are as follows:

1. *DLOC commander.* The commander of this installation should be a member of the division trains commander's staff. He should be an individual well grounded in logistical support activities, and since he represents the division trains commander, he should be granted full authority in logistical support activities.

2. *Quartermaster activities.* The division quartermaster battalion will establish a Class I distributing point, a Class III supply point, the division graves registration collecting point and division salvage collecting point with the DLOC. The personnel assigned to operate these installations will be under the control of the DLOC commander and available to provide technical advice on quartermaster activities.

3. *Ordnance activities.* The division ammunition officer (DAO) will be located with the DLOC. His normal function is to authenticate ammunition requisitions; however, when the division is authorized to operate a Class V ammunition supply point, the DAO will supervise this operation. The DAO will be under the control of the DLOC commander.

4. *Medical activities.* A medical evacuation officer from the armored medical battalion will be located with the DLOC. He will direct the division's medical vehicles to the location of units and the division supply installations. He will work closely with the division traffic control officer.

5. *Administrative services.* An officer from the division headquarters rear echelon will be located with the DLOC. He will coordinate such administrative activities as replacements, mail and all general administrative matters.

The DLOC, therefore, provides that the major logistical operations for which the division trains commander is responsible are centralized at one location. With the establishment of the net control station of the division logistical net at the DLOC, direct communication between the combat commands, division trains commander and the division G4 is possible. This direct communication will greatly enhance logistical controls and distribution within the division. Also the establishment of a DLOC will eliminate separate administrative instructions being issued by the ordnance, medical, and quartermaster technical services. Technical advice will be available at one location.

Division Logistics Coordinating Centers

In addition to the DLOC, the division trains commander can further expedite logistical operations through the use of division logistics coordinating centers (DLCC). The DLCC, as envisioned, is a small control activity and installation with the mission of controlling and coordinating requests for logistical support. A DLCC is located in each combat command trains area. All division logistical agencies, with the exception of engineer and signal units located in the combat command trains area to provide third echelon support, will be under the control of the DLCC. Units of a combat command will submit requests for logistical support directly to the DLCC. The DLCC commander will provide the requested support from the division logistical agencies under his control or will relay the request to the DLOC. Additional engineer and signal support will be requested by the DLCC through the DLOC. The DLCC will not attempt to stockpile fuel and lubricants, rations, or ammunition in the combat command trains area. The establishment and operation of the DLCC will relieve the combat elements of coordination in logistical matters and will provide the division trains commander the necessary control to expedite logistical support to the combat elements of the division.

Conclusion

Hawthorne Daniel in his book *For Want of a Nail* states, "As war grows more complex and costly, the part played by logistics grows ever greater. Logistics lies close to the heart of victory; and a nation's military power, and hence its safety, rests largely on its ability and its willingness to create the goods and the means of transport that are required for war."

If the quotation above is a true statement, it would appear that logistics in the armored division must be organized in such a manner that the success of an operation will not be jeopardized. The constant drive to maintain technical service identity and recognition in the division logistical system must be ruthlessly eliminated or the logistical system is in danger of being adversely affected. Military successes in the future must be because of logistics and not in spite of it.



U. S. Army

Establishment of a DLCC will expedite logistical support to combat elements.

The Command Maintenance Puzzle

The following article is the first of a series. The articles are the results of joint efforts by the members of the United States Army Maintenance Board, Fort Knox. The President of the Board at the present time is Colonel James R. Pritchard. The Board is a field agency of the Deputy Chief of Staff for Logistics, Department of the Army, and is directly responsible to that office.

ON a certain day in December, in this eleventh Year of the Atom, the Guardian Angel of Soldiers surveyed the Army establishment and duly recorded the following events:

All officer students at a service school correctly answered the question: "Maintenance is a command responsibility ☒ TRUE ☐ FALSE."

A battalion motor officer stood at a severe brace before his commander. Two companies had failed the Command Maintenance Inspection, and 20 vehicles had been reported as having major deficiencies on an Ordnance spot-check. The commander wanted to know why.

Ten enlisted and two officer specialists conducted a command maintenance inspection of an artillery battalion. The battalion commander and his staff spoke with the Command Maintenance Inspection team and walked hurriedly through the maintenance area before moving on to other business.

A division Ordnance officer stated at a command conference that many serviceable components were being turned in to field shops as unserviceable, and that units were short of circuit-testers, having failed to requisition them. This confused the subordinate commanders present. They knew of no such shortages, and what is a circuit-tester?

Findings of the Army Maintenance Board indicate that this paradox is at the root of our maintenance problems: Most commanders *know* that maintenance is a command responsibility, but do not know what to do about it. A commander must know his equipment in the same manner that he knows the officers and men who serve under him. It is almost remarkable how rapidly the word gets around and subordinates become vitally interested in those matters in which the boss exhibits an aggressive interest. With the departure of the horse and advent of the tank and guided missile, the average commander has become thoroughly bewildered by the vast array of equipment for which he is responsible. He has consequently embraced a concept whereby the specialist is the high priest of maintenance.

Consider the fallacies inherent in the events recorded by our celestial visitor. Why doesn't the battalion commander pin the responsibility where it belongs, and address the company commanders?

As to the second event, so-called "command maintenance inspections," which are in fact conducted entirely by technicians, are a common scene these days. Certainly the commander must rely on his specialists for a detailed technical inspection, but why does he abdicate entirely? The psychological effect of his personal demonstration of knowledge and interest is worth ten technical inspections.

The commanders cited in the third incident will be interested to learn that a circuit-tester is an important component of a second-echelon tool set, and that in all probability components such as generators and regulators are not being properly checked by shop personnel because of the shortage of test equipment. Besides, an automatic turn-in of components on direct exchange is easier than testing them thoroughly. Is it too much to ask that commanders know the status of tool supply, the general use of test equipment, and that they personally insure exercise of proper shop supervision?

In summary, painful experience has taught that effective unit maintenance will not be attained by a flurry of directives, vast quantities of technical literature, and a host of specialists. We will attain acceptable maintenance standards when we observe the admonition of Poor Richard, "If you would have a faithful servant, and one you like, serve yourself." We must translate the phrase "maintenance is a command responsibility" into personal command knowledge and supervision.

CARDED

WHY PLAY BLIND MAN'S BLUFF?

by

The U. S. Army Armor School

HIGHLY mobile warfare makes it imperative for us to take advantage of all the tools of the trade which potentially increase night mobility. Night vision will make control easier and increase the likelihood of tactical success.

The equipment used for night vision on the M48 tank is the T41 infra-red periscope. This infra-red system consists of a light source permanently mounted on the tank, a periscope assembly which is removable for the purpose of protecting the device, and a high-voltage power package, also permanently installed on the tank. *See figure 1.* The source of light is two red lens headlamps mounted on the front of the tank. These lamps have filters which absorb visible light without absorbing infra-red rays. The projected rays illuminate objects at night and are reflected back to the periscope, where they are converted to visible light for night observation and driving.

Infra-red rays are deflected to the objective lens assembly through a 90-degree head prism which projects above the driver's hatch of the vehicle. The objective lens assembly

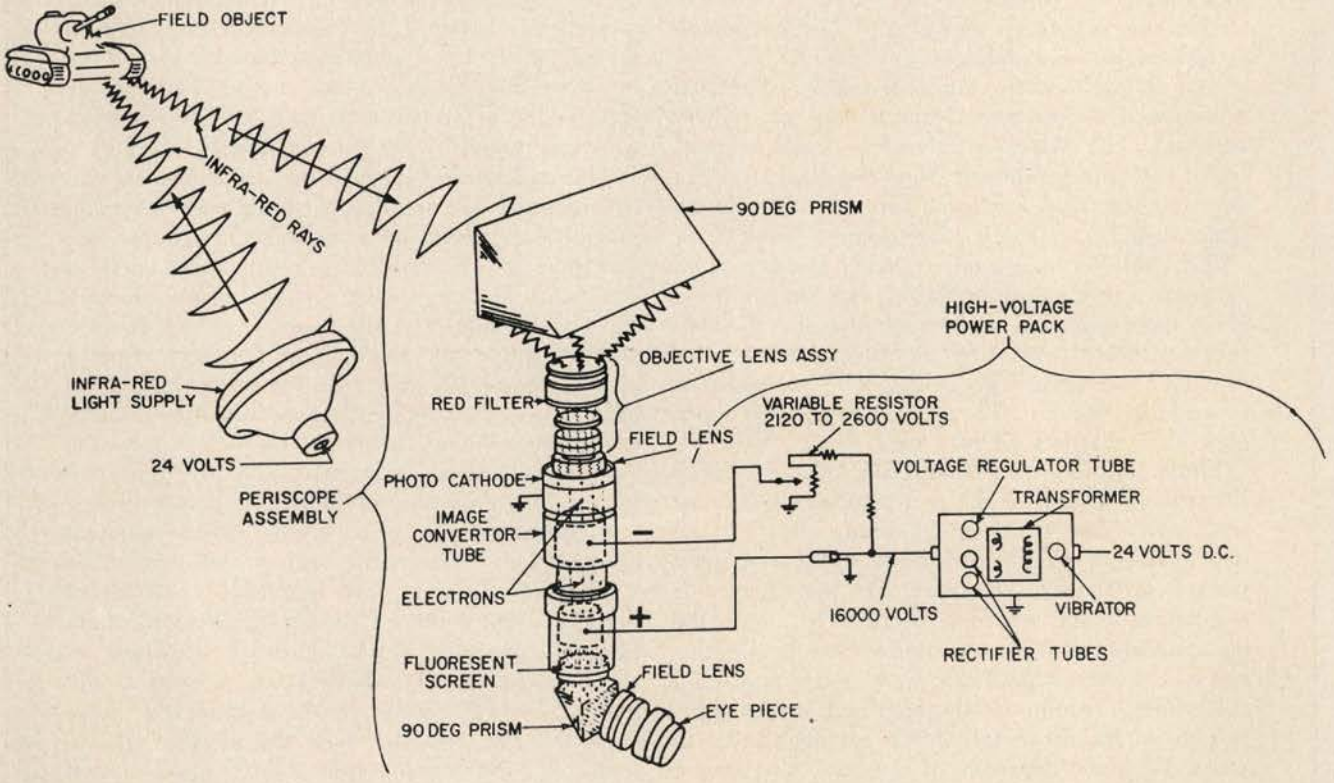


Figure 1, Infra-red System

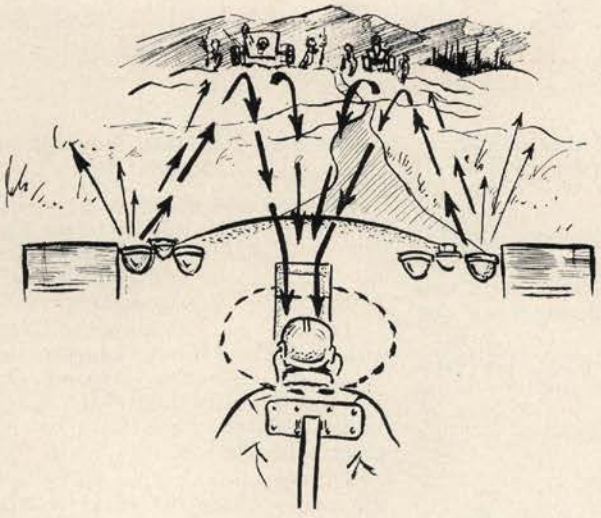


Figure 2, Position of lamps and T41 periscope in M48 tank.

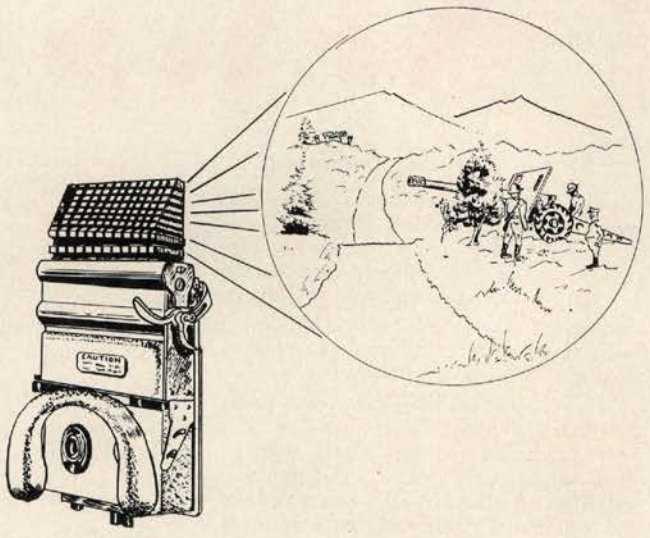


Figure 3, Scene through the T41 periscope.

and the field lens throw a real image on the cathode surface of the image converter tube. This cathode surface is coated with a photosensitive substance which converts the real image to an electronic image, which is in turn projected on a fluorescent screen at the base of the image converter tube. There it can be viewed through a 90-degree prism field lens and eye lens assembly.

Power for energizing the image converter is supplied by the power supply of the vehicle through a high-voltage power pack, which consists of a vibrator, a transformer, two rectifier tubes and a voltage regulator tube. The potential output to the periscope (through a high-voltage cable assembly) is 16,000 volts.

The assembly mentioned above is actually not as complicated as it sounds. The important question, then, is: How are we going to train troops to use it? It is essential that personnel know the technique of moving at night, either to concentrate our forces or to resupply them. The first step in the training process is to familiarize the men with the equipment. Second, they need actual practice in using the devices during night training. Third, they must be able to service the equipment properly. Through conferences and classroom demonstrations, the men can see the equipment and become familiar with it. The first things to be demonstrated are the action of light rays through a prism, and the process by which the infra-red ray is filtered. *See Figure* 2. It is also essential to point out the connections to the power source and the procedure for installation. Time should be allowed for each man to install the equipment, to handle it and note its rugged construction; and to be taught the maintenance checks in accordance with TM 9-6059. Then each student should install the periscope in a vehicle under the supervision of a qualified instructor. When the system is in operation, all objects in its field will be observed in shades of green. Because it is very difficult to judge differences in depth, or distance, of the images seen, a great deal of practice is required before a satisfactory degree of depth perception is attained. *See Figure* 3. To give the viewer a more realistic picture, dismounted personnel, vehicles and other objects should be observed at distances during darkness.

Once the men are thoroughly familiar with the equipment and with the appearance of objects at various distances, the driver should be taught to judge distance while his tank is in motion. This maneuver should be performed first by moving the vehicle in a straight line over an open field, then by driving it over a designated tank trail, and finally by moving tanks in convoy, first a platoon, then a company. After this training, the driver should have developed sufficient depth perception to recognize objects through the scope. Turns and defiles are particularly difficult to negotiate. Fog, dust, rain, sleet and snow sharply restrict the amount of visibility when the scope is in use.

Effective training and practical application in the use of night vision devices will increase night driving proficiency. Commanders can more readily determine the status of night driver training. Frequent use will provide a basis for parts mortality and exchange requirements. The end product will be an organization capable of efficient night operations.

NEWS NOTES

US Army Missile Command

The Department of the Army has selected the title "US Army Missile Command" for units previously described as Atomic Support Commands.

Upon activation the units will be designated as numbered commands, with their type, such as air transportable or medium, indicated parenthetically.

The change in designation was made for several reasons. The term "atomic" was considered too restrictive, since it does not properly describe the dual capabilities of the weapons employed by the command. "Support" was dropped from the name because it denotes a logistical rather than a combat mission.

The term "missile" was included in the title to identify the principal armament with which the command will be equipped.

Army to Commission 13,480 ROTC Graduates

The Department of the Army announced recently that of the 13,480 Reserve Officer Training Corps graduates to be commissioned between May 1, 1957, and April 30, 1958, approximately 7,825 will be ordered to active duty for two years.

Included in the total number of ROTC graduates are approximately 700 distinguished military graduates who will accept commissions as Regular Army officers.

Unless qualified for delay, those officers selected for two years will be ordered to active duty within the 12 months following their appointment but not later than June 30, 1958. ROTC graduates whose services are not required for two years active duty will be ordered to active duty for training for six months.

This year's Army ROTC graduates come from 253 colleges and universities located in 48 states, the District of Columbia, Alaska, Puerto Rico and Hawaii.

Mountain and Cold Weather Training Center to be Transferred

Functions of the Mountain and Cold Weather Training Center, Camp Hale, Colorado, will be transferred to Fort Greeley, Alaska, by July 1, the Department of the Army announced recently.

Half of the approximately 350 operating and instructor personnel assigned to Camp Hale during the seven month training season will return to Fort Carson, Colorado, this month after graduation of the last class in mountain training. With the exception of a small caretaker detachment, the rest of the personnel will be transferred at a later date.

At Fort Greeley, the training will be incorporated into existing courses at the Arctic Indoctrination School, opened in 1948.

Army Research and Development Needs

Research and development needs of the Army for the warfare of the future will be studied for nine weeks at Damariscotta, Maine, this summer by scientists and military personnel.

The meeting will be under the leadership of Dr. Ellis A. Johnson, director of the Operations Research Office of Johns Hopkins University. ORO is under contract to the Army for long-range scientific research.

The agenda, according to Dr. Johnson, will include the effect of atomic weapons on tactics and supply, the tactical refinements required for most effective use of atomic weapons, and many problems of mobility, communications and command associated with atomic land warfare. These considerations will be applied to the requirements of both general and limited wars.

Sizable Payments to Small Firms

Small business firms, during the period July-December, 1956, received almost as much in payments for defense subcontracts from 163 reporting firms as was awarded to small business in new prime contracts during the same period, the Department of Defense announced recently.

Information based on data submitted by only 163 of the large firms participating in the Department of Defense Small Business Subcontracting Program,

COMMAND CHANGES



U. S. Army

General Lyman L. Lemnitzer
Vice Chief of Staff, D/A



U. S. Army

General Williston B. Palmer, Deputy Commander-in-Chief, USEUCOM



U. S. Army

General I. D. White
Commander-in-Chief, USARPAC

indicated that payments to first-tier subcontractors of those firms totaled $1.430 billion in the six-month period as compared to $1.616 billion awarded to small business firms in the form of prime contracts during the same period.

This program was established to enlist the assistance of large prime contractors in furthering the Defense Department policy of assuring that a fair share of all subcontract and prime contract purchase of supplies and services be awarded to small concerns.

Companies which participate in the program do so on a voluntary basis, undertaking to afford small business concerns an equitable opportunity to compete for defense subcontracts which are within their capabilities.

2d Armored Cavalry Regiment on Television

The 2d Armored Cavalry Regiment, stationed at Fort George G. Meade, Maryland, will present an armored attack problem during the 8th Armed Forces Day program to be held at Andrews Air Force Base on May 18 and 19. The attack problem will be one of the demonstrations televised by the Columbia Broadcasting System on Sunday, May 19, from 4 P.M. to 5 P.M. Eastern Daylight Saving Time.

The World War Tank Corps Association Convention

The World War Tank Corps Association will hold their 1957 Convention at Atlantic City, New Jersey during the period 16-19 September it was recently announced.

This group, founded in 1918, was responsible for the successful sponsoring of the Patton Memorial stamp. Their major project at the present time is the adoption of a "Combat Tanker's Badge." This subject will be brought up during the forthcoming convention. For further information contact the National Adjutant, who is: Mr. Tom White, 708 North Wallace Street, Indianapolis, Indiana.



Schalk Studios

Brig. Gen. Almerin C. O'Hara
CG, 27th Armored Division, NYNG



U. S. Army

Maj. Gen. Ronald C. Brock, C/S, Military & Naval Affairs, State of NY

First Titanium Status Report

Substantial progress has been made toward commercial production of titanium sheet alloys with strengths 30 to 50 percent greater than previous alloys, the Department of Defense announced recently.

Titanium alloys in commercial production are urgently needed in the aircraft industry for structural materials necessary in the development of high performance aircraft and missiles.

To date, under the Defense Department titanium sheet rolling program, commercial size ingots have been melted, and production of sheet has begun in the plants of three producers.

This is revealed in the first Status Report on the program compiled by the Titanium Metallurgical Laboratory of Battelle Institute. The report covers the first six months of a joint Army-Navy-Air Force program, coordinated by the Department of the Navy under the auspices of the Department of Defense Steering Group on Titanium Research and Development.

Purpose of the Defense sheet-rolling program is to make heat-treatable alloys commercially available years earlier than the usual pace of development would permit and substantially shorten the time required for titanium to become economically competitive as a structural material.



U. S. Army

General George H. Decker
Commander-in-Chief, UN Command



U. S. Army

Major General W. P. Johnson
CG, 2d Armored Division



U. S. Army

Major General C. Stanton Babcock
Chief, MAAG-France

news from
THE US ARMY ARMOR SCHOOL

Course in Methods of Instruction for Officers of the Army Reserve

Four courses in methods of instruction will be conducted at the US Army Armor School during calendar year 1957 for officers of the United States Army Reserve.

The purpose of the course is to instruct Army Reserve officers in the organization, administration, and conduct of courses in methods of instruction.

The schedule of classes is as follows:

Class Nr	*Reporting Date*	*Closing Date*
1	5 May 57	17 May 57
2	9 Jun 57	21 Jun 57
3	18 Aug 57	30 Aug 57
4	29 Sep 57	11 Oct 57

Administrative instructions pertaining to the course are contained in letter, ATTNG-RC 352/5 (Armor School) (15 Mar 57), Hq, US CONARC, 15 March 1957, subject: "Course in Methods of Instruction for Officers of the Army Reserve" (Reports Control Symbol ATTNG-166).

M51 Heavy Recovery Vehicle

The Automotive Department, US Army Armor School, recently received two M51 heavy recovery vehicles. These vehicles were designed to recover the M43 heavy tank but would, of course, recover all other lighter tank-like vehicles. Limited instruction is now being given to both integrated and specialist classes on this vehicle.

Interesting characteristics of the M51 are:

Weight—120,000 pounds

Boom capacity—30 tons retracted; 15 tons extended

Boom traverse—60°

Main winch capacity—100,000 pounds

Engine—AVSI 1790-6 (1040 hp)

Transmission—XT 1400-2A

Speed—30 MPH

Stream Crossing Capabilities of the M59 Armored Personnel Carrier

Training Text 17-1-1, Appendix V, paragraph 3, states that the maximum stream velocity in which the M59

KEY PERSONNEL CHANGES

Colonel Emett R. White recently succeeded Colonel Walter B. Richardson as the US Army Armor Center Chief of Staff. Colonel Richardson's new assignment is in the Department of the Army, Washington, D. C. and he will be subsequently assigned in Germany.

Colonel White has been serving as Director of Instruction, US Army Armor School.

Lieutenant Colonel William J. Boehmer, former Deputy Director of Instruction, has assumed his new duties as Director of Instruction.

armored personnel carrier can be safely operated depends on such factors as the choppiness of the water, the amount of debris or ice in the water, and the maximum downstream drift distance acceptable for landing. When the rate of flow is greater than six miles per hour, particular attention must be given to drift distance, balance of load, entry into the water and ability of the drivers.

The above paragraph would not apply to administrative or logistical movements where the necessity for taking a calculated risk did not exist.

Fuel Injection Training at The School

Students attending future Integrated and Specialist courses of instruction, conducted by the Automotive Department of the US Army Armor School, will receive instruction on fuel injection with particular emphasis on the AIV 1790-8 engine of the Tank, 90mm Gun, M48A2. One of these tanks is presently in the department; and additional tanks, already on post, will be received shortly. To facilitate the training of the department's instructors on the differences between the M48A2 and earlier models of the M48, a team from the Ordnance Tank-Automotive Command is presently conducting a special course for instructors in the Automotive Department area. An interesting sidelight on the characteristics of the M48A2 is that, due to the changes which necessitated certain hull modifications the weight of this tank has been increased by two tons.

A Tank Turret Trainer Publication

A new publication NAVEXOS P-1326 entitled "Operation and Maintenance Guide for M47 Tank Turret Familiarization and Communications Trainer, Device 3-T-47" has been published by the US Naval Training Device Center, Port Washington, Long Island, New York. Units interested and equipped with these devices may secure copies of this guide through training aid subcenters or normal supply channels.

THE US ARMY ARMOR SCHOOL HONOR GRADUATES

The following students received top scholastic honors of their classes (listed in order of rank in the class):

Associate Armor Officer Advanced Course Class Nr. 2

Capt Louis C. Taylor, Hq 173d Tk Bn, Tenn NG, Columbia, Tennessee; Capt Lloyd A. Epperson, Calif NGUS ADGRU (6513), W/Sta Salinas, Cal.; Maj James R. Miller, OACSI, Washington, D. C.

Armor Officer Basic Course Class Nr. 4

2d Lt Donald E. Nicholson, OS Repl Sta, Pers Cen (6020), Oakland Army Terminal, Oakland, Cal; 2d Lt James E. Thomas, USATC Armor, Fort Knox, Ky.; 2d Lt Marlin C. Lang, 3d Inf Div, Fort Benning, Ga.

Armor Officer Basic Course Class Nr. 5

2d Lt Jackson L. Sigler, Jr., USA Spt Gp, Washington, D. C.; 2d Lt Gerald L. Speth, 9th Inf Div, Ft Carson, Colo; 2d Lt Curtis D. Wilkinson, 4th Armd Div, Ft Hood, Tex.

Armor Officer Basic Course Class Nr. 6

2d Lt Robert R. Dommergue, Hq, USATC Armor, Ft Knox, Ky; 2d Lt Ellis C. Rainey, Jr., 1st Armd Div, Ft Polk, La; 2d Lt Victor J. Bissonette, Jr., Hq, USATC Armor, Ft Knox, Ky.

Armor Communication Officer Course Class Nr. 2

1st Lt Jack C. Howard, 4th Armd Div, Ft Hood, Tex; 1st Lt Samuel A. Roberts, OS Repl Sta, Pers Cen (1264), Ft Dix, NJ; 2d Lt Frederick O. Jacobson, 35th Tk Bn, 4th Armd Div, Ft Hood, Tex.

Armor Advanced NCO Class Course Nr. 4

SFC John J. Hamm, 44th Tk Bn, 82nd Airborne Div, Ft Bragg, NC; Sgt Leon T. Doutrich, H&S Co, 894th Tk Bn, Ft Knox, Ky; M/Sgt Stephen T. Wilson, H&S Co, 157th Tk Bn, Texas NG, Houston, Tex.

Armor Communication Supervision Course Class Nr. 3

Sfc William J. James, Hq Co, 3rd Bn, 2nd Armd Cav, Ft George G. Meade, Md; Sp-3 Robert W. Hootman, Hq & Hq Co CC "C," 1st Armd Div, Ft Polk, La; Sgt Eugene Montgomery, 5th Recon Co, 5th Inf Div, Ft Ord, Calif.

Armor Automotive Supervision Course Class Nr. 3

Sp-2 James Armstrong, Hq & Hq & Svc Co, 4th Tk Bn, 1st Armd Div, Ft Polk, La; Sp-2 Louis L. Byers, Hq & Svc Co, 634th Armd Inf Bn, 1st Armd Div, Ft Polk, La; Sgt Marvin E. Hollenbaugh, 35th Tk Bn, 4th Armd Div, Ft Hood Tex.

Armor Track Vehicle Maintenance Course Class Nr. 7

Pvt Richard A. Hetherington, Svc Co, 11th Armd Cav, Ft Knox, Ky; Pvt Frank E. Wesley, Jr., Hq Co, 1st Bn, 11th Armd Cav, Ft Knox, Ky; Pvt Douglas E. Koehl, Hq & Hq Co, 11th Armd Cav, Ft Knox, Ky.

Armor Track Vehicle Maintenance Course Class Nr. 8

Pvt Harlow R. Mills, Co C, 126th Armd Ord Bn, 4th Armd Div, Ft Hood, Tex; Sp-2 Luther F. Paben, Co A, 136th Tk Bn, Tex NG, Rosenberg, Tex; Pvt Harry M. Clinton, 451st AAA Bn (75MM Gun), March AFB, Calif.

Armor Radio Maintenance Course Class Nr. 5

Pvt Robert D. Fenn, M Co, Sch Regt, US Army Armor School, Ft Knox, Ky; Pfc James D. Zimmerman, 16th Armd Eng Bn, 1st Armd Div, Ft Polk, La; Pvt Kenneth J. Ames, M Co, Sch Regt, US Army Armor School, Ft Knox, Ky.

FROM THESE PAGES

65 Years Ago

During our Civil War there was created a body of cavalry which, in this country, we consider the finest for practical use that has ever been in existence. And it may safely be said that this opinion is today shared by many prominent military authorities abroad. Although it was at first regarded with contempt and considered not be to cavalry at all, yet it did combine, in the highest degree, the attributes which must be possessed by successful mounted troops in future wars. That this fact is recognized abroad is shown by the fact that their cavalry of today is becoming more and more as was ours at the close of the war, when it was ready to either dismount and hold a position against infantry or engage in a dashing saber charge against cavalry.

In our opinion the ideal cavalryman of the future should be able to maintain himself under all circumstances, and if necessary, operate with perfect independence of the other arms, excepting, of course, its own horse artillery. Armed with a saber, long-range repeating carbine or light rifle and revolver, he will be equally prepared for a charge on the battlefield or for holding his own on reconnaissance duty, even against infantry. As for the need of heavy and light cavalry, the former for the charge and the latter for the work of security, it is hard to see the necessity for the distinction. When charging is to be done it is not likely to be against masses, where the weight of the horse will tell as much as formerly, but against scattered men, in which agility will be likely to count more than weight.

First Lieutenant George W. Van Deusen

The Tactical Use of Mounted Troops

50 Years Ago

The editor of the JOURNAL has from time to time received letters from members asking for certain things, such as the abolition of the colored advertisement pages. The reply is simple; the JOURNAL is a business proposition and intends to furnish the best material for reading that can be done for our service. This means expense which must be met. When all cavalry officers are subscribers to the JOURNAL, pay their dues in advance, are willing to meet occasional calls besides the two dollars dues, then perhaps the business acumen of the editors and managers may be criticised; but any criticism until this is accomplished will receive but scant consideration.

A more important criticism is the wish to return to an absolutely technical journal. As published today, the CAVALRY JOURNAL is practically a service journal. It has departed quite considerably from a technical publication. But the JOURNAL today is what the officers make it. Good material is published as we receive it from time to time. If the members of the association desire to retain the technical features of the JOURNAL more technical matter must be submitted to the editor. It seems that the present trend of study among our cavalry officers is a reaching out and assimilating of the duties of other branches, and then a coordination of the whole. The JOURNAL, it is believed, has always reflected quite faithfully, the prevailing subjects of investigation and study in the cavalry at any one time.

Captain Herbert A. White

Secretary's Annual Report, United States Cavalry Association, 1906

25 Years Ago

And the American artillery man as he sends fire data to his battery from his OP may well pause to pay honor and respect to Kosciuszko—the Father of American Artillery.

A worn and faded manual which now reposes in the Library of Congress at Washington is the testimonial of his services to the artillery. The "Maneuvers of Horse Artillery" adapted to the service of the United States was prepared by Kosciuszko at Paris in 1800, at the request of General William R. Davie, then American Minister to France. Translated by Colonel Jonathan Williams eight years later, a copy of the manual was presented to President Jefferson, who despite his ideas of peaceable coercion had nevertheless the foresight to realize that a time might come when the field artillery manual would speak in eloquent terms. That time was at hand. In 1812 the United States and Great Britain were at war, and with no system of artillery instructions except those prepared by Kosciuszko. The manual was then purchased from the West Point Philosophical Society for $200, and the "exercises for cannon" and "maneuvers for horse artillery" were officially distributed to the service by the War Department with the now time-worn formula "for the information and guidance of all concerned."

Elizabeth Camille Brink

Kosciuszko the Patriot—Father of American Artillery

10 Years Ago

This plan called for three equal combat commands. The three rifle companies and the three medium tank companies in each combat command were welded together into what may be called three armored organizations. The tank and the infantry half-track and personnel now became one squad. It consisted of five men inside the tank and 10 men outside the tank. Sometimes on the tank. But the men outside had one job—stay with that tank. Their primary mission was to fight with the tank while their presence near the tank offered some protection from enemy individual weapons, such as the bazooka, magnetic charge and the hand grenade. Their secondary mission was to dig the enemy out of foxholes, cellars and houses. We called it the armored squad.

The armored infantry platoon contained five squads which made an equal union with the tank platoon. The mortar and machine-gun squads in the infantry very seldom used their crew-served weapons in this formation. They became rifle squads, and the armored company of three platoons.

Each company now had two captains, each platoon two lieutenants, and each squad two sergeants. At first thought, surely this would be too many commanders. And another thing, how would these three large companies be divided between the two battalion staffs?

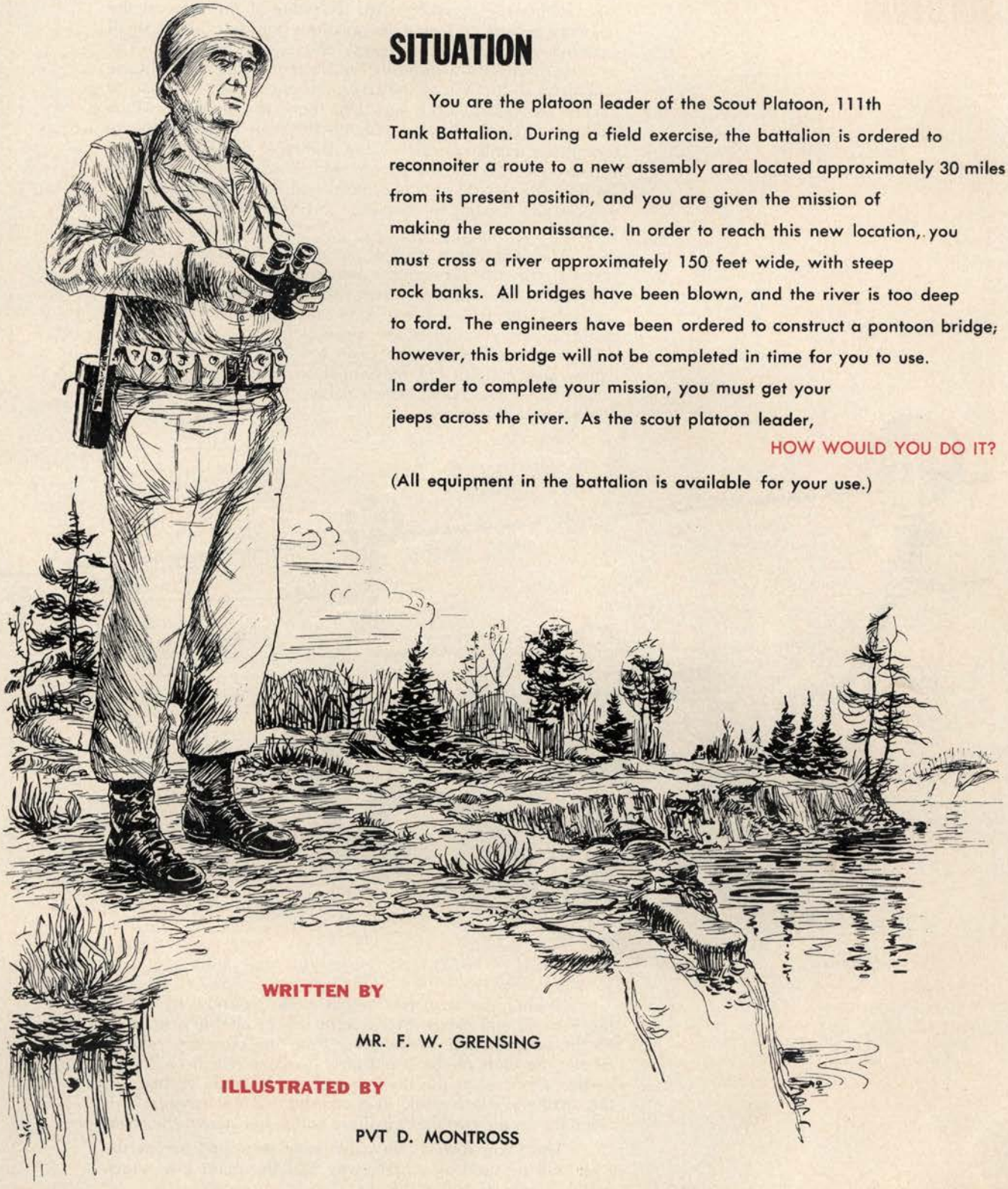
Now, looking back at that situation, those were not questions at all. The combat commander gave two of these companies to the tank battalion staff and one to the infantry battalion staff. The other attachments were divided evenly which resulted in a light task force and a heavy task force in each combat command.

Major Emerson F. Hurley

Tank-Infantry Teamwork At Its Peak In The Armored Division

HOW WOULD YOU DO IT ?

A presentation of the United States Army Armor School



SITUATION

You are the platoon leader of the Scout Platoon, 111th Tank Battalion. During a field exercise, the battalion is ordered to reconnoiter a route to a new assembly area located approximately 30 miles from its present position, and you are given the mission of making the reconnaissance. In order to reach this new location, you must cross a river approximately 150 feet wide, with steep rock banks. All bridges have been blown, and the river is too deep to ford. The engineers have been ordered to construct a pontoon bridge; however, this bridge will not be completed in time for you to use. In order to complete your mission, you must get your jeeps across the river. As the scout platoon leader,

HOW WOULD YOU DO IT?

(All equipment in the battalion is available for your use.)

WRITTEN BY

MR. F. W. GRENSING

ILLUSTRATED BY

PVT D. MONTROSS

SOLUTION

This crossing can be efficiently, quickly, and safely made if you will use the M74 recovery vehicle, with its on-vehicle materiel and equipment, and at least 300 feet of small fiber rope (or an equivalent substitute) in transporting your vehicles across on a cable-way.

Position the recovery vehicle about 20 feet from the water's edge, facing the river. Lower its spade, and drive up on it.

Attach one end of the rope to a man and have him swim the river, pulling out the rope from the bank. When the swimmer reaches the opposite bank, have one of the crew at the recovery vehicle to fasten the auxiliary winch cable, a small snatch block, and a short length of chain to the rope. The swimmer now on the opposite bank can pull the cable, block, and chain to his side of the river. He must use the chain to anchor the snatch block and then reeve the auxiliary winch cable through the block. Leaving the rope fastened to the end of the auxiliary winch cable, the crew can now pull the rope back across to the recovery vehicle side of the river, thus bringing the auxiliary winch cable end back to the recovery vehicle and leaving the two-part auxiliary winch line across the river.

The next step is to reel out approximately ten feet of boom winch cable through the main tow winch fairlead rollers, then fasten the main tow winch cable, the boom winch cable, and a V-chain with a heavy-duty clevis (shackle) to the end of the auxiliary winch cable. Reeling in the auxiliary winch cable while reeling out the main tow and the boom winch cables in a coordinated movement, will pull the main tow winch cable, the boom winch cable, and the V-chain with clevis across the river.

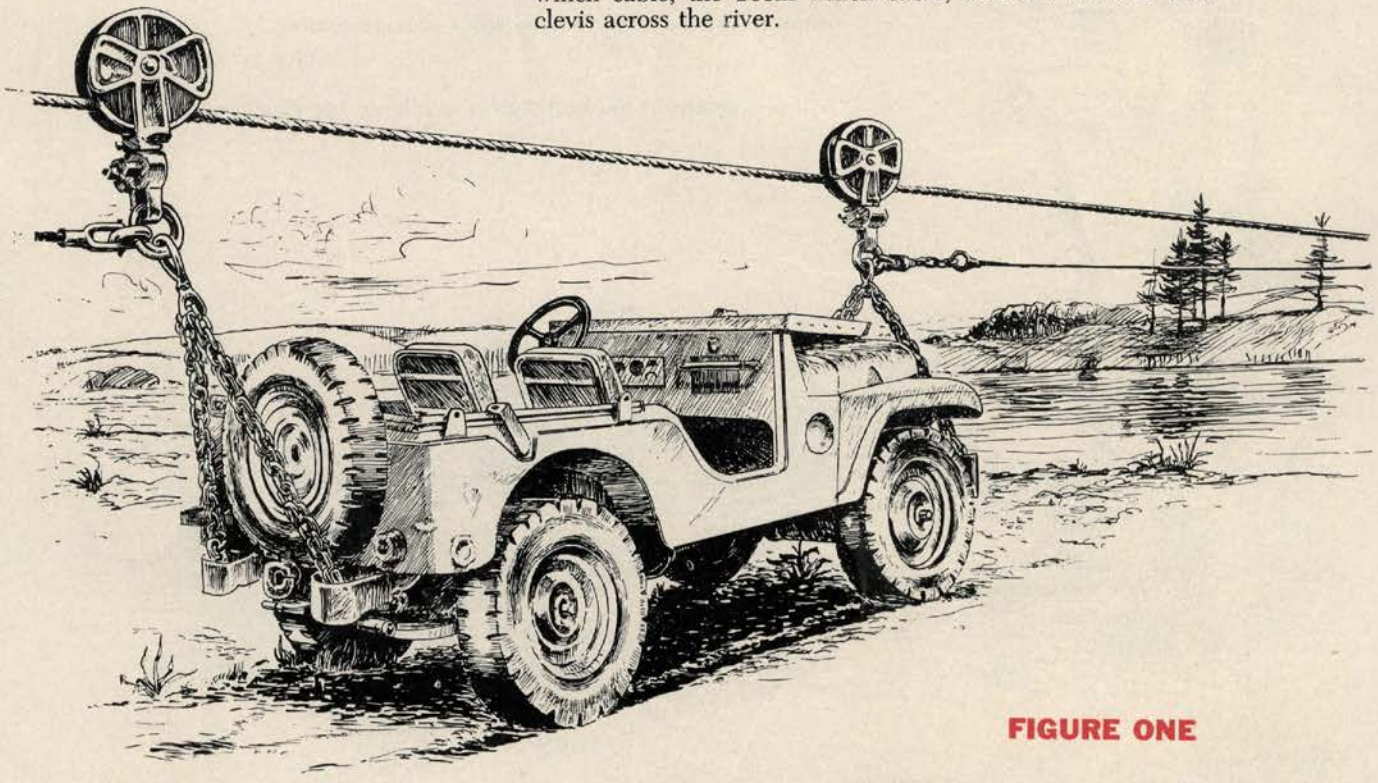


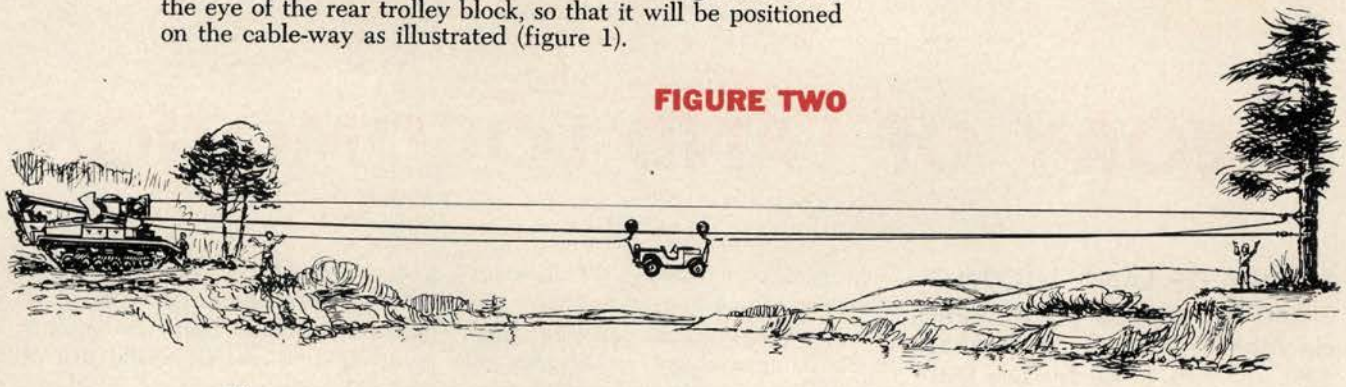
FIGURE ONE

Anchor the main tow winch cable securely, by use of the V-chain and clevis, to a tree or other suitable anchorage on the opposite side of the river from the recovery vehicle. Fasten the ends of the boom and auxiliary winch cables together, and reel in the boom winch cable while reeling out the auxiliary winch cable in a coordinated movement. This again leaves the two-part auxiliary winch line across the river.

The main tow winch cable now stretched across the river will be used as a cable-way and the main tow winch snatch blocks as trolley blocks.

The vehicle which is to be transported across the river must now be positioned under the cable-way. Engage the main tow winch and reel in enough cable to allow the vehicle to be driven under and parallel with the cable-way. Then engage the main tow winch and reel out enough cable to allow it to sag down over the front and rear of the vehicle, so that the snatch blocks can be rigged on the cable-way. After rigging the snatch blocks on the cable-way, one in the front and one in the rear of the vehicle, chain the front of the vehicle by its lifting shackles to the eye of the front trolley block and the rear of the vehicle by its lifting shackles to the eye of the rear trolley block, so that it will be positioned on the cable-way as illustrated (figure 1).

FIGURE TWO



The next step is to attach the auxiliary winch cable end (rigged from the anchored snatch block on the opposite side of the river) to the eye of the front trolley block for pulling, and to attach the boom winch cable end to the eye of the rear trolley block for holding.

Engage the main tow winch, and reel in its cable until about five feet of deflection (slack) remains in the cable-way. This will raise the vehicle off the ground. Then engage the auxiliary winch and reel in its cable; at the same time, with a coordinated movement, engage the boom winch and reel out its cable, thus pulling the vehicle across the river on the cable-way as illustrated (figure 2). Slacking up on the cable-way, by engaging the main tow winch to reel out cable, will lower the vehicle to the ground after it reaches the opposite side of the river. It is then disconnected from the trolley blocks and driven away.

To return the trolley blocks to the recovery vehicle side for transporting the next vehicle, chain the blocks together by their eyes. Then place the auxiliary winch control in the free-spooling position, and engage the boom winch to reel in its cable. The rigging, once in place, can be used to transport as many vehicles as necessary.

CAUTION: Extreme care must be exercised not to overload the cable-way. Never exceed a load of six tons with less than a 5-foot deflection on a 200-foot span when employing the M74 recovery vehicle main tow winch as a cable-way. To determine the approximate amount of stress that a load places on a cable with a 200-foot span and a 5-foot deflection, with the load supported in the center, multiply the weight of the load by 10.

NOTE

If the terrain does not afford sufficient elevation for the operation as described, position A-frames, one at each end and under the cable-way, to support it to the desired height. To construct an A-frame, obtain two poles large enough in diameter to support the weight and long enough for the desired elevation, cross the poles at their tops, and lash them together with chain. The spread of the legs should be about one half the height of the A-frame; to prevent further spreading, connect the legs with chain. The A-frame should also be guyed from the top to a suitable anchorage. If the banks are gently sloping and the stream is not too swift, the ¼-ton trucks can be ferried across on M59 armored personnel carriers.

The Book Section

THEORY OF LAND LOCOMOTION

THEORY OF LAND LOCOMOTION: The Mechanics of Vehicle Mobility. By M. G. Bekker. 520 pp. Published by The University of Michigan Press, Ann Arbor, Michigan, $12.50.

Reviewed by

RICHARD M. OGORKIEWICZ

FOR more than half a century, from the inception of the motor vehicle until recently, progress in the automotive field has relied largely on empirical activity and to a limited extent only on the more scientific, analytical methods. Much has been accomplished by this empirical, trial-and-error development and there is nothing wrong with the way many practical answers have been hammered out in advance of analysis. However, the time taken to bring in the latter and to get down to the fundamentals of vehicle mechanics has been inordinately long. Consequently, in the absence of a clear understanding of the physical nature of the vehicle, design progress was apt to be restricted in scope and outlook.

Moreover, the empirical, trial-and-error methods, to which so many automotive engineers are still firmly wedded, are inherently slow and costly. In fact, their cost is often prohibitive. This was the case with aircraft, where they had to be abandoned years ago in favor of the more rational methods which have made possible the tremendous progress of recent years.

A similar rate of progress may not prove feasible on the ground. But whether it will or not, there is much to be done. The scope for research and development will be appreciated all the better when it is realized that, in many ways, automotive engineering is no further now than aeronautical technology was in the twenties.

The problem is fortunately beginning to be seriously tackled. Examples of a more rational approach and of an automotive philosophy based on fundamentals are provided by the work being carried out at the Cornell Aeronautical Laboratory on car stability and control, at the Harvard School of Public Health on the human engineering aspects of vehicle systems and at the Land Locomotion Laboratory, Detroit Arsenal, on off-the-road locomotion. The latter is of particular interest from the military point of view and especially that of armor. Work in this field is all the more important because the study of off-the-road vehicle problems has been among the most sadly neglected.

Colonel Bekker's "Theory of Land Locomotion" is, in fact, the first book on the fundamentals of off-the-road vehicles to be published in English. For this reason alone it is very welcome. Moreover, it comes from an author who is the Technical Director of the Land Locomotion Laboratory and one of the pioneers in the application of rational methods to the de-

The Reviewer



Rimis

Richard M. Ogorkiewicz graduated from the Imperial College of Science, London University, in 1946 and was subsequently assigned there on research and lecturing. He then held several positions with the Ford Motor Company, England. He is now with the Rootes Group where he is working on long-term automotive design projects. He has written extensively on Armor and has gained international fame in this specialized field.

The Author



U. S. Army

Lieutenant Colonel M. G. Bekker (Canadian Army, Ret.) graduated from the Warsaw Institute of Technology, Warsaw, Poland. A noted writer in his field, he has been a staff member of Operations Research Office, Johns Hopkins University, and head of research in vehicle mobility, Canadian Department of National Defense. He is presently the Technical Director of the Land Locomotion Research Laboratory, Detroit Arsenal, Michigan.



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The shape of contact area between vehicle and ground is important in propulsion, or, in other words, tractive effort.

velopment of off-the-road vehicles. It is further coupled with more than thirty years' work on armored vehicles, with which Colonel Bekker has been associated ever since he received his engineering degree from the Warsaw Technical University—first in Poland, then in Canada and more recently in the United States.

With this unique experience, the author is well qualified to present the basic principles of off-the-road vehicles and to analyze their main problems. It is characteristic of his systematic approach that the book opens with a broad survey of the various modes of ground locomotion, human and animal, as well as vehicular. Many of these are intensely absorbing in themselves and lead to some rather startling comparisons, such as the resemblance noted by Colonel Bekker between certain phases of the operation of a torque converter and the movement of a snake!

The survey of locomotion in nature has, however, a much more general and practical purpose. It shows that the methods with which we are familiar and which we are apt to accept without question are not always the most efficient. It reminds us also that the evolution of transportation based on the wheel—which embraces both wheeled and tracked vehicles—has been tied largely to hard and, more often than not, prepared surfaces. The requirement that vehicles should move freely off-the-road, over relatively soft ground, is relatively recent and demands the re-examination of many time-honored ideas.

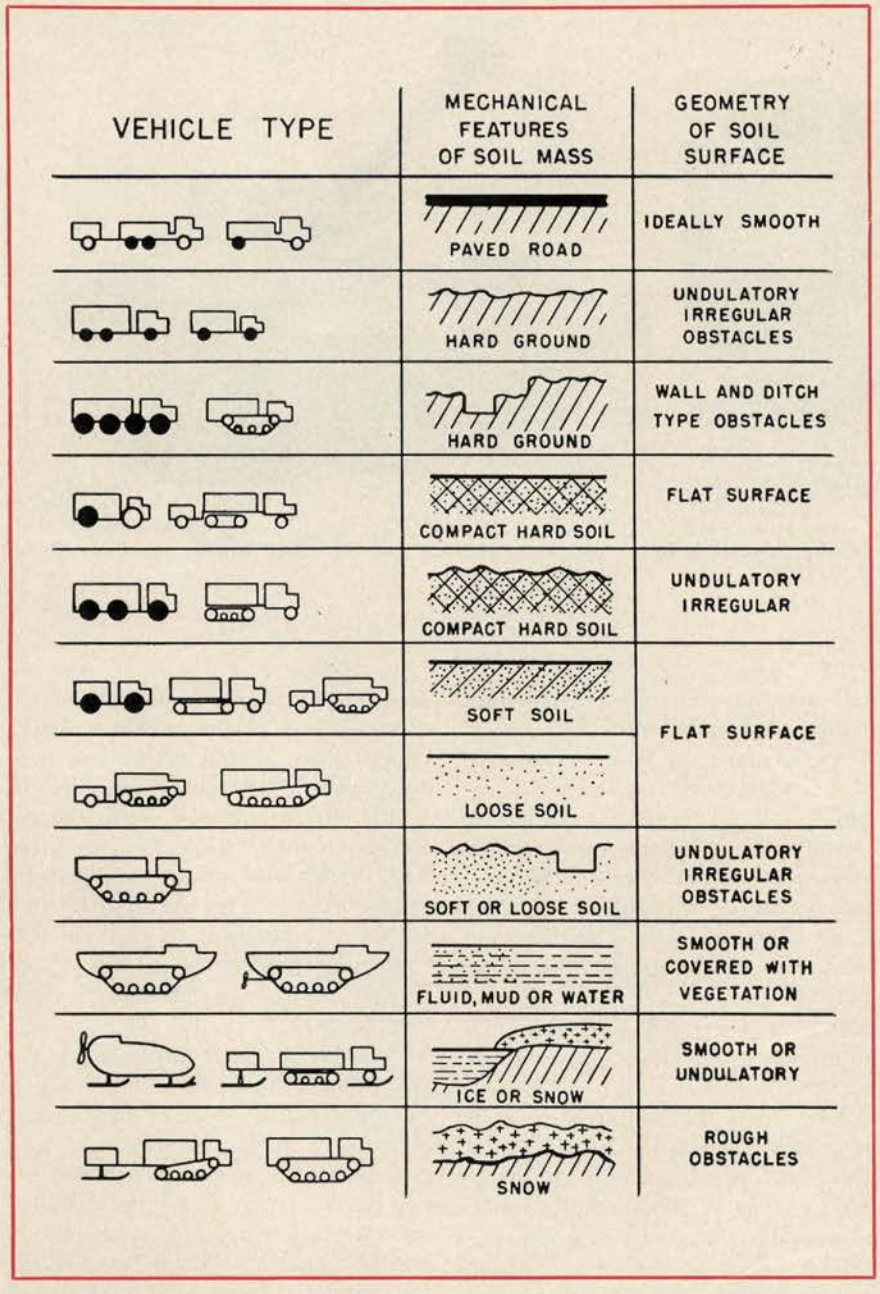
An examination of the evolution of wheeled and tracked vehicles, which follows, leads the author to conclude that, whereas further improvement in the efficiency of vehicles operating on roads or rails depends primarily on the development of the latter and traffic control, rather than vehicles themselves, off-the-road vehicles leave room for substantial improvement in their operating efficiency.

That there is room for improvement is supported by an analysis of the forms which present day vehicles have taken. No general solution emerges from it, nor could one reasonably expect it, but it is apparent that the form index of many vehicles, especially tracked, is unfavorable. In particular, many of them are shown to be shorter in relation to their width than they ought to be, though it is recognized that an upper limit to the length of tracked vehicles is imposed by the existing methods of steering.

More immediate improvements are likely to come by way of detailed studies of the characteristics of the surfaces on which vehicles have to operate and to which Colonel Bekker next turns his attention. Soil and snow mechanics need to be carefully studied to derive the pattern of stresses and strains when a vehicle passes over the ground. The problem is not easy and involves many factors, such as the properties of the different types of surfaces, ranging from the frictional sandy soils to the cohesive plastic clay or snow, as well as the characteristics of the vehicle. The answers which emerge are well worth the effort, however, as they bring out the basic features of off-the-road vehicle operation. They are particularly useful when related, as they are in the following chapters, to the two main categories of wheeled and tracked vehicles.

Probably the most important single point which comes out of it all is the importance of the form of the contact area between the vehicle and the ground. That is, the importance of the shape of this area—generally described by its length to width ratio—and not merely its total size. Thus, the widely accepted concept of "flotation" and the tacitly associated idea of "low ground pressure," arrived at by dividing the vehicle weight by a large enough nominal contact area between the track and the ground, are shown to be not only inadequate but often actually misleading.

The shape of this contact area is important enough in connection with the bearing capacity of frictional type soils under static load. It becomes of paramount importance, however, from the point of view of the forces necessary to propel the vehicle, or, in other words, tractive effort. This is shown clearly by an analysis of the tracked vehicle, where the length of the contact area, *i.e.*, the length of the track, governs the amount of track slip. The



longer the track, the smaller in general is the slip and the greater, therefore, the tractive efficiency.

The importance of the contact area applies equally well to wheeled vehicles, where the length of the tire contact patch depends principally on the outside diameter of the tire. The larger this diameter the greater the tractive effort which a wheel can handle efficiently and the smaller also the rolling resistance—facts which passenger car engineers, as well as designers of off-the-road vehicles, have all too often ignored.

Consideration of the relative ground contact areas goes a long way also toward clarifying the perennial question of wheels versus tracks. In particular, it makes clear that wheels can provide adequate flotation by increased width of tire but that traction generally requires large tire diameters, to which there are obvious practical limits. It is clear, therefore, that for heavier weight vehicles which are to operate over soft ground, tracks are essential and that wheeled armored vehicles are most competitive in the light weight category.

While wheeled and tracked vehicles have much in common, skis, sleighs and toboggans present rather special problems which are dealt with in a separate chapter, together with the associated snow and ice properties. Elsewhere, amphibious vehicles also receive special attention.

Together with wheels and tracks, skis complete the author's analysis of the basic elements of ground vehicles and leave the way open for an examination of the mechanics of the vehicle as a whole. This brings in such important questions as weight distribution, suspension, steering of a tracked vehicle and the general configuration of vehicles.

The last is particularly important from the point of view of the geometry of the ground—a factor which tends to be overlooked. Nevertheless, waviness of the ground, natural obstacles, and the pitching and bouncing which these produce, can and do impose a severe limit on the mobility of vehicles. Unless their influence on the vehicle and its human occupants can be reduced, no amount of engine power will, in fact, increase the cross-country speed of a vehicle beyond the present level. Nor will increased engine power be of any use if it exceeds what the wheels or tracks can handle efficiently, for otherwise most of it will only be wasted in wheel or track spin.

The limitations imposed by the geometry of the ground and the properties of its surface explain the apparent anomaly that the cross-country speed of low powered vehicles is often no different from that of others with much higher power-to-weight ratios. In fact, of course, maximum engine power and maximum speed on hard ground have little bearing on the maximum average cross-country speed, which does not exceed 10 miles per hour for present day vehicles. A corollary to this is the fact that many existing off-the-road vehicles are overpowered.

Such overpowered vehicles are obviously uneconomical. A striking example given by Colonel Bekker shows that a low powered vehicle of superior configuration can actually cover a given cross-country distance more rapidly than another higher powered and ostensibly faster vehicle. High powered engines can, therefore, accomplish little by themselves—except to burn up fuel! As far as the latter goes, one could not agree more with the author's emphasis on the importance of fuel economy in cross-country operations where vehicles and units have to carry much of their fuel with them. One might only add that a further and immeasurably great-

er premium will be placed on fuel economy on any future atomic battlefield.

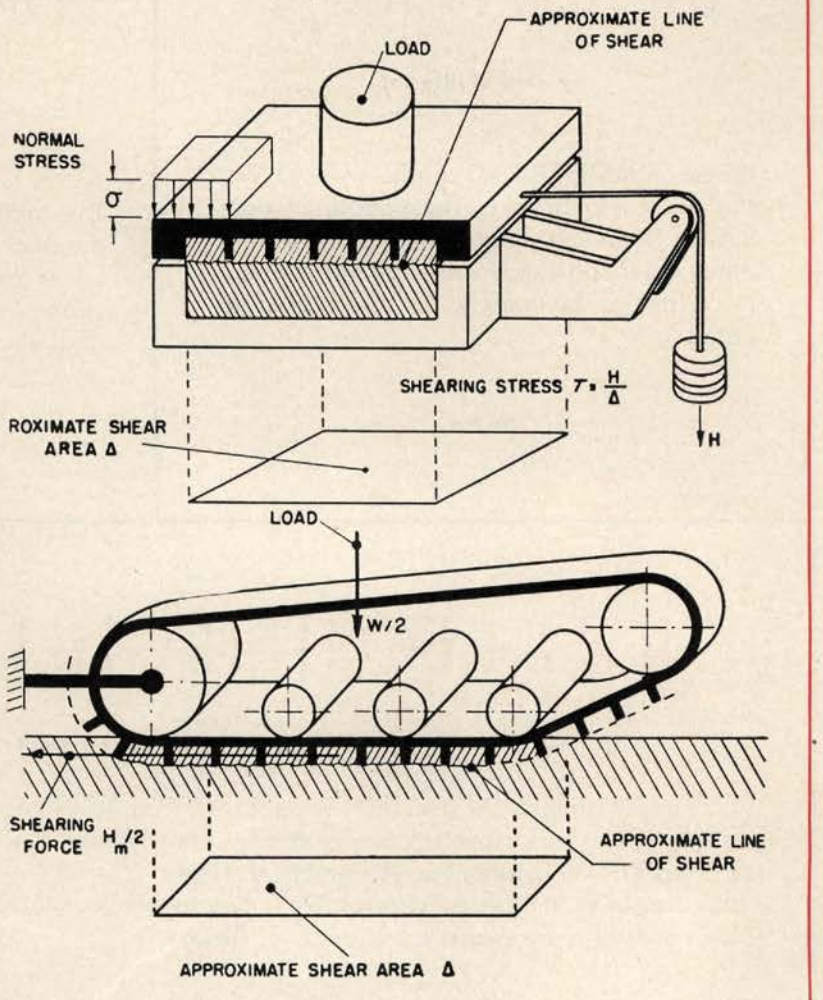
To bring about a much needed improvement in the average cross-country speed, which is in effect the operational speed of off-the-road vehicles and armored units, will require several things: a better adaptation of vehicle form through further study of vehicle configuration, greatly improved suspension systems and possibly stabilization of the whole of the crew compartment. It will also require further study of the geometry and surface of the ground. This emphasizes the need for a definition of terrain cross sections and an agreed soil classification which are at present lacking and which hamper a proper assessment of the influence of the geometry of the ground and the prediction of soil trafficability.

Problems connected with trafficability, performance and economy are discussed at some length and there are several pointers toward a rational choice of vehicles for different conditions. A good example of the latter is a pictorial summary of the problem of cargo carriers and tractor-trailer units, which shows something of the variety of ground conditions and vehicular solutions and which is also typical of the many excellent diagrams contained in the book. *See diagram on the opposite page.*

As a final contribution toward the understanding of off-the-road vehicles, the author deals with scale model testing and dimensional analysis which form a powerful tool for further research and development. Last, but not least, comes a very comprehensive bibliography of no less than 346 references.

In a book of this scope it is probably inevitable that a few inaccuracies should have crept in. For instance, the author ascribes the introduction of rubber tired bogies to the British Carden-Loyd vehicles whereas, in fact, these were used earlier by Walter Christie on some of his vehicles and at least as early on the Vickers A.1, or "Independent," multi-turret heavy tank. He refers also to the Anglo-American Mark VIII tanks of World War I as using electric drive although the regular use of the latter was confined at the time to the French St. Chamond, and the Mark VIII actually had a mechanical transmission. And, unwittingly probably, he perpetuates the myth of the French 3C—the tank which never was, except in the imagination of some contemporary German authorities overexcited by the conversion by the French of one of their ten 2C heavy tanks into a 2C *bis*.

CRAWLERS OF TRACK-LAYING VEHICLES



But it would be pedantic to dwell on such relatively minor points while there is so much else of value in the book. Just how much and the amount of ground covered in general can only be made clear by reading the book itself.

"Reading" should not, perhaps, be taken too literally as far as some parts of the book are concerned. Chapter V in particular, dealing with soil and snow mechanics, involves a fairly advanced level of mathematics. However, this should not deter those who are uncertain of their mathematics, as there is still a good deal which does not require any special preparation. At the same time the mathematical analyses should make the book all the more valuable to those who have to delve into the more technical problems.

The book is thus of interest to the designer of off-the-road vehicles, as well as to the user who wants a thorough understanding of the fundamentals of his equipment. Its possible uses are many, from the formulation of vehicle development policies, through design projects and their evaluation to the planning of mobile operations. Its greatest value, however, is that it offers an integrated analysis of the fundamentals of the soil-vehicle relationship in the light of present day knowledge and a sound rational basis for further progress in off-the-road mobility.

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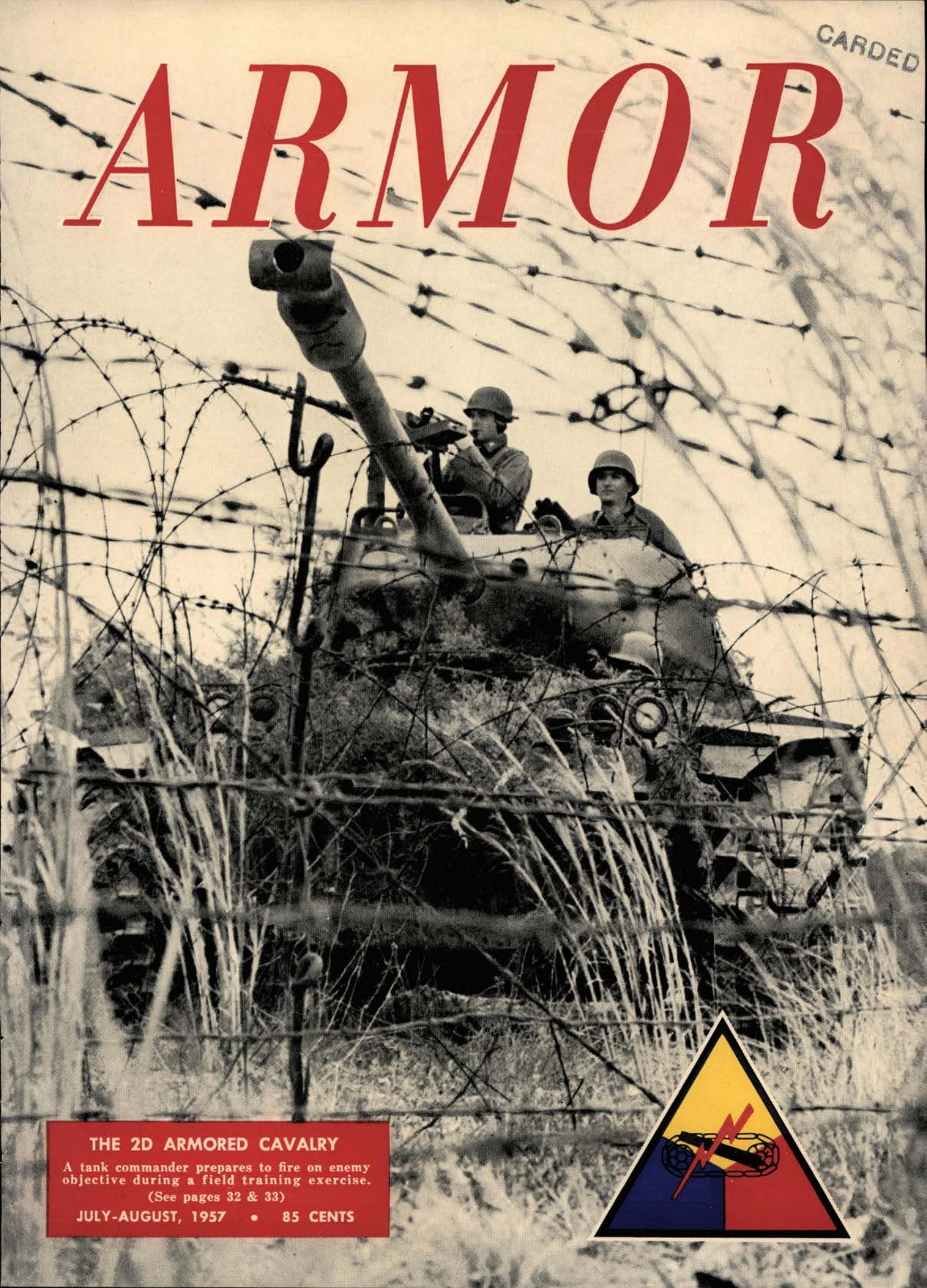


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Reviewed by Colonel John M. Virden, USAF, Retired

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LETTERS TO THE EDITOR

Tanker's Hat

Dear Sir:

I have read with interest several letters concerning the loss of the former distinctive uniform for tankers. I have just read Major Leach's article concerning the Armored Force cap, and fully agree that it should be retained and worn tilted to the left as was previously done.

I also firmly believe that the return of coveralls, the tanker's field uniform (especially the jacket), and the tank boots would not only be good for *esprit* but would be more practical than the usual issue uniform. The old tanker jacket was warmer and was more practical for a tank crewman than the M43 field jacket. And the winter cap couldn't be topped for warmth and comfort by any other issue field cap (especially by the present winter field caps). The pre WWII type coveralls were neat looking and practical and when worn with the Armored Force overseas cap of HBT material made for a very snappy appearance.

I also belive the armor shoulder patch should have been retained for separate Tank Battalions, etc. The wearing of an army shoulder patch tends to identify the wearer as a member of some rear area service unit rather than as one of a proud armor unit.

Let's tilt the caps to the left, and bring back the tanker combat jacket, and the coveralls, etc. Tankers have pride.

CAPTAIN VIRGIL M. GORDON

148th Tank Company
Ohio National Guard
Port Clinton, Ohio

● *Please see the resolution in the Secretary's report of this year's Annual Meeting in the May-June issue. Also the reply from the Chief of Staff in this issue.* ED.

ROTC Awards Stimulate Competition

Dear Sir:

Thank you for the membership card and books for our honor Armor graduate, Mr. Thomas N. Sess.

Mr. Sess has forwarded the completed application blank to your office. His membership in the U. S. Armor Association and the two books awarded to him will be presented at a suitable ceremony.

The U. S. Armor Association is performing an excellent service for outstanding ROTC graduates choosing Armor. I am sure that your acceptance of the nomination of Mr. Sess will stimulate future competition at this University.

COLONEL CARL T. SCHMIDT

PMS&T
University of California
Berkeley 4, California

● *This is one of several letters received from PMS&Ts at institutions instructing in the General Military Science Course. We intend to repeat this practice each year and hope that more colleges and universities will contact us. We also believe that in some small way we are assisting our Army representatives in their important public relations work.* ED.

A Command Vehicle

Dear Sir:

Major Moore's article on the inclusion of a specialized command vehicle in the tank platoon can only meet with sympathy from platoon and troop commanders of all nations.

It is absolutely true that the task of controlling two separate sub-units and one's own mount is too great for efficiency. There is, however, a bigger disadvantage still, to be found in Major Moore's own suggestion. If a platoon consists of six identical fighting vehicles and a radically different vehicle, with lesser powers of self-defense, it is a foregone conclusion that once the enemy finds out what that vehicle's function is, a lot of our platoons will have to operate without any commander at all. Or, rather, command of the platoon will go to the next senior rank who will be mounted in a tank. Anyone who has taken off his rank badges because of snipers, and plenty of us have, will confirm this.

If this is in fact so, only one other course is open, reduce the size of the platoon. A platoon of four tanks enables two to move while two support from hull defilade positions. This provides a 100% reserve in case of tank losses before the ultimate minimum tactical element of two tanks; one firing, one moving, is reached. Otherwise, the present British organization could be used, in which the troop (our platoon—ED.) consists of 3 tanks, commanded by a junior officer, a sergeant, and a corporal respectively. This corresponds to the proposed tank section, and the chain of control is squadron/troop/tank instead of the proposed company/platoon/section/tank, thus removing one link in the chain, and shifting the main burden of command to a more senior, and therefore more highly qualified officer.

However, if Major Moore can answer my original criticism, or if a reduction in tank size and alteration in design makes it possible for the command vehicle to pass as a tank, I shall be the first to applaud, as history shows us repeatedly that efficiency of command is 95% of the victory.

PHILIP BARKER

99 Brentford Road
Kings Heath, Birmingham 14, England

Heritage and Traditions Encourage Reenlistments

Dear Sir:

I enjoy your *Letters to the Editor* section. It gives me a pretty good comparison of my ideas and those of my con-

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Manuscripts: All content of Armor is contributed without pay by those interested in furthering the professional qualification of members of the Armed Services. All manuscripts should be addressed to the Editorial Office, 1757 K Street, N.W., Washington 6, D. C.

Change of Address: All changes of address should be sent to the Editorial Office in time to arrive at least weeks in advance of publication date of each issue, which is the 25th day of the even month of the year: *i.e.*, Dec. 25 for Jan-Feb issue, Feb 25 for the Mar-Apr issue, etc.

Rates: See bottom of contents page.

temporaries. These ideas seem to form a pattern.

Specifically, I am thinking of the junior officer's impressions concerning prestige of Armor, Morale, *Esprit* and other related matters as indicated in the last three issues of the magazine.

Next month begins my fifth year in Armor. In the last four years, two questions stand out. They have been asked many times. The first one is one I have been asked often by my superiors. "Why are so many of you younger officers resigning or failing to renew your categories?" The second question, a familiar topic in *BOQ bull sessions* or at our *Officers Call* at the club, might be one of the answers. This question is: "After our unit identification and traditions have been taken away, what do we have left?" This is stating the question badly. This is making a personal selfish issue of something that must be ignored because of "changes in the service," which we, as officers, must accept.

Is this what we must accept? I am fortunate enough to be in a proud unit with a wonderful history. I am very grateful to the officers in this unit, past and present, for their efforts to maintain the customs and prestige of this unit. In doing so, they have certainly maintained its individuality. In addition to our pride in our own unit traditions and battlefield honors, we also have our old cavalry heritage which every man in the battalion makes an effort to maintain. For this reason, although our state of training and professional aptitude fluctuates to a degree with our training cycles, we have what I consider a comparatively negligible morale problem.

All of this, of course, is an example; probably not the best since I am immodestly discussing my own unit. (*I can think of no better example than when speaking of one's own unit.* Ed.) However, I do believe it will illustrate my point. The junior officer wants this distinctive heritage supporting him!

There have been many fine ideas lately which, if incorporated, would insure this. In my opinion these are some of the better ones: The pentomic concept which brings back the famous old units with their old designations and histories; the drive for prestige in the NCO ranks; the effort to bring back the unit practices such as drills and ceremonies which have been abolished or greatly restricted; the distinctive cap angle for Armored troops (a habit which I would have a very hard time changing); and finally, the distinctive coveralls and beret proposed to identify the tanker as a member of an elite corps.

I would like to see more ideas published on this subject. Since this magazine is a professional outlet what better place could be found to discuss this current and, I believe, very important issue?

First Lieut. John N. Fellabaum

Company C
82d Reconnaissance Battalion
APO 185, New York, New York

A Proposed Command Tank

Dear Sir:

Major Ray Moore's proposal for a better tank platoon (March-April issue) contains some valuable ideas. Certainly the problem he poses is a valid one and something better than the medium tank and/or jeep is needed for the platoon leader's command and reconnaissance functions.

I find it difficult to visualize myself *leading* a platoon of M48's in a 10 ton thinskin. When the attack starts moving that is just what the platoon leader must do—not necessarily from the leading tank, but certainly from well forward in the formation where he can *see* the situation and react quickly.

If we send our platoon leaders out in a variant of the Bren carrier the enemy will soon learn to concentrate on this vehicle in the tank formation. Some platoon leaders will soon be commanding from well back in defilade; the aggressive ones, of course, will grab a tank and get up front. So we are back from where we started.

In my limited combat experience as a platoon leader, and later as a company commander in training, I learned to select a well qualified man, regardless of rank, as my loader and to rely on him to command my tank. A word or two and a pointed finger got my tank where I wanted it (Major Moore comments on this advantage of his proposed command vehicle) and I was free to see my unit and use the radio to control it. The tank commander's rangefinder in the M48 complicated this workable system. Either I used it, to the detriment of my command function, or didn't, sacrificing firepower which a tank platoon could ill afford to lose.

The solution I would propose is a command tank. The M48 turret could readily be adapted by relocating the radio in a fore-and-aft or diagonal position, removing the bustle ready racks, and installing a commander's cupola, giving us a fifth crew position in the left of the bustle somewhat similar to the gunner's seat in the right of the T43 bustle.

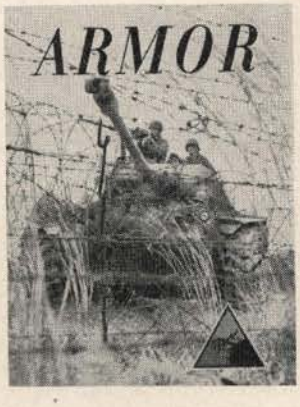
The net result is a tank in which the platoon leader, company commander, or forward observer can do his primary job while a tank commander moves the tank and fights it when necessary. The loss of firepower to the platoon would be slight, amounting only to the loss of a few ready rounds, which should be balanced by the lesser volume of fire normally delivered by the platoon leader's tank. The difference in appearance would be small, possibly not noticeable in combat, and easily compensated for by dummy cupolas on other tanks.

The platoon leader's reconnaissance (and in the case of detached platoons, liaison) problem requires him to have available a small, protected, agile, cross-country vehicle. Major Moore's bantam command carrier would do admirably. Whether these vehicles should be organic to tank platoons or available in a company scout section is, I believe, open to debate.

Going a little beyond the problem posed by Major Moore, I believe a light tank, modified in a manner similar to that proposed above, would be ideal for a battalion and combat command staff tank. On this level increased mobility is more important than the greater protection and combat power of a medium vehicle. It is appropriate for a battalion commander to sit back somewhat and control his unit but occasionally on the dispersed atomic battlefield tight situations will develop where the hitting power of a tank will be needed in addition to mobility.

Captain Theodore S. Riggs, Jr.

826th Tank Battalion
Fort Benning, Georgia



THE COVER

The tank on the cover of this issue is a photo of the 2d ACR, Ft. George G. Meade, Md. It was taken during a recent training exercise (see pages 32 & 33) as part of a series conducted by Mr. William R. Adam, Chief, Special Projects Unit, Department of Defense. The picture is by Photographer First Class Ralph Seghers, United States Navy.

The motivation factor is manifestly important because from it come esprit, *enthusiasm, morale, effort, competition and accomplishment.*

THE CREATING OF SUPERIOR UNITS

By LIEUTENANT GENERAL BRUCE C. CLARKE



U. S. Army

I HAVE found that there are four basic principles which apply to the problem of creating Army units which are considered SUPERIOR.

1. The SUPERIOR unit must be created from the ordinary run of personnel.

2. Classified according to ability, the men in a unit fall naturally into three nearly equal sized groupings—upper, middle and lower. The excellence of a unit depends upon the ability of the commander to bring the men of the lower group to a degree of proficiency which makes them an asset to his unit team.

3. All men desire to do what is wanted of them. When they do not, it is because they have not been adequately motivated and instructed.

4. The best unit in an organization is always the one which is excellent or better in *all* things.

If you agree with these precepts, let us analyze and apply them to the

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LIEUTENANT GENERAL BRUCE C. CLARKE, a frequent contributor to *ARMOR* and an exponent of leadership techniques, Armored tactics and organization of Armored units, presently commands the US Seventh Army in Germany.

basic problem of the commander who is striving for a SUPERIOR unit.

Probably no agency of the United States Government is made up of personnel who so closely approach a typical cross section of our country as is the Army. This statement holds true even in comparison with our sister services. Although there are a few "elite" or special units in the Army, the bulk of our units are made up from the great cross section of America in the so-called "military" age group. This should be a challenge to us. It draws us close to the people of our country, adding to our strength, but magnifying our responsibilities.

The problems of polishing ordinary units until they emerge as SUPERIOR are primarily the problems of raising individual performance and capabilities to a superior level. The many truly outstanding units which have been produced in our Army give ample evidence that these problems can be solved.

Based upon their General Technical Scores, the men in the Seventh United States Army fall naturally into the pattern of the three nearly equal groupings previously mentioned. *See Figure 1.*

Figure 2 shows a breakdown of the personnel in the Seventh Army by grades in the three groupings.

The higher percentages of personnel in the upper grouping are found in the upper grades and in the lower grouping they are found in the lower grades. This fact greatly increases the emphasis required to be given to those in the lower grouping in the lower grades. The middle and lower groupings within the grades E4 through E1 become even more important in the development of the SUPERIOR unit because men in those grades represent the reservoir from which the future top three graders will develop.

	Percentage falling in each Grouping						
	E7	E6	E5	E4	E3	E2	E1
Upper:	55	37	31	33	29	27	15
Middle:	36	45	42	40	38	36	38
Lower:	9	18	27	27	33	37	47

Figure 2

Those in the upper grouping are the best educated, are quickest to learn, can be well motivated, but need to be challenged to develop their full potential.

Those in the middle grouping are the average run of American youths. They are easily controlled, take well to discipline, learn easily, respond to good leadership, but are usually capable of more than they try to do and must be pushed.

In the lower grouping are the ones who need special attention. The disciplinary problem in this group is higher than average. These individuals require special motivation and instruction. Their attitude constitutes a special barometer of the esprit de corps of the unit. This group contains also many of the misfits who, if they cannot be assimilated, must be eliminated.

A single squad, crew or section will probably contain men of all three groupings—certainly they will appear in any platoon or company. This presents a practical problem in the handling and the instructing of the men and in perfecting the teamwork of the squad, crew, section or platoon.

The leader can afford to adopt only one approach to handling his men. He must assume that they all want to do what he wants done. When any number do not respond to this assumption, the fault is more probably his than theirs. He should check his procedures, instructions and subordinate leaders to determine wherein lies the trouble. When only one or two individuals are involved, punitive action or elimination may be indicated.

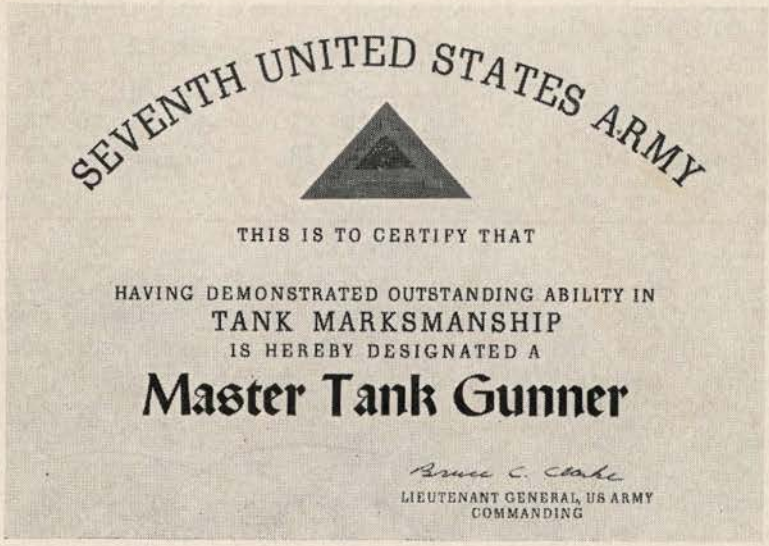
We arrive now at the fourth precept which is based upon the premise that no unit commander has enough time to make his unit superior in all things at all times. How, therefore, should he spread his efforts? It is obvious that his unit must be proficient in marksmanship, communications, supply, administration, tactics, physical fitness, techniques, movements, maintenance, etc. If his unit is not proficient in any one of these things, his team is not sound and will fail him when the test comes. How, then, must he manage?

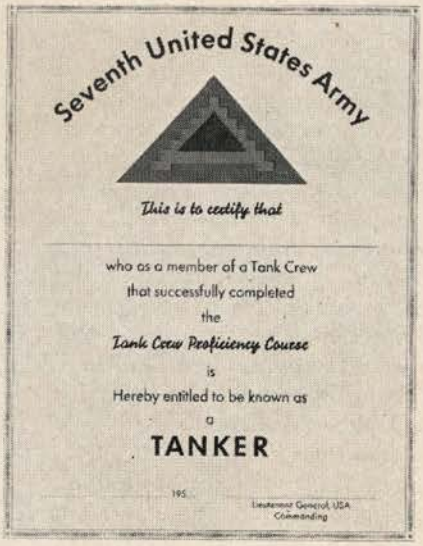
> *First,* he should avoid putting too much stress on any one thing so as to over-emphasize it in order *to make a show of it.* If he practices this method he will do so at the expense of other important things. This is a common error.
>
> *Second,* he must stress adequately all of the many facets of the training job. Even though he is not an expert in each, he must direct a subordinate to be an expert and the commander must then supervise and check this subordinate's work. This latter is important.

Woven into the entire pattern are the threads of motivation. This motivation is manifestly important be-

Upper:	(GT Group I — 5%		
	(GT Group II —27%		
		32%	
Middle:	(GT Group III—39%	39%	
Lower:	(GT Group IV—25%		
	(GT Group V — 4%		
		29%	
		100%	

Figure 1





cause from it comes esprit, enthusiasm, morale, effort, competition and accomplishment. The people in each of our three groupings need to be motivated in different ways and in varying degrees.

In encouraging students to learn, we motivate them by one or more of the following:

1. Showing a need.
2. Developing an interest.
3. Maintaining interest.
4. Encouraging early success.
5. Giving recognition and credit.
6. Using competition.
7. Giving rewards.
8. Awarding punishments.

These same things may be used to incite a body of men or a military unit to action.

Undoubtedly every commander, sometime during his career, after being assigned a difficult mission, has soon thereafter considered how he would present this task to his subordinates, how he would appeal to them to get the job done—in short, on what he would base his efforts to motivate them to tackle the job with the will necessary to attain the goal sought.

He will probably use many factors to motivate his unit. Some of them may be specifically mentioned and some of them may be implied. For instance, except as a last resort, he would not mention punishment in case of failure. His men should know him well enough to know that he will not stand for failure.

The real art in motivating a group of men to accomplish a common mission is *to reach each man* in such a way that *all men* in the unit are incited *to the extent of their several capabilities*. Of course, the kind of mission to be performed by the men will determine the motivating factors used, but there is one element that must be kept in mind, and that is that no amount of motivation will incite a man to undertake zealously that which he knows is manifestly beyond his capabilities.

In the Army we use freely a system of awards or prizes in order to motivate men. Too often these go to the men in the top of the upper group. They provide no incentive for improvement to those in the lower group and little for those in the middle group, because the men know that the award is beyond their ability to achieve. These prizes make good articles for the unit papers but their overall effect on the units is negligible.

It is well to recognize the outstanding men, and we do this through our promotions; however, our system of awards must go beyond this and set the stage for awards to units, teams and crews in such a way that the effort of the men of all groupings plays a part in the winning.

Another method is to set a standard of excellence against which any man can compete and, upon attaining it, receive recognition. Marksmanship badges, Expert Infantryman awards, Master Tank Gunner and Tanker certificates, as shown above, are examples of this effective system.

In conclusion, the job of those of us who are privileged to command is to create SUPERIOR units from the ordinary run of manpower made available to us. This manpower falls into upper, middle and lower groups about equal in strength that have different capabilities, present different problems, and need to be handled differently. All of the men in a unit must be assumed to desire to do what is wanted, and when they do not, they have not been properly handled and instructed. The best and most reliable unit is usually the one that is "excellent" in all things, even though it may not be SUPERIOR in many.

Throughout the whole job runs the problem of motivation. This problem is not solved unless the steps made to motivate the unit are carefully thought out and applied in such a way that their effect is *felt by all men in the unit*. Finally, the excellence of the unit is measured by the extent to which those of the lower third of the unit are developed to play their part on the unit team.

At our 68th Annual Meeting, during the business session, a Resolution was proposed and unanimously passed by the members present to advocate the wearing of the Garrison cap on the left side of the head as a badge of distinction among Armor personnel. At the same time the Secretary was directed to forward a copy of this resolution to the Chief of Staff of the Army. This was accomplished by letter on the 18th of April. The reply from the Chief of Staff to our Resolution appears below.

UNITED STATES ARMY
THE CHIEF OF STAFF

29 April 1957

Dear Colonel Zierdt:

Thank you for your letter of 18 April transmitting the resolution of the Armor Association advocating the wearing of the garrison cap in a distinctive manner by Armor personnel.

I fully share the desire of the Armor Association to preserve and foster the spirit and tradition of Armor in the United States Army. Moreover, I recognize that the wearing of the garrison cap tilted on the left side of the head was considered the prerogative of Armor personnel for several years and contributed in some degree to Armor esprit. However, I believe that the advantages of standardized uniform wear by all of the arms and services outweigh the gain in Armor branch morale that might result from the adoption of your proposal. This is especially true in view of the existing distinctive devices which are now available -- branch insignia, branch colors, guidons and the like -- which coupled with the outstanding history and traditions of Armor provide a substantial basis for a high state of Armor esprit.

Although I cannot agree with this particular suggestion by the Armor Association, I sincerely appreciate the continued interest in the Army expressed by your organization. Needless to say, I shall welcome future suggestions and you may be sure they will receive careful consideration.

With kindest regards,

Sincerely,

Maxwell D. Taylor

MAXWELL D. TAYLOR
General, United States Army
Chief of Staff

Lieutenant Colonel William H. Zierdt, Jr.
Secretary-Treasurer
The United States Armor Association
1757 K Street, N. W.
Washington 6, D. C.

The article on the next three pages was extracted from a speech made by the author before the National Military-Industrial Conference held in Chicago on the 14th of March. Force and diplomacy are so intertwined that they cannot be delineated and treated separately. Hence we, in the military, must be conversant on both subjects to understand our profession.

THE RELATION BETWEEN FORCE AND DIPLOMACY

By DR. HENRY A. KISSINGER

THE subject to which I would like to address myself is the relation between force and diplomacy. It is perhaps the most important problem we are facing today, because power by itself is meaningless unless we can use it in the disputes with which we are likely to be confronted. And diplomacy by itself cannot be effective unless we know what transformations we are willing to resist and unless our opponents know what pressures we will be willing to bring to bear. Throughout history force and diplomacy have been closely related. Because of our past of an uninterrupted domestic development, we like to think that all disputes are settled by reasonable argument, and that men of good will sitting around a conference table can resolve all disagreements. I would suggest that this is a dubious interpretation even of our domestic experiences. Domestically, the orders of a court are accepted precisely because the court represents a monopoly of force. By the same token, throughout history it was always understood—and because it was always understood it never had to be made explicit—that a conference which failed did not return things to the starting point, but that it might bring other pressures into play. Force has always been the ultimate sanction at a conference table; the willingness to apply force has been the ultimate test of will, and the ability to use force has been the ultimate test of the strategic concepts of a society. There are many people who argue that we are now living in a different period, that with the development of nuclear weapons war has become impossible. It has been said that nuclear energy makes it possible for every state to bring about an increase in its productive capability which makes it unnecessary to resort to war, and it has also been said that there is no alternative to peace.

I CANNOT add anything to the remarks of Mr. Barnett and General Gavin about the situation in which we live. We are confronted by a power which, for over a generation now, has built its whole domestic control apparatus on the assertion that there is an irreconcilably hostile world. We are living in the middle of a revolution which is gripping not only the Communist areas but the areas which had formerly been under Colonial rule, and I would like to suggest that if force has indeed abdicated, diplomacy, too, may turn sterile, and that what we have been witnessing over the past ten years has been no accident: A succession of conferences which become tools of propaganda, at least for one side, in which any

DR. HENRY A. KISSINGER, Director of Special Studies at the Rockefeller Brothers Fund, received his BA, MA and PhD from Harvard University. He served in the 84th Infantry Division and CIC during World War II. He holds a Reserve CIC commission. He is consultant to the ORO, the Weapons Systems Evaluation Group of JCS, and other government agencies. He has written articles for many scholarly journals, and is Editor of *Confluence*, Executive Director of the *Harvard International Seminar* and Study Director of *Nuclear Weapons and Foreign Policy, Council on Foreign Relations*. He is the author of *A World War Restored: Metternich, and the Restoration of Peace, 1812-1822*, and a new book entitled *Nuclear Weapons and Foreign Policy* which was published last month.

proposal can be made without penalty, in which the failure of a conference entails no consequences, and the success of a conference reveals only a tactical move almost invariably on the part of our opponent. After the Summit Conference of the four heads of state many of our political commentators asserted that it ushered in a period of peace in which diplomacy would reign supreme. I would suggest that you follow the consequences of this conference. If the Soviets became convinced that war was impossible, they took this not as an opportunity to "engineer total peace," but rather as an opportunity to subvert the existing system with impunity. Not two months after the Summit Conference they sold arms to Egypt, and there could be no doubt what the sale of arms to Egypt would mean for the peace of the Middle East. Not three months after the Summit Conference, at the Conference of Foreign Ministers about the unification of Germany, the Soviets chose the most abrupt, the most brutal means of breaking up the conference to demonstrate to the Germans that the United States had become powerless to affect events, and to lay the groundwork eventually to achieve unification on their own terms. They had learned at Geneva, if they had learned anything, that they could negotiate with us without risks of penalty, that they could use the conferences for propaganda.

If force has abdicated, the role of the weak and irresponsible powers has been greatly exalted. While the West speaks of no alternatives to peace, we have seen, time and again, how states with few resources, with no ability to sustain military operations, achieve great international transformations by the threat of commiting suicide, by the will to throw their existence into the scale. We have come to live in a paradoxical period where irresponsibility becomes a political weapon, where there are no limits either in diplomacy or in the field of strategy to what third rate and fourth rate powers can do.

Now it may be said that there are substitutes to force, that we have international organizations which settle disputes, and there is what has been called the opinion of humanity. As a historian I take a rather dim view of what has often been called the opinion of humanity, at least the way we have interpreted it. There is, as any military man knows, no substitute for leadership. The opinion of humanity will be one thing given one set of American actions, it will be something entirely different given another set of American actions. Every power has an interest in getting a definition of international morality which will help it in its hour of need. It will not risk its existence if we are not willing to risk ours. If you compare the reaction of the United Nations to the Egyption and to the Hungarian situation, I think you will find my point illustrated. In Egypt, the United Nations was effective because they knew they could pass resolutions without risk. They knew that Britain and France by themselves were too weak to continue the operation and we were not prepared to back them up. In Hungary, a resolution by itself was meaningless unless backed up by the willingness to run some risk. The slow pace with which the Hungarian debate was conducted is a good example of what one can expect from an international organization in which leadership is lacking. I would therefore suggest that unless we are willing to use force, and unless we can find a use of our force which is adapted to the issues that are likely to arise, the international community will be more and more demoralized, and even some of those of our international critics who are most insistent that we are militarists, will when the chips are down make their assessment not on the basis of whom they like but on the calculation of their risks. In this respect we have a very important educational task to perform in the world. Millions of people have become independent since the end of World War II. They have become independent in a strange and peculiar way, more through the weakness of their rulers than through their own efforts; more through the moral inhibitions of the former colonial powers than through their own national exertions, with the result that many of the areas which are newly independent have strange notions of what can be achieved in the world through the power of proclamations alone. To them the achievement of their independence must seem nothing short of miraculous. Powers that had ruled them for hundreds of years disappeared without a shot being fired. They, therefore, have a tendency to overestimate what can be achieved by words alone, and they are encouraged in this by another strange circumstance of the nuclear period. When Nehru wanted to redraw the state boundaries of India he soon had a rebellion on his hands, but in the international field no boundaries seem to exist. Because of the contest between us and the Soviet Union every state has been able to play her role in the international field out of proportion with its power and out of proportion with its willingness to assume responsibility, with the result that very often they seek to escape tough domestic problems by entering the international arena. To escape a situation where every action has a price into a field where no action seems to have a price, and where one can be a hero by reading proclamations from a rostrum.

Now, in part, this situation has been brought about by our notion of power and our notion of peace and war. We have had the idea that relations among states are either peace or they are war, that aggression was always unambiguous and that it should be dealt with by the maximum development of our power, that we would punish our enemy and destroy him utterly. We have found that we are living in a world which is neither total peace nor total war, that we are confronted by an opponent conducting a strategy of ambiguity in which the risks always seem out of proportion to the objective in dispute, or in which the grievance that our opponent advances seems somehow legitimate, if not to us, at least to the rest of the world. We have also found something very strange to us, that at a time when our power was never greater the Soviets made extraordinary gains. We had a technological break-through, the like of which we will never see again, when we possessed the atomic bomb. But during our possession of the atomic bomb the Soviets took over the Satellite orbit, China went Communist, and the Soviet Union developed an atomic bomb which itself was one of the most important transformations of the post-war period. Indeed, one could argue

that because of our notion of war, the atomic monopoly may actually have hurt us. It made us feel guilty about our power. It lulled us into believing that no matter what gains the Soviets scored it didn't make any difference because we were technologically superior. It made us believe that we could always defer a showdown to a more propitious moment or to a more unambiguous aggression, the precise kind of aggression which the Soviets strained every effort not to present to us. We should have learned from this period that the relations among nations depend not so much on the maximum development of one power but on the ability to bring the power into some relationship with the issues that will be contested. The Soviets learned that if they kept the increase to their strength sufficiently small, they could deter us through our own preconception. I recently read the MacArthur Hearings, on the Korean War. It is fascinating that at a time when we possessed an atomic monopoly, when we could not have lost an all-out war, there seemed to be complete unanimity that it somehow was up to us to avoid the all-out war, that we couldn't risk expanding the war in Korea, that we couldn't afford to win because the Soviets, we thought, couldn't afford to lose.

We've been basing our strategy too much on a notion of revenge, that it is our task to punish the enemy, to inflict more damage on him than he has inflicted on us. We have been obsessed with a danger of surprise attack because of our memory of Pearl Harbor, and again because we think that any war will necessarily be all-out. At the Symington hearings on American Air Power last year, almost every military commander who testified, except General Gavin, took it as a point of dogma that any war would start with a Soviet attack on the territorial United States: it would be a surprise attck, it would be directed against the installations of our Strategic Air Command, and within a very brief period of time, something like forty-eight hours, the decision would be reached. Nothing in the Soviet behaviour indicates that this is the most likely contingency. On the contrary, the obsession with surprise attack may very well keep us from developing more subtle applications of our power. We've been obsessed by a certain kind of technology. Again, if I may refer to the Symington hearings. There was a great deal of talk about the thrust of jet engines, about which bomber could fly higher or longer; no one examined the fact that bombers do not fight each other. That the test of a modern weapon is not so much whether it is superior to its equivalent on the other side but whether it can perform its strategic mission. There was a great deal of talk on technology. There was very little talk about strategic missions. Our thought has therefore lagged behind development. The threat of all-out war, which may have been a good deterrent during our monopoly of atomic weapons, is no longer effective. We are somewhat in the position of the first manufacturers of the automobile who, having a new technological discovery, made it as much as possible like the previous means of transportation. The first automobile looked like a horse and buggy wagon. The first electric light bulbs looked like gas fixtures. The tendency is always to develop a weapon or to integrate a new discovery into what is familiar. But we are living with a new order of technology and it requires appropriate tactics and its appropriate strategy. Until the military and the political leadership adjust their thinking to the new technology we will live with the paradox of the nuclear age that our power will serve to paralyze our will.

Now, it is difficult in a few minutes to speak about what such a strategy might look like, but it is clear that our military have the responsibility for coming up with a strategic doctrine with which policy makers can live. One is struck when one reads the literature about strategy in the last ten years, how the individuals who seem so tough in the abstract are forced into a position which in practice leads to inaction. The people who want to obliterate the Soviet Union tomorrow morning are very often the very ones who insist on world government the day after tomorrow morning. The individuals who assert that the only war we can fight is an all-out war, never seem to be able to apply their strategic doctrine to the disputes that actually do come up. This is no accident, and one cannot blame them for this. An American President, knowing that military action will involve the obliteration of American cities, must think twice before he accepts the destruction of Chicago, New York or Los Angeles. Unless our military doctrine can present him with alternatives that are less fearful, he is in every concrete case going to be stymied by the alternatives that are presented to him. In 1936, the French General Staff had only one strategic doctrine, that of all-out war. It could react to foreign moves only by total mobilization. When the German Army moved into the Rhineland, the French General Staff was paralyzed. It knew the country would not support full mobilization for it seemed like a German move into its own territory. It therefore did a subtle thing. It adjusted its estimates of German strength to its own strategic doctrine instead of its strategic doctrine to the estimates of German strength, and it alleged that the Germans had fifty divisions, which they were very far from possessing. Finally they took refuge in a political guarantee of their boundary instead of a military one and four years later German armies occupied Paris.

But if the military have to come up with a strategic doctrine for a more subtle application of our power, the policy makers require a more dynamic conception of world affairs. Great revolutions like the coming together of the Soviet Revolution and the revolution of the colonial powers cannot be mastered merely by negative motives. They cannot be mastered merely by the desire to hold what one has or by contesting issues selected by the opponent. There is a tragic element in the history of nations that unless they are willing to fight for what they stand for, and unless they believe that what they stand for can be projected into other areas, they must decline. The challenge that the nuclear age holds to us is that at a time of unparalleled strength we are driven to realize that everything depends on our ability to use this strength with subtlety and with discrimination; and looking at history, the fate of the dinosaur might serve us as a warning that brute strength does not always apply to mechanism in the struggle for survival.

CARDED

BASIC FORMATION TANK PLATOON

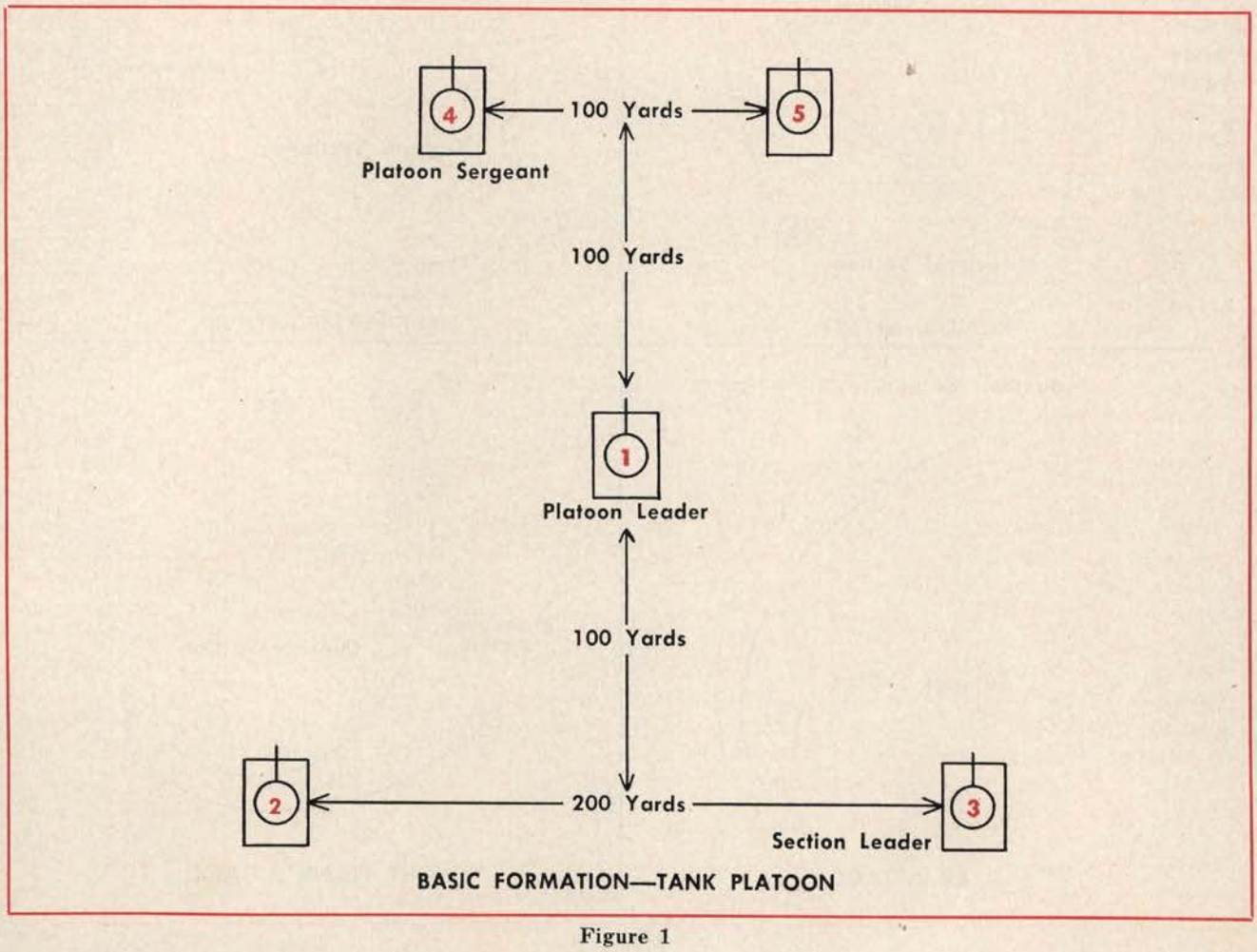
By FIRST LIEUTENANT ALEXANDER P. DYER, JR.

THE need for a basic combat formation for the tank platoon has long existed. Present formations such as the column, line, wedge, echelon and line of section columns each have certain advantages and disadvantages but are only adaptable to particular situations. A formation is needed which incorporates the advantages of these formations, possesses few if any of the disadvantages, and is adaptable to most combat situations and terrain. This formation should also provide all around firepower and allow a great degree of flexibility.

Of the present combat formations, all have maximum or excellent firepower in one or two directions. However, none has excellent, or even good, all around firepower. Only one, the column formation, affords maximum control. The problem of control in the other formations stems from the distance over which the entire platoon is spread and the location of the platoon leader's tank in the formation. The platoon leader must at all times be in a position from which he can exercise maximum control. He should not be unduly exposed to direct enemy fire unless the tactical situation or the principle of personal leadership dictates otherwise. None of the present formations has the capability of immediate fire and maneuver in any direction.

The basic formation, *Figure 1*, more than meets the requirements for this new formation. It contains

FIRST LIEUTENANT ALEXANDER P. DYER, JR., Armor, graduated from USMA in 1954. After attending the basic course at Fort Knox, and receiving Airborne and Ranger training, he was assigned to the 4th Armored Division, Fort Hood, Texas, as a tank platoon leader and company executive officer. He is now a platoon leader in the Tank Company, 3d Battalion, 14th Armored Cavalry Regiment, stationed in Europe.



BASIC FORMATION—TANK PLATOON

Figure 1

the desirable characteristics of the present formations and retains none of the disadvantages. These desirable characteristics are: In addition to the excellent all around firepower and control it affords, the basic formation also provides complete flexibility and is easily adaptable to any type terrain where tanks can maneuver as sections or platoons. Large open areas are not necessary for the deployment of the platoon in this formation. It will be noticed that the normal width and depth of this formation is only 200 yards, and yet the tanks are all 100 yards apart. Of course the formation is not intended to require exact distances between vehicles, and they should be slightly staggered as in all other formations. The size of the over-all formation is determined by the tactical situation and the terrain.

Complete flexibility is the primary asset of the formation. A two tank maneuvering section and a two tank support section are immediately available to the platoon leader regardless of the direction from which an enemy threat exists. Both tank section leaders must be prepared to operate as a section with either the number two or number five tank. The four examples in *Figure* 2 demonstrate this flexibility. The platoon leader's position is completely flexible. He may move his vehicle anywhere within or outside the formation to properly control the displacement of his sections. His tank is never more exposed to direct enemy fire than any other tank in the platoon unless he deems it necessary to so position his vehicle.

These desirable characteristics are:

1. Affords excellent firepower to the front and rear, good firepower to the flanks.
2. Facilitates excellent control.
3. Facilitates rapid deployment into any other formation.
4. Provides sustained effort.
5. Provides all around security.
6. Lends itself readily to fire and maneuver.

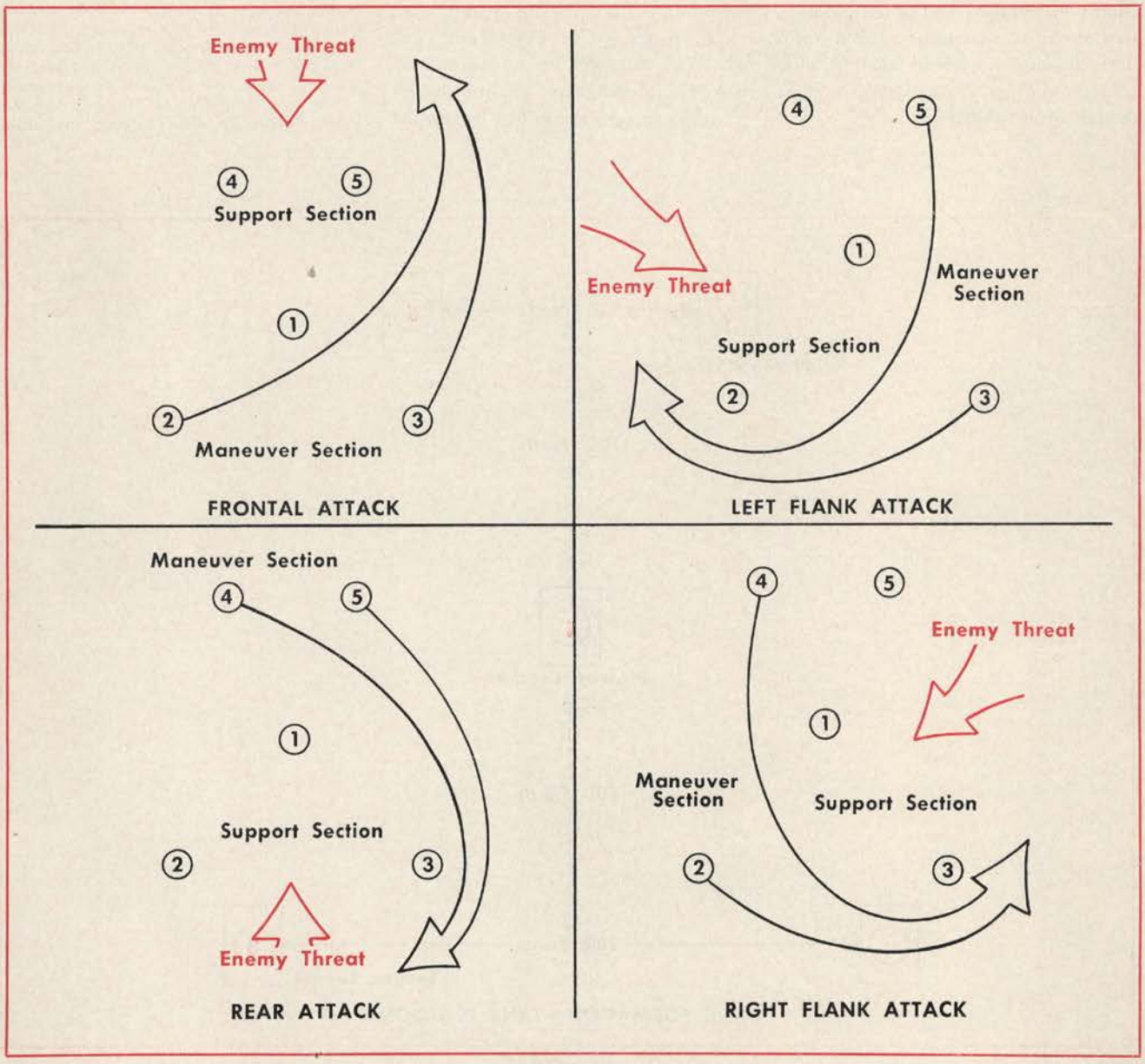


Figure 2

7. Ideally suited for the attack or delay.

The basic formation facilitates rapid deployment into any of the other formations and is an excellent formation for use when enemy contact is imminent. (*See Figure* 3.) This facility for rapid deployment coupled with extreme flexibility, excellent firepower, and dispersion makes the basic formation ideal for employment during atomic warfare. It is equally well suited for both the attack and the delay.

In the attack, the use of the basic formation would be governed primarily by the availability of supporting fires and the terrain. If supporting fires were available and the terrain was such as to allow deployment, the platoon would move to the assault position in the basic formation and continue the attack in one of the other combat formations, such as the line or wedge. Should supporting fires not be available, the platoon would be forced to provide its own base of fire for fire and movement. In this attack the platoon leader could move his sections by either alternate or successive bounds. The basic formation would be excellent for this situation.

A delaying action on the company level would employ the basic formation by the platoons primarily as a method of moving the platoons to their successive delaying positions. The delaying action as conducted by the individual platoon would consist of a movement by bounds to the rear employing the principle of fire and movement. The basic formation is once again well suited for this type of action.

The basic formation was tested by the author to a limited extent in 1955 on Exercise Sagebrush in Louisiana. The formation was further tested by Tank Company, 3d Battalion, 14th Armored Cavalry Regiment at Wildflecken, Germany during the month of May, 1957.

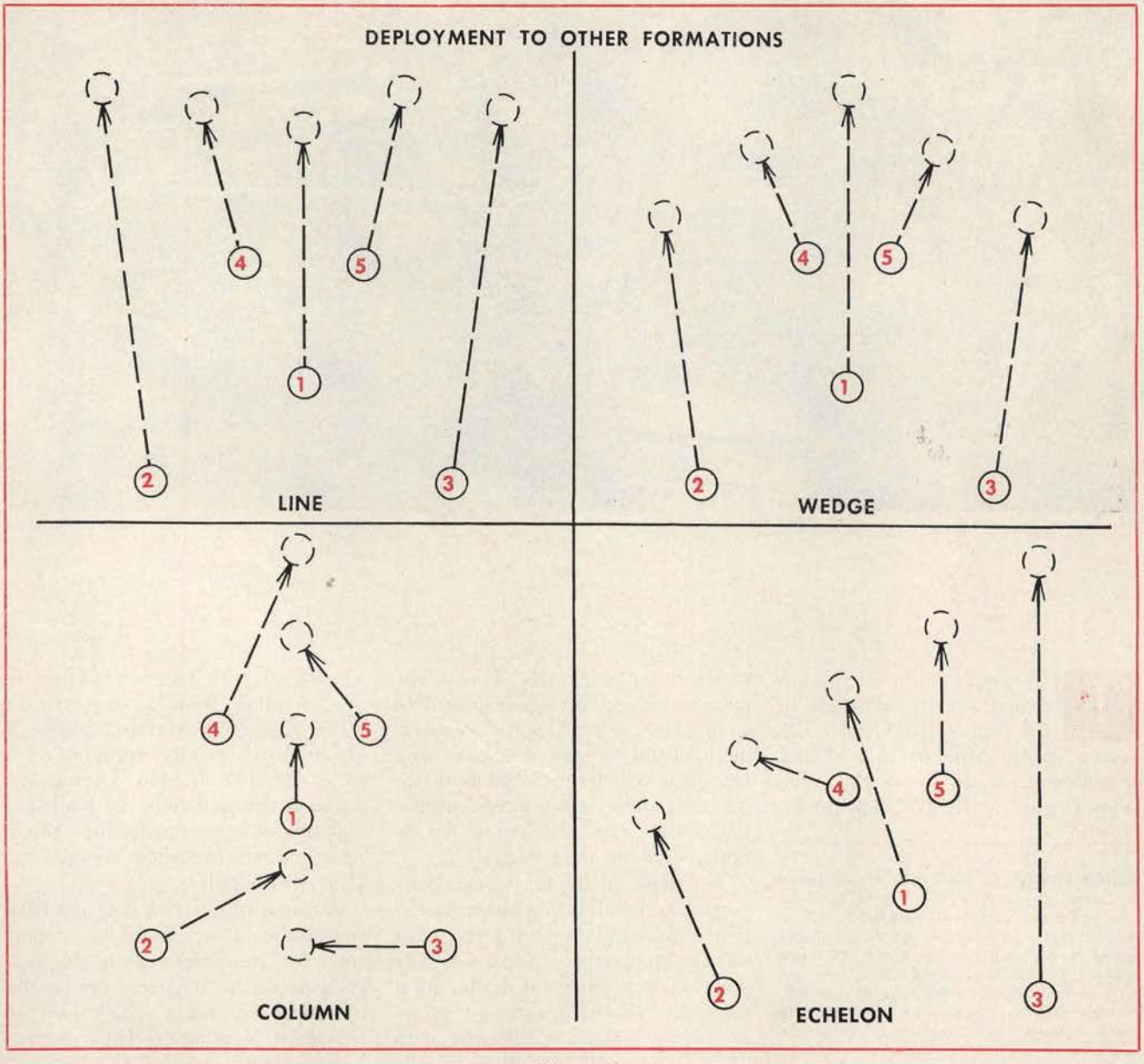


Figure 3

RESUPPLY OF AN ARMORED CAVALRY REGIMENT

By MAJOR LOWELL O. NUTTING



U. S. Army

THE employment of an armored cavalry regiment in the European Theater envisions its frequent attachment and detachment. Both corps and divisions frequently receive such an attachment on momentary notice. Compounding the confusion of these "fast shuffles" is the likelihood that one or more of the organic reconnaissance battalions will be detached from the regiment and given independent missions, or further attached to an infantry division or regiment.

The responsibility for logistical support should follow the chain of tactical control; however, a frequent shifting from supply point to supply point serves to interrupt the logistical continuity vital to a successful operation. This is particularly true with Class III resupply, and often equally so with Class V. The NATO maneuver "Cordon Bleu," conducted in 1955, resulted in the attachment of an armored cavalry regiment (—) to an infantry division. During one phase of the operation, the Regiment had two of its reconnaissance battalions and one attached armored infantry battalion.

An infantry division does not have transportation nor cans to support such an attachment with gasoline. As a result the Regiment got on the objective, with token vehicles, by the expedient of pumping from one vehicular tank to another.

MAJOR LOWELL O. NUTTING, Armor, served in Europe during World War II as a Glider pilot and Supply Officer. He reverted to civilian status in 1945, attended The US Army Infantry School in 1947 and was recalled in 1951 and attended The US Army Armor School. He was assigned as a Gunnery Instructor with MAAG, Formosa. Returning Stateside he was assigned to the 3d Armored Cavalry Regiment at Fort Meade where he is now the S4, having accompanied the Regiment on the Gyroscope move to Germany.

Responsibility for logistical support should follow the chain of tactical control; however, a frequent shifting from supply point to supply point interrupts the logistical continuity vital to a successful operation.

As a result of this experience and the observation that Army Supply Points needed relocating, resupply during this year's NATO exercise, "War Hawk," was handled somewhat differently. Here the Regiment was employed as a covering force in what was initially a retrograde movement. In order to cover the 50 miles of front, it was necessary to place the three battalions on line well in front of the infantry positions, through which the Regiment passed as we fell back. It will be noted in *Figure 1* that the 3d and 2d Battalions passed through only one division each on line *Bismarck*, while the 1st battalion passed through elements of both the 8th and the 11th Divisions. The Regiment then took up positions on line *Red* which permitted the Infantry to fall back through us and take up defensive positions on line *Chicago*. The Regiment then moved into a previously assigned assembly area as Corps reserve. At the time the second passage of lines was effected on line *Chicago*, the 3d Battalion was attached to the 8th Infantry Division and the 2d battalion to the 11th Airborne Division. They remained attached until the two Divisions had taken strong defensive positions on line *Detroit*. At this time they were returned to Regimental control. This is considered a reasonable and typical employment of an armored cavalry regiment.

Resupply during this exercise bears some attention because of the distances involved and the fact that the Regiment had all three battalions under its control most of the time. This latter condition is a little unusual.

Anticipating the confusion in the logistical chain, which inevitably results from frequent attachment and detachment, it was determined that the Regiment would be based on one set of Army Supply Points, even though this would result in longer turn-around distances. Taking into consideration the general scheme of maneuvers as it was initially known, an MSR was selected with an alter-

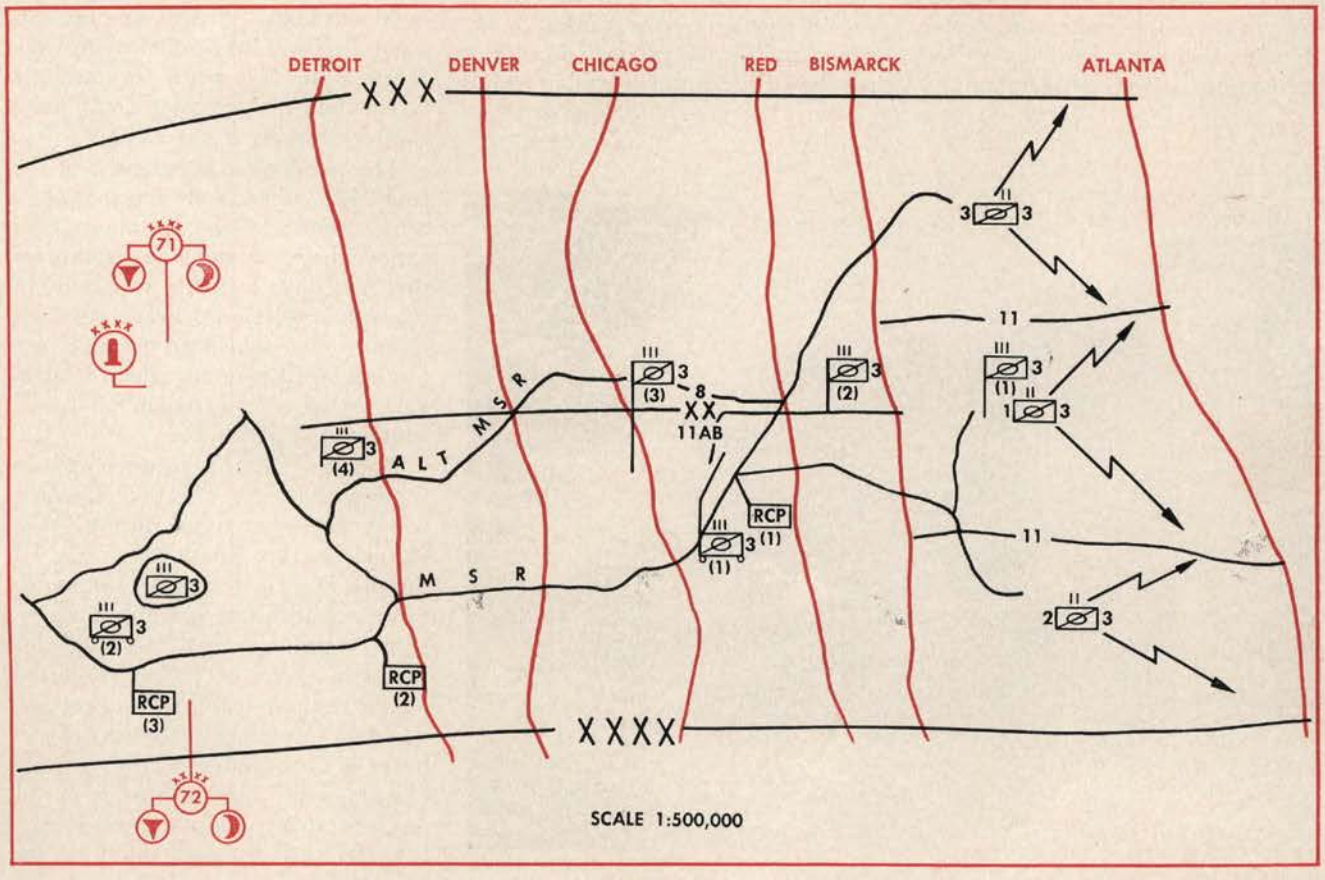


Figure 1

nate running generally through the left portion of the zone as shown in *Figure 1*. In conjunction with the selection of the MSR, Regimental Supply Control Points were also designated.

The use of a Regimental Supply Control Point appears to be the best solution for keeping the flow of resupply vehicles moving to the Supply Points with minimum delay. It insures that vehicles are directed to current battalion locations instead of wandering around in search of units which have displaced. It also serves as an excellent sounding board for the status of resupply within the Regiment. As the vehicles pass through the point on their way to supply points and on their return to the battalions, they are checked off and briefed as necessary by control point personnel. If the MSR utilizes a well defined route and the Supply Control Points are placed at points readily identifiable on the ground as well as on a road map, there is less chance that drivers and convoy leaders will get lost. They know that if they get on the MSR, and keep moving to the rear, sooner or later they will encounter signs, guides or the point itself. Wise selection and use of a control point also permits the location of trains without regard to road net or communications considerations.

Normally, Regimental Trains are made up of the regimental portion of the Maintenance Platoon, the Personnel Section from Headquarters and Headquarters Company, Service Company Headquarters, and elements (at least) of the attached Armored Medical company.

The composition of the Regimental Supply Control point can be extremely flexible but should provide for a minimum of:

1. The Supply Platoon Leader with SCR 506 and AN/VRC-8.

2. One ambulance and one officer or NCO from attached Medical company or organic medical detachment.

3. One VTR, M-74, and/or wrecker M-62.

These can be augumented as the location and circumstances permit. In some instances it is desirable to make the ration breakdown at this point.

If the CW Administrative net is working properly, the bulk of the logistical traffic can be handled in code. This leaves the FM net relatively free for the S1 and S4. The FM net is the only means of communication between the Supply Platoon Leader at the RSCP and the S4 who spends much of his time at the forward CP.

One thing must be borne in mind. A control point must be designed to expedite and not restrict the resupply of the battalions. It may be that the term *Control Point* is poorly chosen. *Logistical Operations and Information Center* may be more appropriate.

In Europe it is normal to attach, permanently, the battalion sections of Service company and the Medical detachment. Consequently, regiment can render little additional maintenance support. However, due to the fact that there is little requirement from the Provisional Battalion for recovery facilities, it can provide some help in this direction. The fuel and lubrication and ammunition vehicles are under the control of the battalions so that regimental facilities can only expedite and insure that all are familiar with the location of Army or Division Supply Points. On "War Hawk" the Regiment lost only one resupply vehicle. This occurred while the RSCP was displacing and the signs at the new location had been neglected.

It will be noted from the diagram that the 3d Battalion on the left was closer to Supply Point 71 in the 8th Division zone. At times, during attachment to the 8th Division, the battalion fuel and lubrication trains were returned to that point for resupply rather than moving another 25 miles south to Supply Point 72.

The permanent attachment of the fuel and lubrication and ammunition sections to the battalions does remove the commander's capability for the immediate logistical weighting of effort. It is believed, however, that the distance over which an armored cavalry regiment operates makes it mandatory that each battalion be as self contained as possible.

Operating in this manner and assuming the same effective handling which we experienced during "War Hawk" at the Army Class I & III Supply Points, it appears reasonable to expect adequate resupply with organic vehicles, over turn-around distances in excess of 120 miles. If the loss of resupply vehicles is disproportionately greater than the loss of the heavy gas consuming combat vehicles (local enemy air superiority could produce this condition), obviously, turn-around distances must be reduced accordingly.



U. S. Army

Each battalion of an ACR should be as self contained as possible.



U. S. Army

SPOTLIGHT ON ARMOR

Many Armor personnel were fortunate enough to witness the Armor attack problem on TV. How it came about and some of the problems involved make an interesting story.

By CAPTAIN WILLIAM T. MAHAFFEY

IT is not often that the general public is given a ringside seat at a realistic demonstration of Armor in action. The vast majority of taxpayers, however, were given this opportunity on Armed Forces Day, 18-19 May, at Andrews Air Force Base, located in Maryland, 12 miles southeast of the Nation's Capital. How this dynamic demonstration came about and how details concerning the planning and presentation were approached will undoubtedly be of interest to those planning a demonstration of similar scale for the future.

As early as November 1956, plans were being made to provide the Nation, through spectator participation, and the world, through newsprint, television, radio and film, with a series of demonstrations and displays by all members of the Armed Forces. These demonstrations and displays were designed to be presented for informational purposes by graphically illustrating the progress made in and by the military forces during the past year—and to give John Q. Public some indication of how well his money had been spent.

Armor had not had the opportunity in the past to exhibit its capabilities and accepted responsibilities as a full-fledged member of the country's fighting team. In the past, Armor units had to be content with static displays or were limited to such tactics as tank rides and inspections by the general public of an armored vehicle rooted to the ground, immobile and unimposing. This type display

CAPTAIN WILLIAM T. MAHAFFEY, Armor, graduated from Ordnance OCS and served in Europe during World War II with the 71st Ordnance Battalion. He reverted to civilian status in 1945. Recalled in 1952 he attended the Motor Officers' Course at Knox and was assigned to the 137th Tank Battalion. He joined the 2d Armored Cavalry Regiment and accompanied them to and from Europe on Gyroscope. He is the Regimental Liaison Officer, S3 Sect., Regimental Headquarters.

did show the public what an armored vehicle was; many admired the thickness of the armor plate, were impressed with the size and weight, and were concerned with the miles per gallon, or better still, "Gallons per mile!"

In March 1957, Major General Doan, Chief of the Armor Branch, US CONARC, was requested to provide the Military District of Washington (MDW) with sufficient personnel and equipment for a full scale armor attack demonstration at Andrews Air Force Base. The demonstration would be presented to retired army personnel on 17 May in a special preview, and to the general public on 18-19 May; in addition the demonstration would be televised live, coast-to-coast on the Columbia Broadcasting System television network on the 19th of May.

General Doan informed MDW that they would have a tank company reinforced with reconnaissance and armored infantry platoons, and that personnel and equipment would be supplied by the 2d Armored Cavalry Regiment commanded by Colonel James W. Duncan. Also the Regiment would supply all administrative and logistical support required by this armored team.

Lieutenant Colonels D. A. Martin and C. T. Krampitz, Armor Branch, US CONARC; Lieutentant Colonel M. L. Davis, MDW Headquarters; Lieutenant Colonel E. A. DeMun, Andrews Air Force Base, and this author, from the 2d Armored Cavalry, were designated project officers for the demonstration. Captain L. S. Wright from the 3d Battalion was assigned the duty of control officer.

Due to various commitments of the Regiment, it was decided that the bulk of the personnel and equipment would come from the 3d Battalion. For this reason, Lieutenant Colonel S. F. Zdravecky, Commanding Officer, 3d Battlion, was given the overall responsibility for the training and administrative control of the task force. The task force commander was First Lieutenant N. L. Dorward.

The Regimental Commander directed that personnel supplied by units other than the Tank Company of the 3d Battalion would be placed on TDY for the entire period of the training and the demonstrations. The matter concerning equipment was arranged by having the officers and enlisted men from the supporting companies receipt for the equipment from their parent units.

Initial planning was based on a rough draft of the proposed 15 minute demonstration. Factors influencing logistical planning included preparation and training at Fort Meade and the training for and the actual demonstrations at Andrews AFB. Fuel and lube requirements were based on an operational distance of 400 miles per vehicle.

Total vehicles involved were 20 M48 and three M41 tanks; one M74 recovery vehicle, one M62 wrecker; 11 M59 armored personnel carriers, 12 M38A1 one-quarter ton vehicles, two M37 three-quarter ton vehicles and 10 M34 two-and-one-half ton cargo vehicles. A three-quarter ton and a one-quarter ton ambulance were also included.

Additional mechanics and communication personnel were included to assist in the heavy load placed on the Tank Company's maintenance section. Blank ammunition for all weapons had to be computed and the 2d Cavalry finally decided on a self-made usage table derived from FMs, TMs and the Armored School's August 1956 issue of "Reference Data For Armored Units." As the original script for the demonstration indicated a 15 minute show, all ammunition was based on phasing of the 15 minute outline. The table, shown in *Figure 1,* was used as a guide in preparing the original ammunition requisition. Demolitions, pyrotechnics, smoke, etc., were included for use when the final scenario was completed.

The 90mm blank cartridge requirement was reduced to 3800 rounds; computation figures were changed due to script alterations. Significant is the fact, that during the final demonstration, 15 M48 and two M41 tank guns were firing an average of 100 rounds per minute. This total volume of blank fire was possible only by reducing the pressure on the breech crank springs to the minimum. The 90mm guns were actually fired at a rate of six rounds per minute, while the 76mm guns were being fired at a sustained rate of five rounds per minute. Needless to say this demonstration of firepower thoroughly impressed audiences present at the airfield, and at home viewing the demonstration on television. After observing the first full scale demonstration, General Doan was overheard to comment that it was fine, and do not make any changes.

Planning also included repeated reconnaissance of the 32 mile highway route to Andrews AFB, the proposed bivouac area at the airfield and the site on which the demonstration would be presented. Coordination with MDW and Andrews officials was continuous.

Convoy procedure and escort was a sensitive arrangement as equipment was moved over Federal and State highways which required both State and Second Army Clearances. Military police escort from Fort Meade and Andrews AFB had to be coordinated with the Armed Forces Police from Washington, D. C. Each march unit was escorted front and rear over the complete distance. Fort Meade Military Police escorted the convoy 24 miles. The Armed Forces Police escorted the convoy six miles and the Andrews AFB Police two miles through the air base. Interesting to note was the wholehearted cooperation the Regiment received from officials at the air base. In order to preclude the heavy track vehicles from having to make sharp turns, the Base

AMMUNITION REQUIRED

Weapon	No Wpns	Rds Per Min	No of Demonstrations	Minutes Fired	Total
90mm	17	5	5	15	6325
76mm	3	5	5	10	800
30 Cal M1	8	15	5	10	6000
30 Cal MG	20	50	5	6	30000

Figure 1

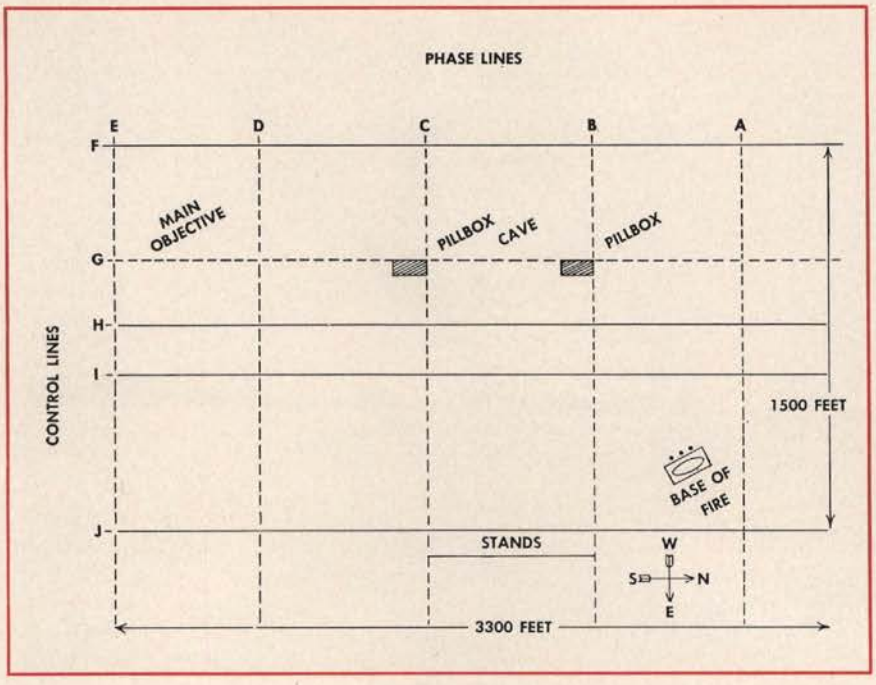


Figure 2

Operations Officer had roads cleared, parking lots emptied and fence posts pulled out of the ground. Comments regarding the move on and off the air base were amazement and pleasant surprise that so little damage was caused to the roadbeds and shoulders.

The Regiment's planning also included provisions for continual briefing of every individual from the cooks to the tank commanders. Every man was required to know exactly what was to occur next. There was every evidence that this briefing was more than successful. Interest and morale were unusually high even though the preparation and training required more than the normal amount of time and energy. Many of the personnel had only recently returned from two months in the Louisiana "King Cole" exercises and were again being separated from their families. All personnel were bivouacked at Andrews AFB in tents supplied from Fort Myer, Virginia. One difficulty encountered was two days of high winds which blew tents down during the early hours of the morning. During one of these windstorms, the wind reached a registered speed in excess of 100 mph. Five tents were blown down and the only reason that the remaining tents stood was that approximately 15 men each were alternately hanging on the windward sides. As the direction of the wind changed, the men would hurry to meet the newly threatened attack.

Organization and leadership were evident during all phases of the preparation. This task force, composed of many veteran officers and enlisted men, shaped into a true fighting team. Communication discipline was rigidly enforced and messages crackled crisp and clear over intercom and radio. Comments overheard were of the nature that many senior officers would be more than happy to go into combat with this task force, composed as it was. This was, above all else, a wonderful training opportunity for every officer and enlisted man involved. It was more like the training experienced during the 2d Cav's pregyroscope duty in Nuremberg, Bamberg, Bayreuth and Amberg, Germany.

The scenario for the demonstration was written and rewritten many times; however, the final script followed closely the original show drawn up by the MDW Project Officer. Timing and phasing were changed and additional plots were added to take up time lag in some instances, but the final impression obtained was one of a smooth flowing, action-packed show. In some instances the proper application of tactics had to be subjugated to television coverage and spectator participation. In one instance, the safety precautions taken during an assault phase detracted slightly from reality, but not from the interest of the spectators. In this instance the task force's one-quarter ton ambulance, which was following the attacking force down the field, was photographed immediately adjacent to a flame-throwing tank in the process of utilizing a 150 foot stream of fire to eliminate a pillbox.

To explain the play of the demonstration of quick orientation of the project area is necessary. *Figure* 2 illustrates the demonstration area. The section which lies between control lines "F" and "H" is composed of stubble growth, heavy brush and small trees. The major portion of the demonstration proceeded through this area. The main runway is 100 feet wide, separating the main demonstration area from the spectators who were seated in the stands to the east of the field. Television cameras were located in the vicinity "CG" and on the north and south ends of the stands. In addition small portable TV cameras were carried by Signal Corps personnel into the demonstration area. All TV coverage was excellent. The total area provided for the project measured 1500′ x 3300′ and paralleled the main runway extending from north to south. Timing for all phases on the demonstration was based on the firing of a simulated army missile carrying an atomic warhead. To add realism to the detonation the spectators were assured that the demonstration of the atomic explosion was harmless with no fall-out hazard. The detonation took place in the area indicated by the letter "C."

The Problem

Units moved out and proceeded to pre-planned positions from which the problem actually started. At H-1, Mr. Walter Cronkite, the well-known CBS commentator, introduced the Army portion of the show, and gave the friendly and enemy situation.

This found the reconnaissance platoon on the move in the initial stage of the problem. They were searching for the enemy and moving into position from which they could observe the effects of the forthcoming Atomic Attack on the main enemy position.

At H-hour an army missile carrying atomic warhead exploded on the main enemy position two miles away. The reconnaissance platoon continued to move, firing on suspected enemy positions in the CG area.

Enemy returned fire from the outpost line of resistance. The reconnaissance jeeps took cover in the wooded area to their right (BG), continuing their reconnaissance mission while the reconnaissance tanks took up the fire and moved into better firing positions in the wooded area (BG).

Next the 3d tank platoon located north of phase line Alfa moved into the "Base of Fire" position. The platoon echeloned right and opened fire on the enemy outpost (CG). At this point the engineers fired demolitions to simulate tank shell bursts in and around enemy outpost positions. Demolitions were fired at a ratio of one to ten tank shells fired.

The Reconnaissance Platoon continued through the wooded area into defilade and joined the aggressor force on the main objective.

The 2d tank platoon, reinforced by a flame-throwing tank and a platoon of armored infantry with one additional carrier loaded with four portable flame throwers, moved in the vicinity of the pillboxes, in line formation to assault the enemy outpost line of resistance.

The 1st tank platoon, which had been in defilade on the right of the 2d platoon (west edge of woods PL-Bravo), came into view of the audience and joined the 2d platoon in the assault, in line formation.

The enemy on the main objective opened fire. The 3d Tank Platoon (base of fire) which had been dropping shells in the vicinity of "CG," shifted its fire to the main objective. The Engineers fired prepared charges to simulate shell bursts on the objective as well as on the outpost.

The attack was then slowed down due to enemy fire from both positions and the difficulty of operating in the woods. The infantry dismounted from their armored vehicles and moved ahead of the tanks in the wooded area. Some tanks of each platoon remained in the open and continued fire and movement. The 3d tank platoon continued firing from its base of fire position. (At this point in the demonstration the play had not moved beyond PL-Bravo). Now both 1st and 2d platoons moved south of PL-Bravo, by-passing the first pillbox. At this movement friendly infantry were fired on from the pillbox and the flame throwing tank is released from the 2d platoon to attack the pillbox with flame. After destroying the pillbox, the tank rejoined the 2d platoon for the balance of the show.



U. S. Army

With the firing of the simulated atomic explosion the problem was under way.

At approximately H PLUS 5, four H21 helicopters, two carrying artillery pieces and two carrying jeeps, landed their loads in the open in the area north of PL-Bravo and south of PL-Alfa, between the main runway and the wooded area. Soldiers already on the ground emplaced the pieces, fired a few rounds, went out of action, hooked up and moved out of the area. Next the H19 helicopter made a drop of supplies to rear of attacking forces "BH."

A simulated enemy fired from the rear. Some riflemen started firing in that direction. At this time the carrier with the portable flame units



U. S. Army

H21 helicopters bring in jeeps and artillery pieces in support of the attack.



U. S. Army

One of the tank platoons crossing a phase line during the attack problem.

unloaded its personnel, who attacked the enemy troops in a cave. (Close-up of this action by portable TV cameras was perfect. This was reported to this office by several TV viewers. Ed.) The simulated cave was located midway between pillboxes in the wooded area.

The Armor-Infantry attack crossed PL Charlie. The tempo of fire increased with tanks firing on the main enemy position. At this point special assault teams were trained for close-up TV shots. One shot was of an infantryman talking on external tank intercom.

The Armor-Infantry attack continued toward PT "Delta." The attack was slowed down by heavy brush and increased fire from the objective.

At this point the Infantry was still moving ahead of the tanks.



U. S. Army

General Doan and 2d ACR officers witnessing a dry run prior to the TV show.

The H21 helicopter landed an Engineer demolition team in the open, midway between the pillboxes on the east side of the wooded area. They destroyed the 2d pillbox with high explosives.

An engineer bridge was dropped in sections in the vicinity of the pillbox at "CG." Engineer troops on the ground assembled the bridge and staked it down.

The 3d platoon having been given the order to move out, proceeded from their "base of fire" position directly to a point on PL "Delta" and east of the main runway. Tanks in the platoon fired rapidly as they moved parallel to the stands and the runway. Three H21 helicopters, each carrying ten infantrymen, followed the 3d platoon down the field. As the tank platoon turned toward the objective and crossed the main runway, the helicopters landed their troops in the open between PL "Charlie" and PL "Delta," east of the runway. The infantry soldiers then followed the tank platoon onto the objective. Troops were landed at approximately *H PLUS ELEVEN*.

The 2d and 3d platoons crossed PL "Delta" supported by infantry. Firing increased in tempo.

Both enemy tanks on the objective were knocked out. Smoke grenades were used to simulate fire. Enemy soldiers and friendly soldiers appeared on TV close-up in hand-to-hand combat. (Special trained Judo instructors put on this show). The enemy soldiers were killed, wounded and captured.

The 1st tank platoon moved out to the west immediately and continued into the regrouping area.

As *H PLUS THIRTEEN* arrived (15 minutes after beginning of demonstration), the 2d and 3d tank platoons with infantry were moving on over the Objective to continue the attack.

This action ended the demonstration. All units moved into a preplanned regrouping position and moved from this location to bivouac area.

And so Armor was given the opportunity to demonstrate its mobility and armored firepower to the nation. The 2d Armored Cavalry Regiment is proud to have had the opportunity to represent the Army on such an auspicious occasion.

CARDED

By MAJOR ROY MOORE, JR.



QUALITY MANPOWER AND THE MODERN ARMY

MANY challenging problems currently confronting military personnel planners are centered around the attraction and retention of the high caliber of manpower required by a modern military establishment. Since World War II, accelerated technological gains have poured forth a flood of new weapons, new tactical concepts and new ideas, all demanding higher levels of leadership and technical ability. Providing the skills to lead, operate and support such complex weaponry and modern tactical concepts is involving the same sort of imaginative thinking that developed the weapons themselves, and is of equal importance. Although quality is essential to effectively operate our missiles, communications systems, radars, etc., this cannot mean that only the best men will be acceptable. The manpower barrel has a bottom and the "cream of the crop" is at best a thin layer and eagerly sought by both industry and the military. How deeply into the barrel it is necessary to go depends on the requirements and how well men who are taken are utilized. One has only to observe the interior of a modern tank, a missile site, or a signal communications center to appreciate the fact that Army requirements are dictating better personnel quality. As this quality requirement becomes more acute, the utilization aspect becomes increasingly vital. What this means is that the right kind of man is the man suited for the job; he meets the requirement and he is not wasted. We all know you do not assign a mechanic to design the guidance system of a new missile; but neither do you assign a master mechanic to do a spark-plug cleaning job. This matching of the man with the job, in face of increasing nationwide requirements for quality, is a problem universal throughout the services. What your Army is doing about it bears directly on your future and the security of your nation.

MAJOR ROY MOORE, JR., Armor, a frequent contributor to *ARMOR* and co-author of *Tank Company Commander's Guide*, served in Europe during World War II with the 735th Tank Battalion. Following the War he taught at the US Army Armor School and held several Armored Command assignments. He returned to Europe to the 2d Armored Division. Attending C&GSC, he is now in the Plans Section, DCS/Pers, D/A.

High Standards for Career Soldiers

It is fundamental that if better quality personnel are to be attained higher standards must be enforced. The standards for men who are inducted are established by Federal law, and are therefore beyond the immediate authority of the military. The Army, therefore, has initially concentrated its efforts toward insuring the highest quality that can be realistically expected of the Regular Army career soldier. Since it is this professional soldier who must withstand the initial shock of enemy aggression and provide the hard core of leader-

ship required by rapidly mobilized manpower, he must be the best obtainable.

New reenlistment standards recently implemented reflect the emphasis towards quality and the increasing importance of suiting the man to the job. Herein the Army has taken a scientific approach. Until recently reenlistment mental standards have been based upon scores achieved on the Armed Forces Qualification Test (AFQT), which is essentially a screening device providing a single over-all score which is reasonably indicative of a soldier's general qualifications for military service. The intended purpose of this test is to assure equitable qualitative distribution of available manpower within the Army, Navy and Air Force. The limitation of this test for reenlistment or retention purposes is that, in reflecting only general qualifications, it tends to submerge special strengths which are important to the modern Army in light of increased emphasis in technical areas. Since Army jobs require varying patterns of skills and abilities, it is reasonable to expect that the career soldier possess comparable patterns of aptitudes which will enable him to succeed in one or several job areas. This is the philosophy of the recently revised mental standards for Regular Army reenlistment.

The device for measuring these aptitude patterns is the Army Classification Battery of ten aptitude tests. These tests are measures of reading and vocabulary, arithmetic reasoning, pattern analysis, radio code aptitude, mechanical aptitude, clerical aptitude, shop mechanics, electrical information, radio information and automotive information. Two or more of these tests are combined to form aptitude areas. These test combinations, or aptitude areas, in turn, predict success in related job areas. There are at present eight such combinations of tests, each associated with specific Army jobs. Regular Army reenlistment standards revised in April 1957 require that the individual achieve satisfactory scores in at least three of these aptitude areas. In other words, in order to be retained as a career soldier, the individual will be required to possess aptitudes of current and anticipated usefulness to the Army.

Job (MOS) Proficiency Tests

As Army jobs become more complex, it is becoming more and more difficult to determine who is and who is not qualified to perform a particular job. Further, it has been found that opportunities do not always present themselves to the soldier to show his commanding officer what he can do. Accordingly, an enlisted MOS proficiency testing program is being established to provide uniform standards for determining an individual's qualifications to do a job. For some jobs, tests will be of the paper-and-pencil type; for others the individual will be required to perform some part of the job for which he is being tested. Determination of the qualifications of NCO's will be accomplished by individual assessment of their leadership ability as well as their job proficiency. The testing procedure will remain sufficiently flexible to permit the development of the best possible measure of the individual's proficiency.

It is anticipated that the first of these tests will be ready for field use late in 1957. Initial priority for test construction and administration will be directed toward those jobs which are considered critical from the standpoint of procurement and training and jobs in which there is evidence of malclassification in the field. The MOS proficiency testing program, coupled with a promotion system based on merit, will provide incentive and motivation for the soldier interested in making a career of the Army, while at the same time assuring the Army that each of its enlisted jobs is staffed by a competent soldier.

Improved Classification of Military Jobs

As a forerunner to the MOS Proficiency Tests discussed above, the Army revised its classification of military jobs to more accurately describe over 500 different jobs and necessary qualifications. The new system, which was introduced in 1955, is constantly under revision to reflect a variety of new technical and leadership positions primarily brought on by developments in the electronic and missiles fields.

Modern Assignment Procedures

To provide improved means for rapid and accurate assignment of key enlisted technicians and leaders a streamlined assignment system is being developed. Providing unit to unit assignment for key enlisted men, the new system will merge the advantages of automatic data processing systems (ADPS), improved communications equipment and advanced management procedures, the object of which is to speed the right man to the right job in as efficient a manner as possible.

"Hard" and "Soft" Skills

As a result of the surge of rapid expansion of forces during World War II and the Korean conflict, and the equally rapid scaling down of forces thereafter, all the services are hampered with excessive numbers of personnel in the upper enlisted grades skilled in occupations other than those currently required. In December 1955, the Army had approximately 27,000 upper three graders in such overage specialties. Many of these men had been promoted in occupations mainly of an administrative or service nature for which little formal military training is required—the "soft MOS's." On the other hand, there was critical demand for these grades in the more highly skilled technical and combat arms areas—the "hard MOS's." A year and a half of dogged, unglamorous, unpopular, mandatory retraining and reclassification on the part of the major commands has resulted in a 60% reduction of the 1955 overages of 27,000. The remaining 11,000 overages are expected to be virtually eliminated prior to the end of 1957 thereby permitting better utilization of the manpower available through a more equitable distribution of personnel in the upper grades.

Army manpower must provide the outstanding leaders and technically qualified personnel adaptable to the demands of newly developed tactical concepts, more flexible organizations, and complex equipment. The measures herein described are acknowledged to be no immediate solution to the problem of manpower quality, but will ultimately serve to attract and retain as career soldiers those individuals possessing the qualities of leadership and technical ability best suited to the modern Army—present and future.

JOINT ARMORED DIVISION ASSOCIATIONS' MEETING

On the Reconnoitering pages in the March-April issue of *ARMOR* (pages 40-41) we editorially proposed a joint meeting of all Armored Division Associations to meet in Washington, D. C. in 1960. At the same time we suggested the Labor Day weekend and asked for pros and cons to our plan. We also asked that representatives be appointed from the respective associations interested in such a plan.

To date we have heard from four Associations, of which only two appointed representatives. The 1st and 3d Armored Division Associations appointed representatives located in the Washington area. Two associations stated that Labor Day weekend did not constitute the best days. In fact, it was pointed out that only two of the 12 Armored Division Associations would hold their 1957 conventions over Labor Day weekend this Summer. These days were actually picked arbitrarily when the proposal was made to get the idea off the ground. Any dates agreed to by the committee would be satisfactory. The trouble is that there has not been sufficient interest shown to warrant exploring the idea any further. It is possible that some of the organizations plan to appoint representatives at their forthcoming 1957 reunions to be held this Summer. However, unless more interest is shown in the near future, it is believed best to drop this plan. Three years' planning for a joint meeting is necessary in order to hold such a huge meeting in as busy a city as the nation's capital, and unless there is a more favorable response we will quietly pull in our horns and forget the whole idea.

WHERE ARE YOU?

Since the inception of Gyroscope, we have attempted to keep abreast of all address changes of members of these units and unit subscribers of Gyroscope-bound organizations by contacting the commanding officer and asking his assistance in encouraging notification of pending changes by sending in change-of-address cards promptly. This has

materially assisted us in keeping a great many copies of *ARMOR* and the *NEWSLETTER* from going astray. We wish to thank these commanders for their assistance. We realize that the individual is responsible for keeping us informed of his whereabouts. When we receive changes promptly it means that he is anxious to keep himself abreast by continuing to receive *ARMOR* without interruption. However, in the throes of moving dependents, bag and baggage, from one place to another, some members forget to notify us of their forwarding address. First class mail is forwarded; hence, you continue to receive renewal and annual meeting notices. However, although we like to believe the magazine and newsletter are first class, the postal authorities treat these pieces as periodicals similar to commercial-type magazines. They cannot be forwarded. That is why it is important to keep us informed of your location.

With the great number of impending transfers during the Summer months, we are asking you to please keep us informed of your whereabouts and in turn we will see that you are kept informed with the latest issue of *ARMOR* and the *NEWSLETTER*. In fact, now that you are contacted each month with the addition of the *NEWSLETTER*, the prompt notification of your move to this office takes on added importance.

HERE WE ARE!

Now that we have asked about your whereabouts, let us inform you of our location. Many organizations still keep our old addresses in their files. Hence, our first-class mail is going to one of two old addresses and consequently is held up for several days. In the case of second and third class mail, we often do not even receive such. In writing to us, please note the correct address:

ARMOR—1757 K Street, N.W.,
Washington 6, D. C.

The Editor

Ordnance Activities At VILSECK

By SERGEANT AUTHOR W. HOUSE

HOW do you go about getting your vehicle repaired if it develops motor trouble or is damaged in the Grafenwohr-Vilseck training area? This is the story that answers that question and also describes the multitude of tasks performed by the Ordnance Section of the Seventh United States Army Tank Training Center located at Vilseck, Germany. The Ordnance Section has the mission of providing continuous third echelon support to the Tank Training Center and other units permanently stationed in the Vilseck area. The Ordnance Section also supplies parts and minor and major assemblies on a replacement basis (item-for-item exchange) to the various Seventh Army units utilizing the Grafenwohr-Vilseck training area. This support to lodger units is furnished primarily to place vehicles back into operation and thereby remove them from the "deadline" list.



U. S. Army

Parent unit delivers wrecked vehicle to Ordnance Section.



U. S. Army

German mechanic repairs mechanical defects of vehicle.

The Ordnance Section, commanded by Major Edward L. Kisten, contains the minimum number of officers and enlisted men necessary to supervise the work of the skilled German civilian employees that are assigned to the various shops within the section. The military personnel and civilian employees operate a tank shop, an artillery shop, a welding shop, a battery shop, a canvas repair shop, a paint shop, a wheeled vehicle shop, a parts reclamation shop, a parts supply office and four supply storage warehouses. These various shops are capable of processing a yearly average of over 150 artillery pieces, 12,000 small arms and automatic weapons, 300 tracked vehicles, 1,800 general purpose vehicles and trailers, and several thousand fire control instruments.

How are damaged vehicles processed? When a damaged vehicle is delivered to the Ordnance Section, it is accompanied by a work request form and the maintenance file on that particular vehicle. The vehicle is then given an initial inspection, which is actually a complete technical inspection, performed by skilled mechanics to determine the deficiencies that exist on the vehicle. This

SERGEANT AUTHOR W. HOUSE, Ordnance NCO at the Seventh United States Army Tank Training Center since 1954, joined the U. S. Army in June 1947. Since that time he has been connected with Ordnance work as a tank mechanic, recovery chief and shop foreman. He served in Korea from 1950 to 1952 in these various capacities prior to this assignment.

Quite frequently combat units move their vehicles from place to place or station to station, and do not have any realization of the support rendered them which keeps their vehicles moving. How Ordnance support is given to the units that go to the Vilseck Tank Training Center is told in the following article by the Vilseck TTC Ordnance noncommissioned officer.

inspection also ascertains the replacement parts that will have to be obtained before the vehicle can be completely repaired.

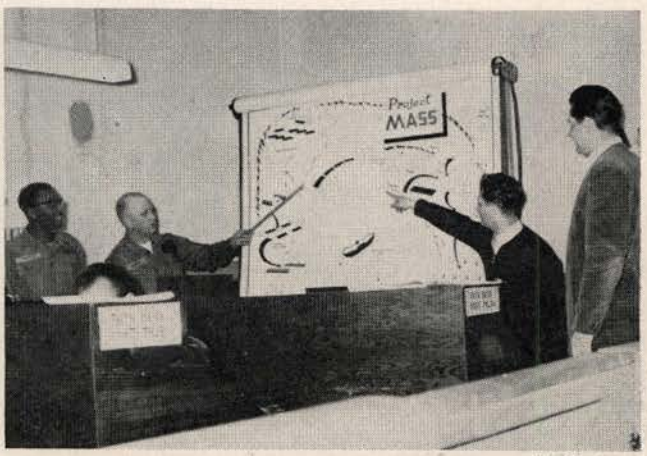
If the necessary replacement parts are not on hand in the ordnance parts supply, the requisition card is transmitted to the next higher ordnance supply depot. All parts are ordered through "Project MASS" (Modern Army Supply System) shown schematically. IBM machines automatically determine whether the replacement parts are available in a European depot. If the parts cannot be obtained locally on the continent a radio telegram is sent to the United States where the parts are located and flown to Europe bearing the address of the Ordnance Section, Tank Training Center at Vilseck. This new supply system enables needed items to be obtained from the United States in a matter of days. If this system did not exist, enormous stockpiling of all possible replacement parts would have been necessary here in Europe.

Occasionally, the desired part is not available through MASS and the necessary part is then manufactured in the Ordnance Section's machine and welding shop (allied trades shops). In the allied trades shops, two civilian master machinists are capable of producing practically any metal part required on either a track or wheeled vehicle.



U. S. Army

German welder repairs the fender of the wrecked vehicle.



U. S. Army

The parts not in stock are ordered through project MASS.

Following the inspection, the vehicle is then moved into the wheeled vehicle shop where the actual repair work is performed.

Before the vehicle is repaired, the work request form (DA Form 811—Work request and job order), the technical inspection form and the maintenance file (WD AGO Form 478) are hand carried to the production Control Office where the necessary replacement parts are requisitioned. The job order (work request form) is recorded and assigned a reference number, and time sheets are prepared to record the actual work hours performed by the civilian employees on this vehicle.

While the replacement parts are being obtained, the mechanical defects are corrected on the vehicle and it is then sent to the welding shop. In the welding shop the dents are removed from the body and fenders, the bumpers and frame cross members are straightened, and torn or cracked places on the body are repaired.

The vehicular canvas, in the mean-

time, has been sent to the canvas repair shop which is located in one of the supply warehouses. There the canvas is carefully inspected, and any rips, loose seams or torn places are repaired; and tie ropes and plastic windows are replaced. The canvas is then given a final inspection, and if it is in excellent condition, it is carried back to the vehicle.

The vehicle is then spot painted, the canvas installed and necessary lubrication is accomplished. A final technical inspection is then performed and all repairs and adjustments are carefully checked before the vehicle is released. After the vehicle has passed the final inspection, it is moved to the pick-up parking lot. The unit is then notified, and when personnel arrive to move the vehicle back to the unit's kaserne, the maintenance file and the vehicle are released to them.

The repair procedure followed for this wheeled vehicle is quite similar to the process used to repair tanks, artillery guns, fire control instruments or small arms. Regardless of how small or large the piece of equipment, it is carefully inspected, repaired and reinspected to insure that all defects have been corrected.

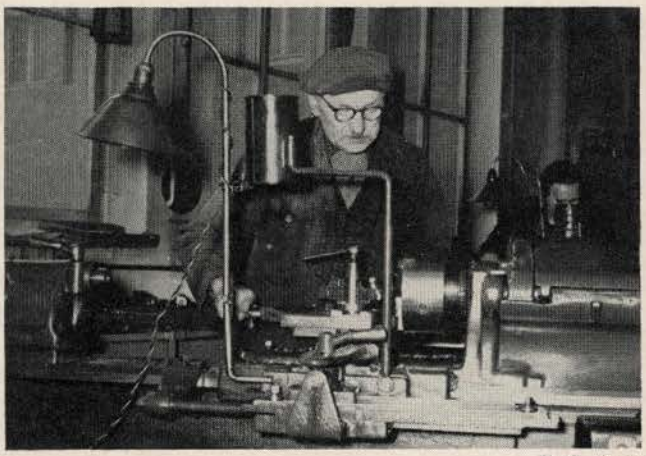
The 90mm tank gun is removed from the tank turret to enable a complete check to be performed. If the weapon passes the required tests, it is then lubricated and reinstalled in the tank.

Power packs are removed from a tank to enable the engine's carburetors, magnetos and transmission to be checked and properly adjusted. After the necessary work has been done on the power pack, it is placed on a special test stand and is given a running performance test. This test stand was designed by tank shop personnel to provide a means for operating the engine outside the tank —thus enabling compression checks to be performed and numerous other checks that would be difficult and time consuming if performed with the power pack installed. This test stand also eliminates the possibility of installing a defective engine which would have to be removed for further repairs.

Regardless of the type of equipment being inspected or repaired by the various ordnance shops, if any part or assembly is discovered to be defective it is removed and taken to the direct exchange supply section where it is exchanged for a non-defective one. Defective carburetors, magnetos, starters, distributors, generators, brake shoes, clutch discs, propeller shafts and numerous other parts are sent to the ordnance reclamation shop for repair. In the reclamation shop experts disassemble, clean and completely rebuild these vital assemblies to factory specifications. After the assembly has been rebuilt, it is tested and if declared serviceable, it is placed back into the stock of the direct exchange section. The Ordnance Section's electrical shop possesses a test stand, built by the civilian employees, which can be used to check and repair any part of a tank's electrical system from the heaters to the various instruments located on the dash panels.

The Ordnance Section of the Seventh United States Army Tank Training Center has been organized in such a manner that the Ordnance officer is able to pin-point the exact status of any piece of equipment on a moment's notice. The full story of the operations performed by the Ordnance Section would require many volumes of written material. This article is a brief résumé of the section's operations and should benefit those personnel whose units train in the Vilseck-Grafenwohr area by making them aware of this support facility.

This story should also be of interest to any member of the Army since it describes the type of work that can be performed by any unit's supporting Ordnance.



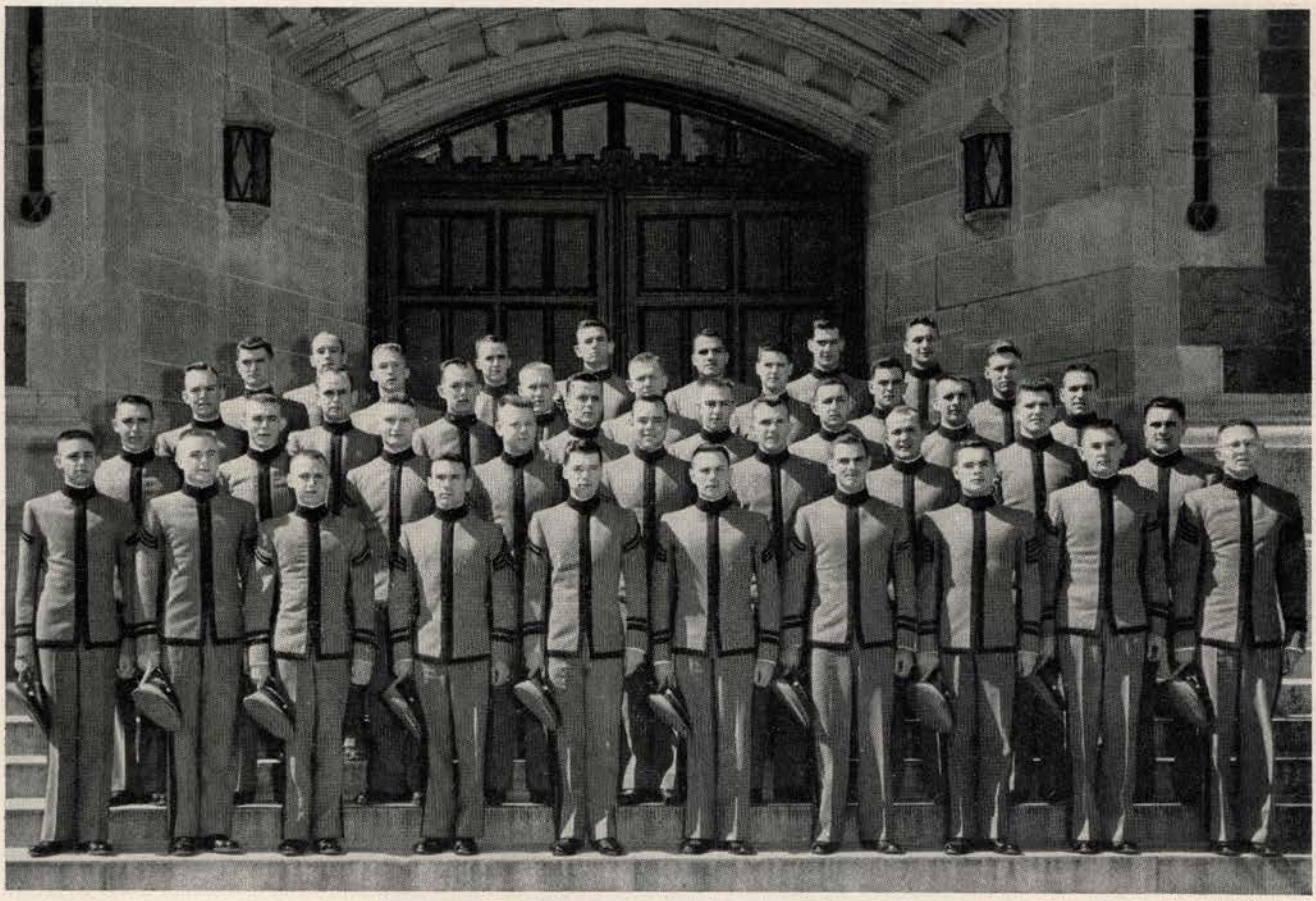
U. S. Army

German machinists manufacture some "hard to get" parts.



U. S. Army

German mechanics shown removing power pack of a tank.



U. S. Army

Left to right: Front Row—Kaiser, James B.; Rogers, Gordon B.; Calyer, Peter D.; Shimek, E. Joe; Murchison, John; Schafer, Donald; Gaspard, Glaudis; Pocock, James A.; Gale, Edward W.; Lea, Charles E. Row 2—Mead, Dana G.; Conrad, Hawkins; Friend, William; Hall, F. Whitney; Westerfeldt, Robert F.; Little, John A.; Focer, Samuel W.; Lindholm, John L.; Cortez, James J. Row 3—Sowers, William; Kennedy, Ronald; Jenis, Donald S.; Buck, Champion F.; Solberg, Anthony; Pritchard, Walter L.; Britton, James H.; Waldenaier, Carl H. Row 4— Britt, Albert; Roller, Robin J.; Beasley, Benjamin B.; Fitzpatrick, Donald K.; Bell, Raymond F.; Cooper, Jack B.; Bodenhamer, Robert F. Row 5— Moreland, Gordon R.; Apperson, Jack A.; Glen, G. W. B.; Politis, John N.; Comeau, Robert; Parker, Kenneth.

United States Military Academy Class of 1957 Armor Graduates

On the fourth of June the 40 cadets, shown above, from the United States Military Academy, completed their four year course, received their Bachelor of Science degrees and were commissioned in Armor.

Upon completion of their graduation leave they will report to Fort Knox to attend the Basic Armor Officers Course at the US Army Armor School. Upon completion of this course, and other required training for Parachutist, Ranger or Army Aviator ratings, they will join their units in the field in the Spring of 1958.

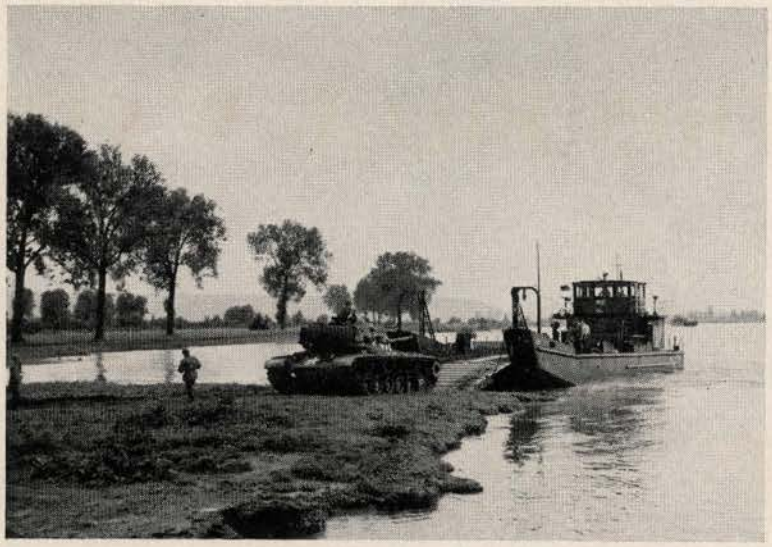
As in the past Armor received a very small quota of the graduating class. The breakdown by branches was: Engineers–51; Signal Corps–38; Artillery–130; Infantry–146; US Air Force–136 and Armor–40. The quotas are established by the Department of the Army based on comparative strengths of the Combat Arms of the Army. This year's Armor group had an academic median of 143, while the quota was filled at 226 out of a class of 548 graduating cadets.

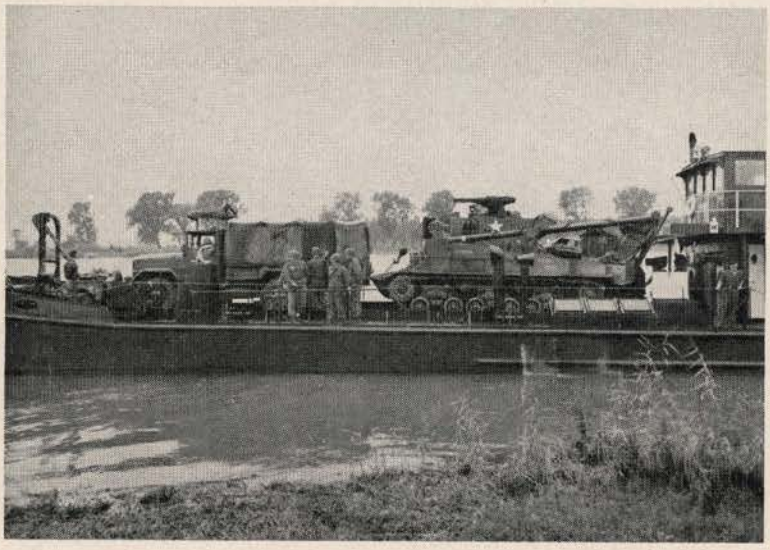
Letters of welcome into the branch signed by the President were sent to each newly commissioned officer in the mobile arm. Letters signed by the Secretary, notifying each graduate that he had been given a one-year membership in the Association were also sent. To those cadets who were already junior members their memberships were extended accordingly. In addition copies of *Preparation for Leadership* by Robinett and *Tank Company Commander's Guide* by Brier and Moore were given each graduate.

During the four-year course at the Military Academy all cadets receive tactics instruction in all the branches of the Army with emphasis placed on the combat arms. This instruction is given in the classroom and in the field.

Armor instruction at West Point is given by the Armor Section, Combat Arms Detachment, under command of Lieutenant Colonel R. P. Campbell, Jr. The Executive Officer of the Section is Captain V. DeP Gannon, Jr.

The Association welcomes these newly commissioned officers in the mobile arm and wishes them a long and distinguished military career.







Photographs
U. S. Army

THE German-built landing craft of the United States Navy's Rhine River Patrol slowly grounded itself to a halt on the riverbank. Slowly at first and then more rapidly, the front ramp of the barge swung its way to the ground and revealed an M48 tank of the 57th Tank Battalion, ready to roll off the craft. The ground guide glanced at the chalked number on the front of the vehicle, and signaled the tank forward and to the left. Four minutes later the tank was safely in the holding area and the landing craft was well on the way for another 50-ton passenger.

This rapid and seemingly effortless movement across the Rhine River of a tank battalion was the result of many hours of schooling and work on the part of the 57th Tank Battalion of the 2d Armored Division and the Rhine River Patrol of the US Navy Forces in Europe. Preparation for this exercise was begun six weeks prior to the actual crossing with the initial conference between the 57th Tank Battalion commander, the commander of the Rhine River Patrol in Mannheim and personnel of the operations section of the 57th Tank Battalion. The following of the preparation of the exercise to its actual day of execution demonstrates how careful planning alleviates last minute "flaps" and changes.

As a result of the initial conference between the two services, a target

CAPTAIN THOMAS W. BOWEN, Armor, graduated from USMA in 1948 and was assigned to the 15th Constabulary Squadron in Europe. Returning Stateside he served in the 1st Armored Division, attended the Advance Class at the US Army Armor School and returned to Europe as assistant G3, 2d Armored Division. He is presently the company commander of Company B, 57th Tank Battalion, in the Division.

"Across The Rhine"

OPERATION BILGE WATER

By CAPTAIN THOMAS W. BOWEN

date for the exercise was selected. Based upon that target date, the scheme for the schooling of personnel involved was decided upon. At the meeting, the areas to be reconnoitered for holding areas and the recommended landing and loading areas were also designated. Based upon the information derived from this meeting, action was taken to make detailed plans for the operation.

Administratively, maneuver rights had to be obtained for areas to be used; road clearances were applied for based on the results of ground reconnaissance. Clearances from the higher headquarters of both services were requested to approve the liaison which had already been started at the working levels. Logistically, the gasoline situation had to be checked to determine if the battalion allocation could support the problem.

Simultaneously with the staff work involved, training of the tankers began. The training was conducted in three phases. The first phase involved an orientation given by Navy personnel at the Rhine River Headquarters. This briefing was given to the officers and key noncommissioned officers of the battalion. It covered the following: history, mission and capabilities of the Rhine River Patrol; the various types of craft available used by the Patrol; the loading capacities of the craft to be used on our operation; and finally instruction on safety and special accident preventives which applied to the crossing. The first phase was completed by a tour through the various landing craft.

Phase II brought the working level into the picture. Practice loading of the various type vehicles took place, *i.e.*, tanks, half tracks, armored personnel carriers and trucks with trailers. The drivers and vehicle commanders as well as the officers witnessed this demonstration. The capacity of each landing craft and the proper method of obtaining maximum loading capacity was shown.

Before Phase III, the actual operation, could be started, additional detailed plans were needed. A ground reconnaissance showed the necessity of having two holding areas on the leading side of the river; one initially for the wheels and another for the first tank company that would cross. By having both wheels and tracks available for each loading during the operation, capacity loads could be obtained throughout the crossing. To facilitate loading the trucks towing trailers, two trucks were equipped with tow pintles on the front bumper. During the operation these vehicles were used to back the trailers onto the landing craft. Later the parent truck was backed onto the craft and the two vehicles were re-coupled.

Holding areas on the far side of the river were designated for each unit. Each area was numbered and all vehicles bound for that area were chalked with that number. The ground guides (members of the reconnaissance platoon) knew the various holding areas and directed the drivers to the correct road to their assembly area.

The tactical plan called for the first company to be a covering force for the remainder of the battalion. The covering force had the mission of both ground and air defense; for, while friendly forces held a bridgehead, the crossing of a tank battalion might have caused unexpected reaction by our imaginary foe. The next two companies were to go to holding areas which doubled as attack positions; once assembled these companies would lead the assault through the friendly troops holding the bridgehead. The last tank company was to move with the covering force with the mission of attacking through or assisting the two assault companies when needed. After crossing, the trains element was to remain in its holding area prepared to move along the axis of advance on order.

The plans slowly became facts as the pieces began to fall into place. The troops were trained and ready for Phase III. The day before the crossing, the battalion moved to an assembly area 15 miles from the crossing site. The final briefings were given and the attack orders were issued.

Feeding was accomplished prior to daybreak on D Day while the reconnaissance platoon moved out to mark the routes and positions. At 0530 hrs the lead company moved out followed by the command group and mortar platoon. The other elements were alerted and prepared to move on call from the crossing site. At 0700 hrs the first vehicles of the reconnaissance platoon were loaded on the landing craft and dispatched to the far bank. "Bunching up" of vehicles at the crossing location was averted by sending only a few vehicles at a time to the loading site from the near-by holding areas; this resulted in a smooth flow of traffic and decreased the possibilities of presenting a good target for aggressor air.

Six hours later operation *Bilge Water* was history, marking the first crossing of the Rhine by M48 tanks, courtesy of the Rhine River Patrol.

Mutual cooperation on the part of two sister services had resulted in a job well-done.

THE 2D ARMORED CAVALRY



A platoon leader briefs Friendly and Aggressor forces prior to an exercise.



A tank sergeant communicates with platoon leader.



A scout moves in advance of tank during exercise.



Troopers of the 2d Armored Cavalry Regiment rush from M59 personnel carrier.



Infantrymen probe the water for mines in advance of tanks.



A tank and M59 personnel carrier are shown fording a small stream.



During the training exercise this M41 tank advances along a road.



An Aggressor tank hits a simulated mine during exercise.

The 2d Armored Cavalry Regiment, stationed at Fort George G. Meade, Maryland since 1954, is typical of all our Armored Cavalry Regiments. It is not intended here to promote any one unit. But we do publish these pictures as a tribute to all Armored Cavalry Regiments which include five Regiments in the Regular establishment, and nine Regiments in the Reserve Components, all National Guard units.

Organized 121 years ago, this Regiment has, since its inception, been a mounted unit. It is organized and equipped for light combat wherein it might attack, delay or defend against any enemy. Its security in part is derived from its ability to move on a moment's notice. Fundamentally, the 2d Cavalry is a reconnaissance unit with a reconnaissance mission during combat. Normally assigned to an Army or Corps, the Regiment may screen the front, furnish flank security or reconnoiter to the front of the larger unit. Trained and equipped to act independently in small, company size forces, the unit's organization, derived in pre-World War II days, is especially adaptable to atomic warfare.

The role of the 2d Cavalry today is one of training—training of pipeline replacements—training of replacements for her sister regiment the Third Armored Cavalry, stationed in Germany—training of fillers to go into her own ranks under the scheme of "Gyroscope." To date the 2d Armored Cavalry has trained approximately 2500 personnel.

February 1958 will see the Regiment again on the continent of Europe replacing her sister regiment. The mission will, we assume, be one of patrolling borders.

We are indebted to Mr. William R. Adam, Chief Features and Special Projects Unit, OPI, Department of Defense, for this pictorial display. The photographer was Photographer First Class Ralph Seghers, U. S. Navy.

RDED

THE KEY—MOBILITY

By LIEUTENANT COLONEL W. F. FRANK

MAURICE wrote "the ultimate object of mobility is to obtain superior power in battle." This goal has been before every commander in battle. Each has endeavored to move his forces into action before his opponent could assemble or rally his own. Thus, there has been not only a requirement to move forces but to move them at a faster rate.

Although Maurice defined the "object" of mobility, the meaning of mobility was not set down. Mobility is defined as the quality or state of being mobile, militarily as capable of being readily and rapidly moved about. By the mathematical process of substitution, *mobility* can be initially defined as the quality or state of being capable of being readily and rapidly moved about. In a pure sense, this element of "movement" is mobility as generally thought of by the military. It implies speed, and the obvious conclusion that the faster and more widely forces travel, the greater is the mobility of these forces.

These forces have been and are composed even now of machines and men. Machines not only include means of movement but also the means with which men actually conduct war; the arms so to speak, individual and supporting. The passage of time, the advance of civilization, and the ingenuity of men have brought the simple weapons of war of yesteryear to the stage of weaponry known today. With weapons it has been a state of progressive development. In contrast, the movement of men in battle has followed that of a pendulum, afoot and mounted, then afoot and then mounted. This seeking of the best means for movement has sought the goal of regaining superiority in battle after an improvement in weapons.

It has been an unchanging characteristic of man that he has sought to do all things faster. Discovery of the means of applying the power of steam engines to vehicles began to make changes in the mobility of armies. From the earliest times the movement of troops to battle had been limited to the distance that a man or horse could cover and *still be capable of fighting.*

The employment of railways increased the pace of strategical maneuver. Paradoxically, however, the range of tactical movement became limited by the newly-gained firepower. Although it became possible to move larger masses of men and their supplies (over greater distances and faster) the end of the railway line was the limit to maneuver and the result was a *decrease in the mobility of operations.* Thus man, in seeking to concentrate greater forces at a given point, suddenly discovered that an improvement in the ease of movement was offset by restrictions upon direction of that movement.

The discovery and development of the gasoline-powered vehicle offered an opportunity to partially overcome the restriction on direction of movement imposed by railroads. World War I was the first opportunity to employ this new means of improving mobility. Yet the suddenness with which this war became a static battle likewise hobbled the horsepower of the truck. Armies treated, of necessity, the motor vehicle as they had the railroad earlier; a means of amassing men and supplies. With the war at this point reduced to actions emanating from elaborate trench systems, Major General J. F. C. Fuller wrote

This excellent article appeared in the May 1957 issue of the *Marine Corps Gazette* and is reprinted here with the kind permission of its editor. All the illustrations are supplied by *ARMOR*.

LIEUTENANT COLONEL W. F. FRANK served a tour with the Office of Naval Intelligence, during which time he studied the problem of mobility and the nature of our Armed Forces. Prior to that time he was the Assistant Naval Attaché in Moscow. Presently he is the Executive Officer, 3d Service Regiment, 3d Marine Division.

"the tactical problem thus became one of reinstating mobility, and the first solution was sought in vastly increasing shellfire—that is, in heavier blows—which was rendered possible by substituting the truck for the ammunition wagon." Now commanders began to regain some ability to mass force against an opponent. The great artillery battles bludgeoned and battered opposing defense systems and yet the advantage of mobility afforded by the use of motor vehicles to mass supplies and forces was not forthcoming. It came as somewhat of a surprise to the commanders to learn that the cratered areas produced as a result of these great artillery battles proved to be as effective an obstacle to forward movement as the original entanglements and trenches had been initially, and for the destruction of which the massive barrages had been fired.

At this point, a general air of stagnation set in as regards mobility. It is true that motor vehicles became larger, faster and more efficient but generally speaking, no direct corrective effort was made to regain mobility over ground cratered and ploughed by the massed artillery fires. Increased dependence was placed on motor vehicles and their designs generally directed employment over road systems. To overcome obstacles, smooth out craters and create even primitive roads, road building equipment was added to armies. Fuel consumption demanded transporters and the cycle began. More vehicles required more fuel which required transporters which required roads which required road building equipment. Heavier and faster vehicles only repeated and increased the problems. So most commanders entered World War II with a mobility generally tied to roads. In truth, because of the increased ease of transporting supplies and men, commanders unfortunately amassed greater quantities of stocks required on the front lines. The end result was that they became as tied to roads as they were bound by rail during World War I.

At the beginning of World War II, the lessons of World War I regarding artillery fire and its effect on mobility seemed to have been forgotten.

Tanks, motorized troops, personnel carriers, self-propelled artillery—here were the elements which would provide mobility as commanders had sought it. Using German success as the key to mobility, Allied armored and mechanized divisions, corps and armies came into being and remained. Yet even while these very copies of the "key" to mobility were being made, the key itself showed that it had not opened the door to mobility.

That such was lost to the Allied commanders is evident in the observation of Brigadier General Robinett, USA (Ret.), that "In the European theater . . . in Allied Force headquarters and in Twelfth Army Group headquarters . . . the *concepts of battle and of logistical support* originating in these headquarters displayed a uniform lack of imagination *in concepts of mobility*" (italics supplied). The fact that over 10 years have passed since the end of World War II has made little impact in the concepts of mobility.

As to the present state of concepts it is of pointed interest to observe that in a press interview in the spring of 1956 Field Marshal Montgomery stated "The armies of today have to a large extent *lost their mobility;* they are becoming roadbound and are weighted down by a gigantic administrative set-up" (italics supplied). This statement was made a year *after* he said "I'm for mobility. Absolute mobility! That's the great danger with modern equipment. When you clutter people up with things, they can't move." It is not just the matter of "cluttering people up" with the things that provide protection, firepower and shock effect that renders armor less mobile. Sir John Slessor, Marshal of the RAF, emphasized this problem of logistics in a recent lecture when he asked, "In a war in which nuclear weapons may be used against our line of communications, can we rely on the supply of vast quantities of fuel and ammunition required to sustain modern mechanized and armored divisions with their mass of atomic weapons?"

Thus in mechanization of forces, commanders have not found the complete key to mobility for they are bedeviled by weight, the need for favorable terrain, the requirement to eliminate bypassed obstacles and the problem that so long as that heavy army up front consumes so much, the very act of keeping it alive will create a Frankenstein monster behind.

The airplane, latecomer to the machines of war, offered a possibility to achieve the long sought mobility. In this machine, there was speed, range, surprise and the capability of bypassing obstacles. It was a newcomer to war and its capabilities and limitations were not known. Some commanders looked upon the airplane as an extension of the power of artillery and employed the weapon primarily in this role. Still other com-



U. S. Army

World War I was the first chance to use gasoline powered vehicles. They partially overcame the restriction on direction of movement imposed by railroads.

manders saw in it a means of moving troops, equipment and supplies, limited in numbers and amounts but sufficient if and when applied at the proper time.

As the Germans had sought to achieve superiority in battle by employment of armor, so did they seize upon the airplane to provide additional superiority, perhaps relying entirely upon the principle of surprise coupled with mass at the proper time and place. The battle for Crete was the proving ground of airborne assault. Crete fell to the German forces. The effect of the employment of this new machine in war was dynamic, nor could it have been otherwise. Now the assault could be launched with secrecy; any point could be the objective; defenses could be overflown, surprise was almost germane; massing of superior forces at the very objective; all this was at hand! Little time was lost in emulating the German airborne concept.



U. S. Air Force

Airborne troops armed with maximum firepower, able to pass over defenses, capable of appearing en masse at a given point, were believed to be the key.

The facts that most infantry supporting weapons were not air-transportable and supply would pose problems were acknowledged. The thought of rapidly moving groups of infantrymen armed with weapons with a maximum delivery volume of fire, able to pass over defensive systems, capable of appearing *en masse* at a given point all overshadowed the past proven facts of battle, and the key to mobility was again thought to be in the door. The Allies were quick to take up a concept which offered the prize of fewer men and less equipment accomplishing more. Costs would be lowered. The United States, unaware of the exorbitant cost of the seizure of Crete, created a large airborne force. Such a force is by far the most costly and *least mobile* form of ground troops.

It is interesting to note that the Cretan operation was the largest independent airborne operation of World War II. The Germans never again employed airborne troops independently. Likewise it is of interest that the Soviet Union which had pioneered in mass airborne operations and had numerous parachute troops never employed them in this role. Operation "Varsity" was the most successful Allied airborne operation on a large scale. The attack, launched against the east bank of the Rhine near Wesel in conjunction with a river crossing, owed most of its success to the facts that it was begun *after* the main assault crossing had started and could be supported by long range artillery fire. Major airborne assaults pointed out that the weakness in heavy supporting weapons, the inability to counter enemy armor, the problems of aerial resupply, the staying power of airborne troops, the need to link up rapidly with properly equipped and supplied ground forces and the need for overwhelming mass surpassed the advantages of ease of movement and rate of movement. So the employment of the airplane as a means to achieve mobility failed, even though it potentially offered speed, range, secrecy, surprise and a favorable capability of employing mass.

In the search for means of attaining superior power in battle, commanders have developed and employed each means that would provide ease of movement and speed of movement. The railroad, motor vehicle, armor and airplane, each in its proper time, offered these sought-after goals to the commander. Yet in each instance, the commander did not achieve mobility *nor* its object. Invariably he found himself to be less mobile. Each mode of easing and speeding up transport did that very thing. The forces were transported to the battle, but once there, the machine failed to give them mobility.

Major General R. W. Grow, USA (Ret), wrote, "There is a marked tendency . . . to confuse *transportability* with *mobility*. In the old days, infantry was sometimes transported on horse, but this didn't make it cavalry. Today infantry may be transported by rail, motor vehicle or aircraft. *But infantry fights on foot!*" To say that infantry in LVTs moving to a beach is less mobile than when in trucks traveling on an expressway or when in helicopters is erroneous and confuses principle with implementation. There is no question but that ease of movement and rapidity of movement are essential to mobility; speed and machines alone do not provide mobility.

If one of the elements of the combat forces, machines, does not give mobility, then perhaps the other element, men, must be considered. There are many who believe with utmost sincerity and conviction that the infantry with mobility and firepower will play as decisive a role in any war of the future as in the past. From the original Army field tests (1954-1955) ". . . it was concluded that until much more new equipment, giving more and larger-range firepower, electronic ground recon-

naissance, and a higher degree of mechanization actually is here, men must take their place." The Army historian, Brigadier General S. L. A. Marshall, is one of those proponents who believe in the key role of the infantry, and the problem of mobility is of grave concern to him.

Marshall does not believe that mobility comes primarily from the machines which give speed and reliability. To him men are the key to mobility. From and within men there must be the ability and willingness to enter into the fire fight, to endure the enemy's efforts, and then to deliver fire in superiority over the enemy. This does not mean that there must be superiority in numbers but superiority in methods and abilities. Liddell Hart, in his book *The Rommel Papers* and in associated studies on North Africa, has shown how a numerically inferior force has many times checked, isolated and destroyed a vastly larger force. Neither secret nor new, the method is based upon superior mobility and superior firepower at the chosen point of contact.

Of necessity, in future wars a commander must accomplish as much as or more than now with fewer men. This means that maximum use must be made of the capabilities of men, that their energies must be conserved until needed, and that an economy of their powers must be effected if superiority in battle is to be attained.

If this is the ability to be possessed or achieved, then, in addition to machines for moving forces, there must be developed in men endurance, courage and the will to fight. To accomplish these things in and for men, there must be a reduction or elimination of the fatigue and fear that are casualty-producing and reduce effectiveness. It is not sufficient to merely equip men with weapons and train them to use these instruments correctly. The technical aspects can be mastered by anyone, given sufficient time. The vital thing is to make provision within men themselves to utilize these weapons effectively and efficiently.

To do this requires a physical and mental well-being. This state is not achieved merely by food and rest. It requires a conditioning that is based upon the realization and acceptance of the fact that endurance is a matter of nerve and reaction as it is related to the physical capabilities. Men who are physically weary are slow in their responses. They are aware of this and its result—that in battle celerity and split-seconds can mean life. Let these be lacking and injury or death is inevitable. When this is before men, they become fearful, overcautious, reluctant—more hindrance than help. Their interest becomes self-preservation even to the point where they will become an actual casualty because they cannot move. The nerves sense the danger, but so strong is the reaction of fear that physical movement is impaired.

If men are to combat this fear which results from fatigue, then they not only must be physically conditioned, but every effort must be made to husband their strength and to eliminate those harassments which sap it. Actual physical strength can be developed only to a certain level. Beyond that point nothing is gained, not even hindrance. Rather the effect can be detrimental. Disproportionate fatigue is induced and stamina and the will to continue decline. There is a certain amount of weight that each man can carry and still be effective, varying with his structure. He can be conditioned to carry this weight almost indefinitely. But he cannot carry additional weight and retain his effectiveness no matter how much conditioning and training he is given.

When brought to this point, men achieve a sense of pride in their physical ability, confidence and the will to fight follow. This physical state of well-being and faith in self will not permit fear—except that sort of fear of not doing all that can be done. In this state of mind men will go any place and do anything willingly. They will know how to husband their strength and to be alert. Military history is marked by incidents when a small group of rested, alert men defeated a much larger force of men whose physical and therefore mental powers were impaired.

The welding together of machines and men in the search for mobility is not an incompatible union. Each is dependent upon and yet interdependent of the other. When employed in harmony, they embrace the basic *elements* necessary to achieve superiority in combat—ease of movement, rapidity in movement, stamina, endurance and the will to fight.

It is not sufficient merely to have these elements of mobility. These elements must not only be properly organized and employed if success in battle is to be achieved. They must be properly led if their potential is



U. S. Army

From men must come the ability and willingness to enter into the fire fight, to endure the enemy's efforts, and then deliver fire in superiority over the enemy.



Acme

Men and machines embrace basic elements necessary to achieve superiority in combat—ease and rapidity of movement, stamina, endurance and the will to fight.

to have its full impact upon the enemy.

The commanders of these forces must have vision and imagination in the conduct of their operations. They must be able to perceive what is to be gained by rapid, fully supported movement which understands and makes maximum utilization of the potential possessed. They must not be cautious and slow-moving in thought and action. Leaders must recognize, accept and take advantage of the austere and severe nature of combat, discarding the heavy, creature-comfort-providing supplies and equipment that impede progress. Objectives must reflect a here-today-gone-by-morning attitude rather than a there's-a-comfortable-place-and-good-shelter concept. They must accept the need to decentralize control to keep their forces moving and at the same time they must demand limited control from above. In their planning and execution commanders must endeavor to keep their minds at the same mobile levels as their forces.

General Robinett points out that, "In a military sense, mobility implies more than just mobility in equipment and organization. It is also a state of mind. If it does not exist in the minds of responsible . . . military leaders, mobility is impossible on the battlefield even though equipment and organization of forces make it possible. The lack of mobility in mind will result in rigid, shortsighted plans and sloth-like operations which tend to degenerate into static situations."

Tactical and strategic skill in planning is not sufficient. Commanders must consider the abilities of the forces which are to execute these plans. The greatest concern is oft-times devoted to conditioning the machines of war for battle. Training for men too many times is concerned with tactics and skill in arms. What purpose is served if men are not capable of employing these tactics and weapons when the time for battle suddenly bursts upon them? Commanders must allow for and ensure completion of the physical training required to give men confidence in their endurance. A leader must accept the necessity to train his men to fight without reliance upon the comforts of the rear areas. Men cannot be put in fighting condition as a machine can be—in a few hours. A commander must have a complete understanding of the physical machine that does the fighting and must put it into combat condition and keep it there, for without this all else is of no avail in battle.

Commanders must not only possess "mobility of mind" but they must also appreciate mobility in terms of logistics. This is not just the problem of keeping supplies moving to the using units. It is an understanding of the types and quantities of logistic support required. This is not only beans and bullets but also the logistics in personnel—replacements and casualties. In history there have been many brilliant strategists and tacticians. In each instance their successes were founded upon their abilities in



U. S. Army

Mobility is a state of mind. In their planning and execution commanders must endeavor to constantly keep their minds at the same mobile level as their forces.



U. S. Army

Combat commanders can no longer be assured of logistical support emanating from ports and steadily fed to them through available railroads and highways.

logistics equally with their plans. Their failures inevitably were assigned to insufficient attention to logistics.

Forces, regardless of composition, employment and leadership, must be sustained if they are to be successful. Without a means of sustainment, engines stop, guns cease firing and men collapse. Enormous amounts of supplies are required to keep in motion the varied forces in war. The means required are not available in the countryside today as they were in the past. Commanders must devote time and thought in planning to ensure that forces can be supported logistically, not only for their formation, but in their employment, as to supplies and personnel.

Commanders can no longer be assured of logistic support emanating from ports and steadily fed to them via railroads and highways. The ever present threat of nuclear warfare almost prohibits reliance upon such means. Once committed to action, commanders may well have to rely primarily upon the logistic support they can carry with them. Air Commander Wykeham, Royal Air Force, told the press that, "The army strategy and tactics of World War II must be scrapped in an atomic war. Fighting units must carry with them all the supplies that they will need."

The threat of nuclear warfare is not the only factor which will require a greater consideration of logistics by the commander. Small, localized wars may be fought in primitive areas of the world where proper roads and rail systems do not exist. The ever-increasing aspect of guerrilla or partisan activity in such wars makes the present system of supply-route reliance costly in men, materials and effort. Commanders must make maximum effort to keep their forces austere yet sufficient, lean yet enduring, strong yet not ponderous. Logistics must be given a full consideration by commanders in organization, employment and support of their forces so that these forces may be employed successfully at any time, in any place, under any conditions, without restrictions.

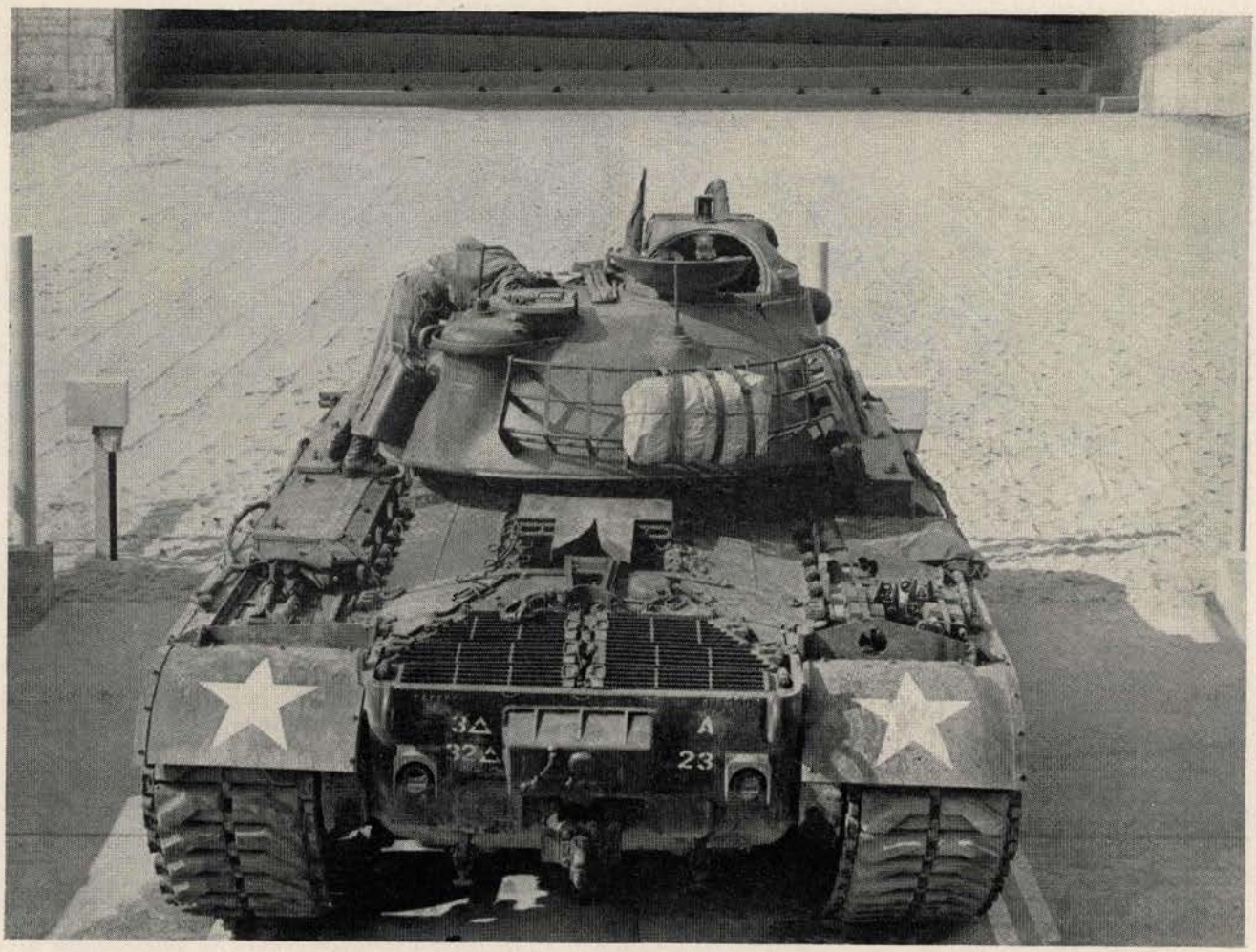
If this can be done, then it may be said that these forces possess mobility. But this mobility is not just being capable of being readily moved. Commanders have employed various machines and still did not achieve mobility by these means alone, for, in themselves, machines cannot fight. Men can fight but they are subject to lack of endurance. However, when men and machines are combined they can provide the will to fight and the endurance of men can be improved. Yet these two elements must be sustained, supplied and properly commanded else they cease to be effective.

Thus, mobility is comprised of machines, men, logistics and leadership. It is defined as "the capability of easily and readily bringing forces into action in such condition and with such means as will permit maximum effective application of the commander's will until the goal is achieved."



U. S. Army

Men and machines provide the will to fight, endurance of men can be improved, yet they must be sustained, supplied and properly commanded to be effective.



MINIATURE TANK TARGET FIRING RANGE

By COLONEL THOMAS O. BLAKENEY

BY opening the first outdoor subcaliber tank firing range in USAREUR, the United States Army has added a training purpose to the old gimmick of shooting clay pigeons. Tank gunners at Friedberg, in the 3d Armored Division's Combat Command C, fire 30-caliber machine gun rounds at what appear to be tanks speeding along the crest of a hill 1500 yards distant. Actually their targets are tank silhouettes 200 feet from the firing point, which race at speed equivalents up to 50 miles per hour in two directions and at various angles.

Built into the slope of a hill, the grey target area resembles a rectangular shed whose only open side invites the gunner's carefully aimed bullets. One tank platoon at a time fires from precisely designated places on the firing line. Mounted in each of the five tanks are the 30-caliber coaxial ma-

COLONEL THOMAS O. BLAKENEY, Armor, graduated from the University of Louisiana. He served in Europe during World War II with the 760th Tank Battalion. Subsequent to the War he served with AGF Board No. 2, where he received the Legion of Merit for outstanding service in improvement of armament, ammunition and fire control of armored vehicles. He was assigned to USARPAC. Returning home he attended C&GSC and remained there as an instructor. Attending the Army War College, he was transferred to G2 Division, USAREUR, prior to his present position as Commander, CCC, 3d Armored Division.

chine guns which the gunners fire at the silhouettes as they move in the distance. The intervening 200-foot tableland of sand appears to those in the tank as terrain suited for tank battles.

The tanks are stationed on a concrete platform under immediate surveillance from the control tower. Perched two flights of steps in the air, a room houses the controls operating the targets. Below the control room a balcony can support safety officers overseeing the firing.

The NACOM Engineers were responsible for the construction of the range. Begun on December 1, 1956, it was completed several weeks ago at a cost of $93,000. Plans for the project were developed before the 3d Armored Division arrived in Europe, and were completed last Summer.

First official use of the new range was made after the arrival of the gyroscope packet replacements from Fort Hood, Texas. These new men intensively used the range for two weeks night and day before shipping to the Belsen-Hohne range North of Hannover for service practice with the 90 millimeter cannon. The effectiveness of the new miniature range soon became apparent at Belsen-Hohne where the tank battalion who had used it qualified more experts than corresponding units who had not. The primary advantage was in the moving targets of Table VII where the new men matched the old-timers practically score for score.

The new type range will improve the combat effectiveness of the tank crews in that the problems met here will be similar to those actually experienced while firing in battle. In Germany on-post facilities are limited and most gunnery training is done in designated major training areas used by all units. An important value in this new range is that having it on-post better enables the commander to maintain year-round proficiency.

The soldiers do qualify in Table II on the new range. But one of its most subtle purposes is to develop an enthusiasm for firing and a will for perfection. Not only do the soldiers take pride in their scores, but they enjoy the thrill of firing at the miniature tanks and knocking them over.

The target area consists of four levels staggered from front to back at close to ten-yard intervals. Each level is raised approximately three feet over the one in front of it. All levels are different; the first carries targets along a horizontal line and the last forms a wavy line of targets. The second and third levels slant upwards from right to left, and from left to right respectively.

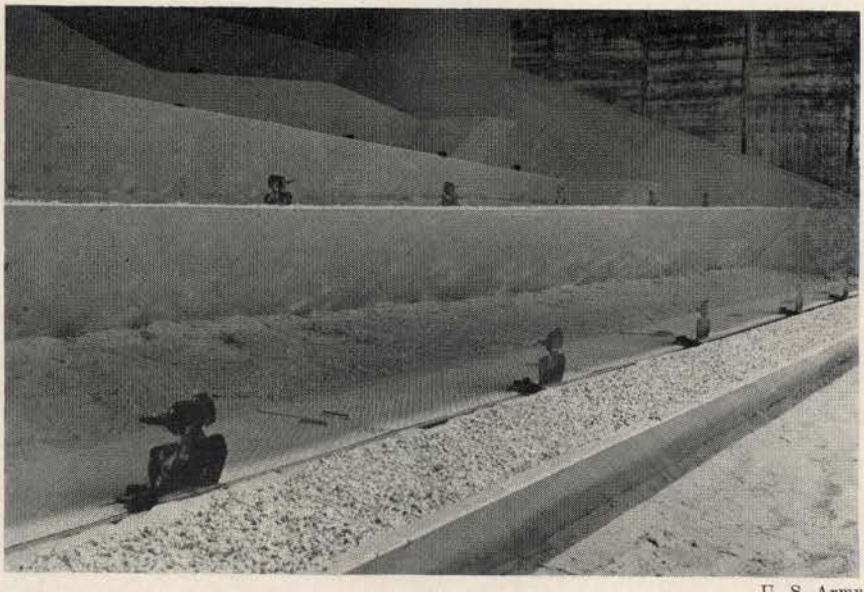
Each level contains a built-in track. Along this, the linked rectangular frames of a continuous chain supported by wheels are propelled by the cogwheel turning at the end of the table. Collapsible tank silhouettes, 12 of which are always visible on each level, are pulled along with the track.

By manipulation of the control board, each track can be run separately from all the others. The tracks can be reversed instantly, and can move at any speed equivalent from five to 50 miles per hour. For instance, level one can maintain a ten mile per hour speed to the left, while level two moves at 15 miles per hour to the right. Assuming that levels three and four are also moving at different speeds and in opposite directions, they can suddenly be made to head in the same direction. Consid-



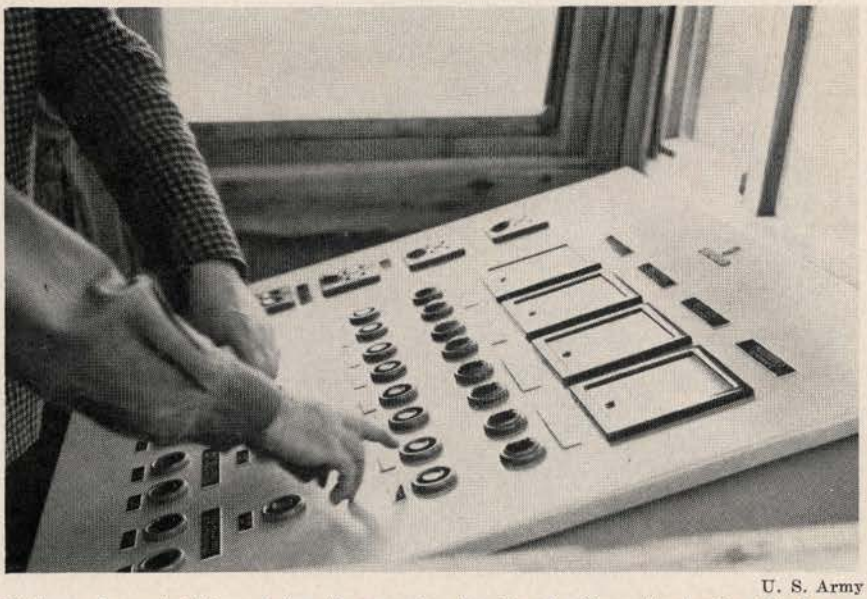
U. S. Army

M48 tanks on firing line aim 30 caliber machine guns at moving silhouette targets which appear as though they were 1500 yards away. Control tower in back.



U. S. Army

Ten by twelve inch tank silhouettes move perpendicularly to the oncoming stream of bullets. The silhouettes collapse when they are hit to facilitate scoring.



U. S. Army

Bi-lingual control board for the moving levels of silhouette tanks. Each can operate individually to drive the tanks at speed equivalents from five to 50 mph.

ering that each level follows a different direction and a dissimilar course, these variations require expert manipulation by the gunner to track and hit a target on any given track.

The dark green tank silhouettes are made of one-quarter-inch steel measuring approximately 10x12 inches. The targets collapse when a hit is made, thus facilitating scoring. And as the revolving chain draws the collapsed targets down over a cogwheel at the end of their run, they fall back into the standing position and are returned to the starting point.

The facing on each level consists of an inclined one-quarter-inch steel plate which pulverizes the frangible bullets and buries the fragments into the sand of the next lowest level.

Lights embedded in the roof illuminate the face of the tanks to permit simulated day firing at night. Rain and snow slide off the back of the shed to make the new venture an all-weather range.

The lights, as well as the motions of all the silhouette tanks, are manipulated from the control tower. The control board is labelled in both English and German. Four sets of similar panels permit the separate operation of each level.

When the red flag is raised, the firing range is in operation. Two tanks pull in from one side, three from the other. In a matter of minutes all five tanks have snuggled up to a concrete block, and the drivers ensure that the tanks are outlined by the white lines painted on the platform for that purpose. In this fashion, the tank is lined up so as to fire in the proper direction.

The 90 millimeter cannon is rotated to the forward position. It is then harnessed by one of the range's built-in cable gun stops so that its turret traverse will be limited to the open face of the shed. The cables act as effective traverse and elevation stops. These safety devices guarantee that all bullets will be safely grounded in the backstop.

The tank loader loads 24 rounds of ammunition. Upon the command of commence firing the gunners track the moving targets. If the first shot misses, the burst-on-target method is used for the second shot. All hits are scored by the tank commander. The tankers develop efficient gunnery techniques by using the standard fire commands to develop the habits in training which they must use, almost subconsciously, in combat.

The exercise simulates the platoon cooperation that would prevail in actual battle firing. The gunners primarily fire Table II. Scoring is based on time as well as the number of hits made. Each gunner receives five points per hit, five points if the first shot is fired within five seconds, and five points if the trial is completed within 15 seconds. The range can be operated so that Tables I, III and IV are also fired.

Although the firing can be done under the tank's own electrical power, built-in outlets form a part of the range. By a process known as "slaving the tank," turret power is supplied without the necessity of running the tank auxiliary generator and engine.

The new subcaliber range has only been in operation for a short time. But in the first month of its existence it has proved its worth. This augurs well for the future of tank gunnery in Germany, as well as for this range which may be considered the finest subcaliber range in Europe.



U. S. Army

The 90-millimeter cannon is harnessed in the range's built-in cable gun stops so that its turret traverse will be limited to the open face of the shed.



U. S. Army

Major General John L. Ryan, Jr., Commandant, USAAS, presenting the silver "Revere" bowl to Captain Crawford Buchanan, honor graduate, on behalf of the Association.

U. S. ARMOR ASSOCIATION AWARD

This was the first presentation of this award, which goes to the Honor Graduate of the Armor Officers' Advance Course at The US Army Armor School

Last December the Executive Council of the Association, at its Fall Council Meeting, unanimously passed the proposal to sponsor an award to the top graduate of the Armor Officers' Advance Course.

The first winner of this award is Captain Crawford Buchanan. It is interesting to note that the recipient is an Infantry officer, thus proving that Armor is composed of the combined arms team. Captain Homer S. Long, Jr., Armor, finished number two in the class and Captain John R. Lauderdale, Armor, was the third honor graduate.

Congratulations go to all who completed the difficult course of studies with special accolades to these three top honor men. Of the 128 officers who completed the course 15 Allied countries were represented.

Major General John L. Ryan, Jr., one of the Association's vice presidents, presented the bowl on behalf of this organization.

General I. D. White, newly appointed Commander-in-Chief of the United States Army in the Pacific, was the guest speaker at the commencement exercises held in early June. General White emphasized the importance of imagination and initiative in the make-up of a commanding officer. He stated that the ability to lead depends largely on the extent to which the officer utilizes the qualities inherent in him as an individual.

He recounted his experiences as a platoon leader and company commander, which he described as "the happiest period of my army career." He urged the graduates to seek such command assignments and said they would be "richly rewarded" in the satisfaction of holding such a position.

He also urged that commanders direct more attention to preventive maintenance within their units. This is a responsibility of the commanding officer.

EXPERIENCE

KEEPS A DEAR SCHOOL*

EFFECTIVE unit maintenance requires skilled personnel, and to get skilled personnel we have to *train* them. Unfortunately, we seem to be depending upon the costly school of trial and error, rather than taking aggressive action to train our people.

In the way of example, I would like to tell you about a conversation



I had a few months ago with an officer friend of mine. He is a unit commander, and has had a lot of maintenance troubles. (You know the sort of trouble I mean—gigs through channels on spot-check inspections, bad CMI results, vehicles and other equipment constantly breaking down, replies by indorsement, and just general harassment; and all in spite of maintenance people working overtime.)

My commander friend asked me to look over the unit and give him some suggestions on what was wrong. I started with some questions. How competent were his maintenance people? Well, the Battalion Motor Officer and Motor Sergeant were school trained; in fact, the Motor Sergeant was an old-timer who had been in motors all along and had gone to maintenance school in 1943. He did not know exactly how many of the company motor officers and sergeants were school trained, but he thought they were "pretty good men." Then I asked him about his mechanics. He said he did not know about these details, and called in his Motor Officer. The Motor Officer said that about half of the battalion mechanics had attended a service school course since 1950, and the rest had learned by OJT. I asked the MO what he meant by "OJT"; he stuttered a bit and then said, "Well—I mean that we have had to just assign some men to the motor



pool, and let them learn by doing the job."

Then we got started on the rotation problem, and we agreed that the rapid turnover of personnel certainly did make it difficult to have trained specialists. So I asked the commander how many of his maintenance personnel he anticipated losing in the near future. He said this was another detail he was not familiar with, and called in the Adjutant. The Adjutant said he was not certain, but would look it up for us.

My next question had to do with communication people, food service and mess personnel and armorers. By this time we had called in the Battalion S3 and Supply Officer. Everyone seemed a little surprised that I strayed from the automotive field, so I reminded them that, after all, maintenance applies to all equipment and you had to have people trained to maintain communication equipment, weapons, field ranges and generators, as well as vehicles. Neither the commander nor the staff officers present could give me much information on the training status of these other personnel.

I asked whether there had been any difficulty in getting quotas for service school courses. The S3 said no, as a matter of fact they were



given larger quotas than they could fill many times, and apparently, the courses were often undersubscribed. I asked why they could not meet quotas, when many of the people

*Prepared jointly by members of the US Army Maintenance Board.

were not school-trained. The S3 said, "Well, I just ask the company commanders if they have anyone to go, and they seldom do."

Then I jumped into the specific question of unit schools. To make a long story short, the Battalion had conducted no unit school to the knowledge of personnel present. Furthermore, the only division maintenance school was a one-week motors course conducted by the Division about a year ago. One of the motor officers and two motor sergeants in the battalion had attended this school.

During all this questioning the S3 and S4 kept looking at each other as if they were confused as to who should be answering my questions. So, I asked them who was responsible for the technical training of everyone in the battalion. Well, it seems that the S3 had the overall responsibility for training, but he thought the S4 should take care of the specialist people. The S4 hinted that, after all, training was an S3 matter. The commander said nothing.

Later, my commander friend and I adjourned to the officers' club where I risked our friendship with some pretty blunt language. "Bob," I said, "to be perfectly frank with you, there is no need for me to look further into your maintenance troubles. You simply do not have the trained people to do the job. Most of your specialists have not been school-trained, and it is unlikely that they are learning very much simply by OJT. Furthermore, those who have attended a formal course did so some time ago, and have had no refresher training. You cannot expect them to keep up with new equipment, all the modifications we get, and new procedures under these conditions. Why not direct your company commanders to fill available quotas, or give a good reason why they cannot. Otherwise, they just will not meet them, because they do not want to spare the people.

"Even if you get all your people school-trained, you should have either your own unit school or utilize courses established by a higher commander. This applies not only to your motor maintenance people, but also to your mess personnel, communication personnel and armorers. Furthermore, you need an occasional preventive maintenance course for your staff and commanders. They do not seem to know much about maintenance management, and I will bet you would get a jolt if you asked one of them to inspect anything more than a carbine or a pair of shoes.

"Now, when I say 'unit schools' I do not necessarily mean some permanent school, nor do I mean a 2-hour course you conduct once a year. What I am suggesting is that either your battalion or a higher headquarters should provide periodic specialist courses pertaining to all the equipment in the unit, say about every 6 months or so, to take care of new people coming in as well as new equipment and methods. The same thing applies to a preventive maintenance course for your commanders and staff officers. They do not have to be technicians, but they must be able to make a common-sense inspection on all the equipment in the battalion, and also know the tools of maintenance management.

"The trouble with this OJT business," I went on to say, "is that it is no good unless you have a system of teaming up your experienced and inexperienced mechanics so that your new men are carefully supervised at all times. What we call 'OJT' is, in most units, nothing in the world but a trial and error procedure, mostly error, that results in inefficient maintenance if not actual damage to equipment.



"Actually," I continued, "your basic weakness was evident to me at the beginning of our meeting this afternoon. It seemed to me that your staff officers are not keeping themselves informed of the status of specialists throughout the battalion; they are not allowing for anticipated losses by training personnel to fill vacancies; and worst of all, they obviously are not keeping you informed. As a matter of fact, it was apparent to me that your Adjutant, S3 and Supply Officer were thoroughly confused as to who had staff responsibility for what. Assign specific staff responsibility to each of your staff officers, and make them keep you informed.



"I will be glad to look further into your maintenance problems in the morning; such things as parts supply, scheduling maintenance services and the general condition of your equipment. However, these things are all dependent upon the skill of not only your specialists, but your company commanders and battalion staff officers."

The next time I saw him was about six months later. I inadvertently overheard him talking to another battalion commander at the club. "Jim," he was saying. "The trouble with your maintenance is you just do not have the trained people. Now you have to have unit schools, and as for this OJT business . . .".



NEWS NOTES

The Scorpion

The U. S. Army recently named its 90mm self-propelled airborne gun the "Scorpion."

Announced in October, 1955, and officially designated the M56, the weapon's new designation was announced at a meeting of the American Ordnance Association at Fort Knox, Kentucky, by Major General Andrew T. O'Meara, Deputy Chief of Army Research and Development.

The "Scorpion" is designed to meet military requirements for a light, highly mobile and hard-hitting self-propelled antitank gun for use in the assault phase of airborne operations.

Tractor Operated by Remote Control Being Tested by Army

A "robot" tractor that can be operated anywhere within range of the radio by which it is controlled is undergoing tests at the U. S. Army Research and Development Laboratories, Fort Belvoir, Virginia, the Department of the Army announced recently.

The tractor, believed to represent the first application of the remote control principle to a piece of construction equipment, may prove invaluable in construction work in radioactivated and combat zones. It may also be useful in various other tasks, such as fighting large fuel storage fires.

From a jeep or helicopter equipped with a standard military radio transmitter and a special control box, the operator can start and stop the machine, engage and disengage the gears, operate in forward and reverse, manipulate the dozer blade up and down, and activate the steering mechanism.

Normal operations can be performed from distances of up to 15 miles, the practical range of the radio, simply by manipulating the buttons on the control box. Army Engineers believe that the installation of small television cameras on the tractor will give the remote operator additional knowledge and observation of the machine, and give him the ability to work it without the need of information relayed by a visual observer.

The prototype is the standard commercial "tournadozer" manufactured by Le Tourneau-Westinghouse of Peoria, Illinois. The only visible change to the machine is the substitution of a standard military radio receiving set for the operator's seat. Manual controls have been retained for conventional operations.

As a safety precaution, earlier tests have been conducted with the tractor and control point within viewing distance. It will be operated from greater distances as the test schedule progresses.

Light Boat for Assault Missions

A new lightweight, durable assault boat has been developed by the U. S. Army Corps of Engineers' Research and Development Laboratories at Fort Belvoir, Virginia, the Department of the Army announced recently.

Carrying a maximum capacity of 15 men, the pneumatic type craft can attain speeds of 7.1 miles-per-hour by use of a 25 horsepower outboard motor, or 3.3 miles per hour by hand-paddling.

Constructed of neoprene-coated nylon, the boat consists of a main flotation tube, an air-mat bottom, a thwart tube connecting the main flotation tube amidship, and a 4-inch diameter spray rail extending around the periphery of the main flotation tube.

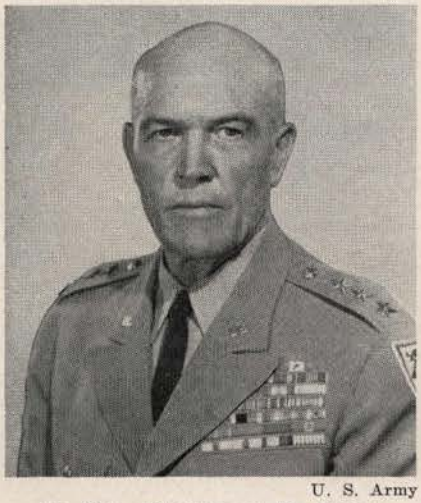
The main tube is 18 inches in diameter and is divided into six compartments by hemispherical bulkheads. Compartmentalization of the tube is a safety feature making it possible for as many as four compartments to be damaged without knocking the boat out of action.

The craft is equipped with two large and one small inflation-deflation pumps, a repair kit and 11 five-foot paddles. A carrying case fabricated of cotton duck is also provided. With equipment, the boat weighs 255 pounds. When inflated, it is 17 feet long, and five feet, eight inches wide.

The boat may be dropped from the air and can be readily carried by six men. Due to its weight and construction, more than twice as many pneumatic boats can be carried on a two and one-half-ton truck as the conventional rigid type boats.

Engineering tests have been completed, and additional boats have been procured for troop tests.

COMMAND CHANGES



U. S. Army

Lt. Gen. Blackshear M. Bryan
Commanding General, First Army



U. S. Army

Lt. Gen. Clovis E. Byers
Military Advisor, OSD



U. S. Army

Lt. Gen. George W. Read, Jr.
Commanding General, Second Army

New Facsimile Set Speeds Battle

The unveiling of its newest facsimile set, the fastest known means that will flash a photograph from one spot to another, was announced recently by the Department of the Army.

Developed by the U. S. Army Signal Engineering Laboratories at Fort Monmouth, New Jersey, the new portable radio facsimile system can put a high-quality photo in the hands of a person miles away—five minutes after the photographer clicks the shutter.

The set can flash vital military reconnaissance pictures by radio to Command Headquarters in time to affect a critical decision and perhaps change the course of a battle. Its record speed could also revolutionize photo reporting by daily newspapers.

The new facsimile equipment fits easily into the back of a radio-equipped jeep or car and can send a picture to its companion receiver 40 miles away. The set can also send a photo thousands of miles, over standard telephone lines or around the world, by long-range radio circuits.

The new facsimile, the fastest in the world, combines high-speed Army picture-sending techniques with a polaroid film that produces a finished print one minute after exposure. No darkrooms or messengers are needed.

In combat, a front-line soldier with a specially-equipped camera can take a picture of important enemy movements and get a 3¼ by 4¼-inch picture to his commander in five minutes flat. It takes one minute for the picture to develop in the camera, giving a print that fits right into the transmitter in his jeep. The set automatically sends the picture in three minutes. Far behind the lines, the picture is received on another sheet or polaroid film, and is ready for use one minute later.

TO RETIREMENT



U. S. Army

Lt. Gen. Thomas W. Herren

The set can also be mounted on a light reconnaissance plane or helicopter, allowing an aerial photographer to send surveillance pictures continually to battle headquarters direct from the aircraft.

Another important application is speeding of military weather predictions. The device could be used to tie together a network of widely-scattered weather radars scanning the skies for storms and hurricanes that plague the Eastern seaboard. Scope pictures from each of these radar stations could be sent in minutes to a central point for rapid analysis.

The final transmitted photo is almost as sharp as the original and is suitable for newspaper reproduction. It could be enlarged in print to twice its size, or larger.

Tank Contract Awarded

The Department of the Army announced recently the approval of contract awards for 900 M48A2 tanks amounting to approximately $119,000,000.

Chrysler Corporation will be awarded the prime contract for the production of these tanks in government-owned facilities located at Newark, Delaware. Under the selected Government option in the terms of the contract, the production of these tanks in the Newark facilities will result in final savings to the government of $1,878,000 as opposed to the other option of producing the tanks in Detroit.

The M48A2 tank is presently being made by ALCO Products, Inc., Schenectady, New York, formerly the American Locomotive Company. This contract, awarded in November, 1955, is now nearing completion.

ALCO Products, Ford, General Motors Corporation and Chrysler Corporation were invited to submit proposals.

The Chrysler Corporation has previously manufactured the M48 tank at Newark, Delaware, since 1951 and completed such production in 1956. Chrysler is presently performing modification work on the heavy gun tank at the Newark, Delaware, facilities. The management personnel for the heavy gun tank modification program and the new M48A2 production will be the same. The work force for the M48A2 production will require approximately 550 new employees at the Newark facility. In addition, 250 personnel now engaged in the heavy gun tank modification program will continue work on that program.

Deliveries under this new contract are expected to begin in the early part of 1958.



U. S. Army

Major General William S. Biddle
Commanding General, III Corps



U. S. Army

Major General Raymond W. Curtis
Hqs, USAFFE—Eighth Army (Korea)



U. S. Army

Major General Paul D. Harkins
Commanding General, ALFSE



Raytheon

The HAWK

The HAWK

The successful development of a versatile air defense missile system designed to reinforce the low-altitude capability of our air defenses was announced recently by the Department of the Army.

Designated the HAWK, the new air defense weapon system will carry a lethal modern warhead and be capable of destroying attackers flying at even the lowest altitudes at ranges insuring effective protection of defended areas. It will complement the defense against high-level air attack provided by the Army's NIKE system.

The system is capable of operating both in the continental United States air defense complex at fixed installations and with fast moving combat troops of the field Army. It may be transported on the highway, using a minimum of vehicles, by helicopter, and by aircraft. HAWK in its mobile role also will be adopted by the U. S. Marine Corps.

At the same time, the Army said, site selection actions for the emplacement of the new weapons already have been initiated in the New York City and Washington-Baltimore areas. While the land requirement for each individual site is relatively small, positioning of the site is comparatively rigid. Only the absolute minimum of land necessary to emplace, operate and administer the weapon system and to afford safety protection is to be acquired. Each battery will require approximately 40 acres for emplacement. To reduce land holding requirements to a minimum and in the interests of safety, underground storage of the missiles is planned.

Raytheon Manufacturing Company of Massachusetts is the prime contractor under Army Ordnance for the development of the entire weapon system, with Northrop Aircraft of California as the major sub-contractor.

The missile, using a solid-fuel propellant, is approximately 16 feet long and 14 inches in diameter.

The HAWK system uses guidance techniques which are unusually successful in hunting down and destroying the attacker. Radars of unique design are highly effective in detecting and tracking the low flyers in the blind zone of conventional radars.

A production contract for the HAWK has been awarded to Raytheon. Research and development missiles are now in production at the company's Andover, Massachusetts, plant, where pilot production will be started shortly.

COMMAND CHANGES



U. S. Army

Major General Andrew P. O'Meara
CG, 4th Armored Division



U. S. Army

Brigadier General James I. King
Asst. Commandant, USAAS

Do You Want a Hundred Dollars?

Saying it needs short humorous anecdotes of Army Life, *The Reader's Digest* is inviting members of the Army to submit contributions for its well-known "Humor in Uniform" department. The magazine pays a flat $100 for each story accepted.

To date, 84 alert soldiers and WAC's of today's modern atomic-age Army have had their favorite, heartwarming stories of Army life published in the magazine. The way is now open for hundreds of others to try their hand at winning the ever welcome $100 cash payment.

According to the magazine, contributions must be true, unpublished anecdotes based on service experience. They should be typewritten, double spaced, and not more than 300 words long. Contributions cannot be acknowledged or returned.

Army personnel should mail their anecdotes to Chief, Magazine and Book Branch, Office Chief of Information, Department of the Army, Washington 25, D. C., ATTENTION: Humor in Uniform Editor, *Reader's Digest.*

Army to Hold Eight Major Exercises

Eight major field and command exercises have been programmed by the Department of the Army from July 1, 1957 to June 30, 1958.

The tentative schedule calls for participation of 114,000 troops during the fiscal year starting July 1. All include plans for simulated use of atomic weapons both offensively and defensively.

The locations will be in Kentucky, Washington, North Carolina, Louisiana, Nevada, Virginia and possibly Texas.

The largest will be for 20 days in April on dates not yet determined, at Fort Polk, Louisiana. It is designated GULF STREAM and 26,000 troops will participate. Included in the training will be use of the Nike Hercules AAA missile. Units taking part in the command post exercises include portions of XVIII Airborne Corps, XVIII Airborne Artillery, 101st Airborne Division, 82d Airborne Division, 1st Infantry Division, 4th Infantry Division, 1st Armored Division, 2d Armored Division and various other units.

The other exercises are:

RED ROCK for a 15-day period to be selected, probably in May, 1958, at Yakima, Washington; training to include assault bridges, casualty reporting procedures and reconnaissance patrols, 4th Infantry Division and other non-divisional units; 19,000 troops.

EAGLE WING for a 15-day period between February 15 and March 15 at Fort Campbell, Kentucky; training to include airborne reconnaissance, airborne movement of surgical hospital, aeromedical evacuation and loading techniques; 101st Airborne Division and non-divisional units; 18,000 troops.

ALL AMERICAN for a 15-day period in October at Fort Bragg, North Carolina; training to include aeromedical evacuation and loading techniques, movement of field hospital by air, air transport of reconnaissance patrols and air dropped observers; 82d Airborne Division and non-divisional units, 19,000 troops.

STRONG ARM for a 15-day period between April 15 and May 31 at Fort Polk, Louisiana, or Fort Hood, Texas; training to include assault bridges, supply problems, evacuation hospital support of armored troops, air transported reconnaissance patrols, air-landed infantry in support of armor and casualty reporting procedures, 1st or 2d Armored Division detachment and non-divisional units, 19,000 troops.

COLD BAY, Alaska, for a period to be designated during January-March; training to include aeromedical evacuation and loading techniques and Army air transport of troops and supplies; 4th Infantry Division units; 1,600 troops.

LOGEX for a 6-day period during May at Fort Lee, Virginia; training to include certain Reserve officers; stressing of importance of maintaining logistic support under combat conditions with an enemy capable of using atomic weapons, and demonstrating cooperation of Army, Navy and Air Force elements to provide logistic support in a theater of operations; 6,000 troops.

DESERT ROCK VII & VIII during June, July and August at Nevada Test Site; training to include indoctrination of selected personnel and provide equipment testing and training for selected units in operations featuring atomic weapons; 3,000 troops to include one battle group from the 4th Infantry Division and other selected support troops, and 3,000 observers.



U. S. Army

The Sun-powered Helmet Radio.

Helmet Radio Powered by the Sun

The helmet radio being developed by the Army may soon need only exposure to sunlight to obtain all the electrical power necessary to operate both its transmitter and receiver for as long as a year, it was announced by the Department of the Army recently.

Experiments at the U. S. Army Signal Engineering Laboratories, Fort Monmouth, N. J., prove that solar batteries, which convert light to electricity, can power the world's smallest transmitter-receiver. This helmet-housed radio is nearing final design at the Laboratories.

The experiments have been so promising that similar power is now under serious consideration for the walkie-talkie and other light field radios.

Long, narrow clusters of tiny solar cells are placed on either side of the crown of the helmet. These silicon wafers power the radio for normal daylight operation. They also charge four small nickel-cadmium storage batteries to supply peak current in daytime and to operate the set at night.

Use of the solar cells in combination with rechargeable nickel-cadmium batteries would provide power for many months, possibly a year or more. With the dry cells now used in the helmet radio, battery life is less than a day if used continuously.

Army Signal Corps engineers at the U. S. Army Signal Engineering Laboratories working on the solar helmet faced several formidable technical problems. Although comparatively short-lived, the dry batteries presently providing electricity easily furnished the 50 volts required by the radio's final stage transmission tube as well as the much smaller needs of the transistors used elsewhere in both the transmitter and receiver.

But solar cells with enough surface to supply 50 volts would more than cover the helmet. So it was necessary to design a power converter that would raise the approximately 4.5 volts of the solar-nickel-cadium battery combination to 50 volts.

Careful design produced a completely transistorized converter small enough to fit, with the nickel-cadmium cells, in the aluminum housing already used for the helmet radio's dry batteries.

Even with the solar batteries, power converter and nickel-cadmium cells the sun-powered version of the radio is as light as the dry-battery powered set, which weighs slightly less than a pound.

Work on the solar conversion of the helmet radio was done in the Power Engineering Branch of the U. S. Army Signal Engineering Laboratories' Power Sources Division.

Army Awards 10-Ton Truck Contract

Mack Trucks, Inc., has announced receipt of a contract from the U. S. Army Ordnance Corps for production of 10-ton cargo trucks.

P. O. Peterson, Mack President, said the massive military vehicles will be manufactured at the company's Allentown, Pa., plant. Deliveries are scheduled to begin late in the year, and conclude by August, 1958. Mack is now completing production on a previous $13 million order for the big military vehicles.

The 10-ton 6-by-6 trucks were designed and developed by Mack, and have undergone rigid tests at Aberdeen Proving Grounds, Md., Fort Knox, Fort Sill and at the Yuma, Arizona test station. Using principally Mack components, the huge vehicles are capable of carrying tremendous loads in off-highway operations. Equipped with 300 horsepower gasoline engines, they are one of the most massive and powerful types of military trucks built.



Robert Smith Duncan, Jr.
Alabama Poly Inst.



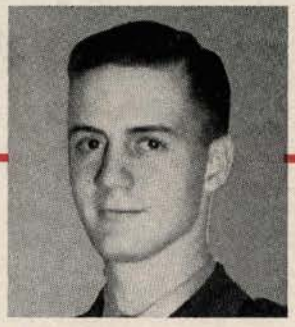
Jerry K. Stanners
University of Illinois



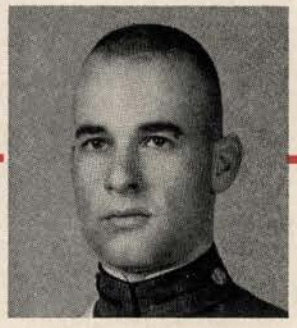
Robert B. Beckwith
Massachusetts Univ.



Alan B. Buchan
Norwich University



Leighlus E. Sheppard, Jr.
Texas A&M College



William H. Huffcut
Virginia Mil. Inst.

OUTSTANDING SENIOR 1957 ARMOR ROTC CADETS

For the past five years the United States Armor Association has given awards to the outstanding senior cadet in the Armor Reserve Officers Training Corps at those colleges or universities where an Armor instructional course is still in operation.

Since last year three more institutions have transferred from the Armor Course to the General Military Science Course.

The engraved scrolls signed by the President and Secretary of the United States Armor Association and one year honorary memberships have been forwarded to the ROTC instructors at these six institutions for presentation to the individual recipients. A package of books has also been forwarded. The package included: Robinett's *Preparation for Leadership in America,* Moore and Brier's *Tank Company Commander's Guide,* von Mellenthin's *Panzer Battles* and Semmes' *Portrait of Patton.*

Since last year many PMS&T's at GMS institutions have inquired into the possibility of receiving some type of an award for the top graduate from their respective schools choosing Armor as their branch. In the March-April 1957 issue of *ARMOR* we offered a suitable award to the top graduate choosing Armor as his branch. To date more than 30 PMS&T's from different GMS institutions have responded. In return we sent one-year honorary memberships, which entitled the recipients to receive the magazine, newsletter and book benefits for a similar period. We also forwarded a package of two books: Robinett's book on *Leadership* and the *Tank Company Commander's Guide.*

As in past years these Distinguished Military Graduates have been tendered appointments as Second Lieutenants in the Regular Army upon graduation this June. Whether they accept the appointment in the Regular Army or choose a civilian occupation and hold a Reserve Commission we wish them well in their chosen endeavors and welcome them to the team of combined arms.

To the instructors, both commissioned and noncommissioned, at these various institutions teaching either Armor or the General Military Science Curriculum, we give special accolades and a vote of thanks for a job well done. For it is here at College level that you, as representatives of the Army, can accomplish a great deal in the field of civilian-Army relations.

How Would You Do It?

US ARMY ARMOR SCHOOL PRESENTATION

Situation

You are the commander of Company A of the 101st Armored Infantry Battalion. Your company occupies a strongpoint in the mobile defense. Aggressor forces have made contact with your position. You are observing the terrain and enemy action in front of you. You hear some dull bangs from the area behind the enemy positions, but cannot see any flash. In a few seconds, several heavy shells explode behind your company strongpoint at points 1 through 9 (figure 1), and a few minutes later you hear similar explosions from Company B's positions to the right of your position.

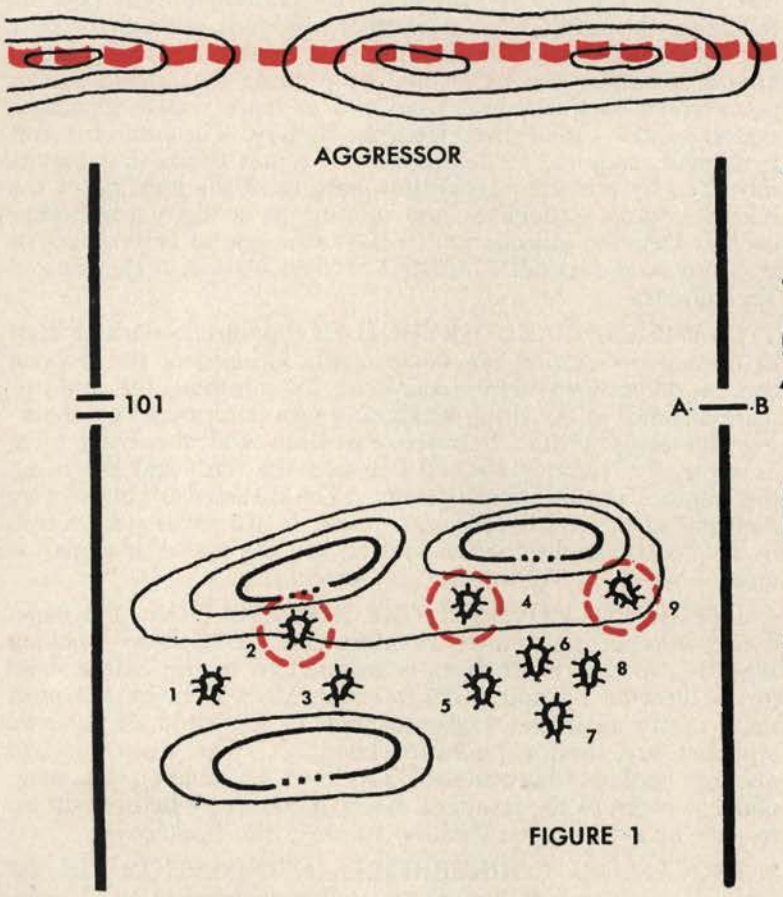


FIGURE 1



Requirement

What are your actions concerning the shelling?

AUTHOR: MAJ P NYSTEN

ILLUSTRATED BY MR J BAIN

Solution

1. Observe the impact of the shells in order to be able to locate the craters. Immediately after the shelling, have the shell craters examined. Select three of the most distinct craters (2, 4, and 9) which are at maximum distances from each other, and have the craters analyzed (figure 2).

2. Prepare a shelling report (figure 3) and have it transmitted (by radio) to the battalion S2 (or as directed by unit SOP).

TYPICAL MORTAR CRATER

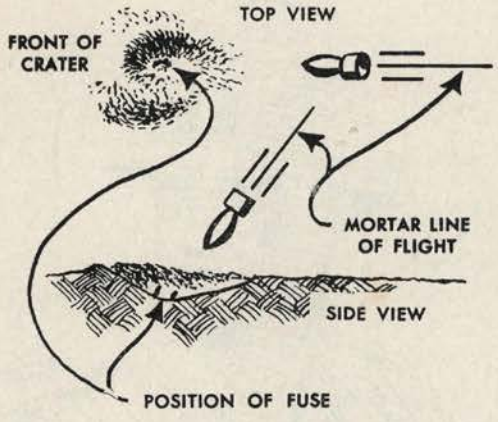


FIGURE 2

DETERMINE AREA LOCATION OF ENEMY WEAPONS BY CRATER ANALYSIS

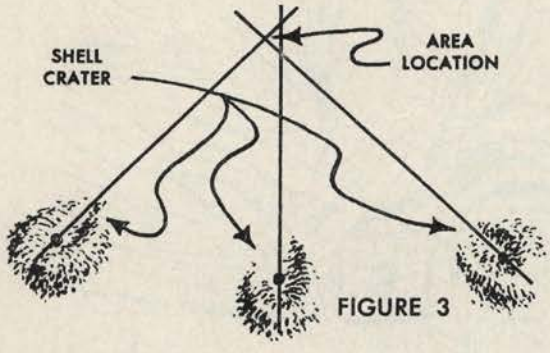


FIGURE 3

STANDARD SHELLREP, MORTREP, BOMBREP FORM

(CIRCLE TYPE OF REPORT

(THE INFORMATION SHOWN IN THE CENTER COLUMN IS NOT, OF COURSE, TRANSMITTED IN THE REPORT.)

ALFA	(FROM)	BLUE 1
BRAVO	(POSITION OF OBSERVER)	860180
CHARLIE	(MAGNETIC OR GRID AZIMUTH OF SOUND, FLASH, OR GROOVE)	6115 MAG—GROOVE
DELTA	(TIME FROM)	0650
ECHO	(TIME TO)	0652
FOXTROT	(AREA SHELLED)	863175
GOLF	(NUMBER AND TYPE OF GUN, MORTAR, OR AIRCRAFT)	UNK MORT 120-MM
HOTEL	(NATURE OF FIRE)	HARASS
INDIA	(NUMBER AND TYPE SHELLS)	9 HE
JULIET	(TIME OF FLASH TO BANG)	UNKNOWN
KILO	(DAMAGE—REMARKS)	NONE

Discussion

1. GENERAL. Information which assists in locating enemy close-support weapons is known as counterfire information. When enemy shells fall into a unit's area, the unit is responsible for making shelling reports based on flash-sound observation and/or crater analysis. Additional, and often more accurate, counterfire information may be obtained by various types of acoustic or electronic equipment handled by special counterfire units. How well we succeed in gathering adequate data for effective counterfire action depends greatly on the prompt delivery of accurate shelling reports by all units receiving enemy fire and/or capable of observing it.

2. CRATER ANALYSIS. The direction of flight of a projectile can be determined with reasonable accuracy from its crater or ricochet furrow. If the crater is located accurately, and the direction of flight of the projectile is determined, it is possible to obtain the azimuth of a ray that will pass through or near the actual position of the firing enemy weapons. The position area of a battery can be located by plotting the intersection of the average back azimuths from two or more widely separated craters made by shells fired from the battery. The front-line unit is normally required to determine and report the back azimuths (obtained by crater analysis); the plotting of the location of the enemy battery is done by the infantry or artillery counterfire center. Detailed information on the technique of crater analysis is found in paragraph 273-291, FM 6-20 (Artillery Tactics and Techniques).

3. FLASH AND BANG METHOD. If the muzzle flash or blast of the enemy weapon can be seen, the location of the weapon can be determined more accurately. In addition, the approximate distance of the firing weapon can be determined by checking the elapsed time between the flash and the bang. For example, if 5 seconds elapsed between the flash and the bang, the distance would be 1850 yards. (The distance is obtained by multiplying the speed of sound, which is 370 yards per second, by 5. To obtain distance in meters, use the speed of sound in meters, which is 340 meters per second.)

4. REPORTING COUNTERFIRE INFORMATION. For expediency in reporting counterfire information, a "shellrep" (shelling report) is used. The shellrep is transmitted to the battalion S2 (or as directed by unit SOP) in abbreviated form by the most rapid means available. Letter symbols of the standard phonetic alphabet are used to indicate headings. The new standard message book will have the shellrep form available on the cover. Older versions of the standard message book may be brought up to date by printing the shellrep form on the back cover.

5. PROCESSING COUNTERFIRE INFORMATION. In the armored infantry battalion, the battalion counterfire NCO operates a counterfire information center. This center, under the supervision of the battalion S2, processes the shelling reports and forwards counterfire data to supporting mortar or artillery elements. In the tank battalion, or tank-heavy battalion task force, counterfire information is normally processed by the liaison officer from the attached or supporting artillery battalion.

FROM THESE PAGES

65 Years Ago

The old adage that cavalry cannot charge unshaken infantry, has been emphasized by the adoption of the magazine breech-loader and possibly by smokeless powder. But it is not often necessary for cavalry to charge *unshaken* infantry, and, in fact, it would not be used under such conditions except in very extraordinary cases. However, infantry cannot always remain unshaken, and when it has been subjected to the fire of artillery and infantry for a long time, possibly for hours, it may well become disorganized and in a condition of nervous strain in which such an influence as a charge of cavalry on the flank or even in front would produce a decided effect and cause such a panic that, for the time, it would not make the slightest difference whether they were armed with magazine rifles, muzzle loaders or even clubs. Such a charge, promptly supported by the infantry, might prove the turning point of the battle.

The fact of increased rapidity of fire does not necessarily imply increased accuracy, and it is a well known fact that men in the excitement of action are much more likely to waste their fire than when required to use more deliberation and load more slowly. It certainly does not seem to be a fair test to take the hits made by a skirmish line on the drill ground, and infer from this result that it would be a physical impossibility for cavalry charging on this line to ever reach it.

First Lieutenant George W. Van Deusen

The Tactical Use of Mounted Troops

50 Years Ago

It is the cavalry division, then, a mobile, self-sustaining fighting unit in itself, which the army commander will rely upon as his strategic weapon. We must look upon this organization in the new light of modern improvement; as a powerful, self-supporting body of greatest mobility—a new unit which warfare never knew before, combining the offensive and defensive powers of infantry with all the possibilities of cavalry—supported by its own guns, served by its own engineers and signal corps, a combination of the three arms for powerful attack for protracted defense.

To discuss in detail all the strategic results possible to such a unit, ably led and thoroughly understood by the army commander, would be to exhaust practically the whole range of strategic combinations.

We can only glance at those possibilities most evident and most general in their character, and most likely to occur under normal conditions; their ramifications and opportunities are endless.

For convenience, the strategical duties of cavalry, as the campaign develops from the time of declaration of war, may be considered under two phases: 1. The protection of the strategical concentration of our armies in anticipation of campaign. 2. Strategic aid during the active campaign.

First Lieutenant S. R. Gleaves

The Strategic Use of Cavalry

25 Years Ago

The day before official news arrived that a treaty of peace had been signed with England, von Steuben submitted a carefully worked out plan for a military academy. It is substantially the plan upon which West Point is operated today. He proposed that one hundred and twenty volunteer cadets should be educated every three years for the purpose of supplying officers for all branches of the service. They should be instructed in natural and experimental philosophy, eloquence and literature, civil law and the law of nations, history and geography, mathematics, civil architecture, drawing, the French language, horsemanship, fencing, dancing and music. Congress should appoint each year a board of visitors who should make a report to it.

The influence of von Steuben pervades the Army today through the Military Academy at West Point. Most of the first instructors at West Point had known von Steuben personally; his methods and ideals, as demonstrated in the training camp at Valley Forge and on the battlefield, were preserved by traditions that have become far more powerful than written regulations. There can be no doubt that the discipline of von Steuben, transmitted by tradition to the army through the Military Academy, is a very strict military discipline. Its quality lies not in the severity of the penalties which it imposes; but in the unquestioning obedience to command which it requires.

Colonel Samuel C. Vestal

Frederick William von Steuben

10 Years Ago

How should the point platoon move? Should it move in column down the road at a uniform pace? This was the usual manner in most divisions in exploitation phases. However, it is not the most intelligent and it is not the fastest. Furthermore, it is not the steadiest.

The best method in every sense is a movement by bounds; that is, within the advance party. The way it has worked superbly is this: the Advance Guard commander (leading tank company commander) rides behind the point platoon at some distance. This distance, of course, varies with the terrain, but usually should be sight or not more than 500 yards. This Advance Guard commander rides at an even pace (often set by the combat commander). He is accompanied by an artillery forward observer, and possibly, by a forward air controller.

In front of him the point platoon works. The leading three tanks moving rapidly from cover to cover under protection of the second section. Great speed can be obtained by making these bounds in an alternate manner. When resistance is met the Advance Guard commander stops, sizes up the situation and takes action immediately. There is a distance between him and the point and he is free to employ his support intelligently or to by-pass obstacles or strong points without the necessity of back-tracking and reversing the column.

First Lieutenant Thomas W. Burke

Technique of The Tank Platoon As The Point in An Exploitation

news from
THE US ARMY ARMOR SCHOOL

New Field Manuals

The United States Army Armor School is completing a new series of field manuals, the final phase of the preparation of training literature for ROCAD and ROCID units. The present schedule calls for the submission of six manuscripts to United States Continental Army Command by 1 August. Present indications are that the field manuals will be available for distribution approximately five months thereafter.

To cover the period until the manuals are distributed, US CONARC directed the printing of training texts to be used by units reorganizing under the ROCAD and ROCID program and for use by service schools in presenting instruction on these organizations. Each new field manual is based on the appropriate training text. Training texts prepared by the US Army Armor School in this program were:

TT 17-1-1: Armor Operations, Small Units.

TT 17-20-2: Armored Infantry Platoon, Company, and Battalion.

TT 17-33-2: Tank Platoon, Company, and Battalion.

TT 17-35-3: Armored Cavalry Units, Armored and Infantry Divisions.

TT 17-50-1: Armor Logistics.

TT 17-70-2: Signal Communication in the Armored Division.

Since these texts are US CONARC publications, they were printed in quantities sufficient to make the distribution directed by US CONARC. The US Army Armor School retained a small quantity and has distributed them on a "need-to-know" basis.

No distribution to Reserve Component units or personnel can be made under current plans, since it is anticipated that the field manuals will be available well in advance of actual needs of reserve component units.

A Change in Voice Procedure

The latest ACP on voice procedure, ACP 125 (B), shows a change from the proword "ORIGINATOR" to the proword "FROM" in conjunction with a relay type message.

Example A: (OLD METHOD)
Dexter 16 This is Dexter 6
Message Follows—Relay to Dexter 26
Time 100830S—*ORIGINATOR* Dexter 6
(Text) over

Example B: (NEW METHOD)
Dexter 16 THIS IS DEXTER 6 Message
Follows—Relay to Dexter 26—Time 100830S—*FROM* Dexter 6 (Text) over

NOTE: The only change in the transmission above when the message is transmitted by the relay station to the final addressee is to delete the operating instructions *"RELAY TO DEXTER 26."*

A Safer Antenna

Contact of vehicular mounted antennas with high tension power lines presents a hazard to personnel and also results in damage to radio equipment. In recognition of this hazard the Signal Corps has recently let a contract for the development of four types of high-impact-strength plastic insulated whip antennas. Plastic materials, having suitable physical characteristics, are now available which appear suitable for giving dielectric protection up to 20,000 volts. A plastic constructed antenna, consisting of a small wire embedded and completely surrounded by plastic, is expected to give mechanical and electrical performance on par with present-day metallic tubular types.

These antennas will be for use in transmitting and receiving RF signals within the frequency range of 1-60 megacycles and are intended to replace standard military vehicular whip antennas now in use. Special emphasis will be placed on design of an insulated radiating element to minimize the hazard of electrical shock to personnel when the antennas come in contact with high voltage power lines.

New Training Films

During the month of May the US Army Armor School forwarded the following training films to Headquarters, US CONARC for release. It is anticipated that these films will be available at local film libraries subsequent to July of this year.

17-2385; *Safe Loading Procedures, 90mm Tank Gun.* This film illustrates the proper techniques and procedures for loading a 90mm tank gun while observing the necessary safety precautions. (Length—three minutes.)

17-2494; *Medium Wrecker M62—Part I—Preparation for Lifting.* This film illustrates the proper positioning of the Medium Wrecker M62 for

lifting—The correct lifting techniques for the Medium Wrecker M62. (Length—ten minutes.)

17-2495; *Medium Wrecker M62—Part II—Power Package Removal.* This film illustrates the proper lifting technique for power package removal after the engine has been disconnected. (Length—seven minutes.)

17-2496; *Tank Recovery Vehicle M-74—Part I—Preparing for Boom Operation.* This film illustrates the techniques and procedures necessary to prepare the Tank Recovery Vehicle M74 for boom operation. (Length—six minutes.)

17-2497; *Tank Recovery Vehicle, M-74—Part II—Rigging and Live Boom Operation.* This film illustrates the techniques of boom operation of the Tank Recovery Vehicle M74—The rigging necessary for loads of various weights. (Length—six minutes.)

17-2498; *Tank Recovery Vehicle, M-74—Part III—Power Package Removal.* This film illustrates the proper lifting technique for power package removal after the engine has been disconnected. (Length—five minutes.)

17-2425; *Range Determination.* This film illustrates estimation of range by eye. It compares the estimation of range by eye with the other methods of determining range—The film also discusses the binoculars in detail. (Length—28 minutes.)

An Additional Radio Set

You have no doubt heard or read the story in which the phrases "For want of a nail, a shoe was lost, for want of a shoe, a horse was lost," etc. The communication version of this could have been "For want of a PRC-6," etc. This no longer applies, however, since, in comparing armored infantry companies under TOE 7-27R and 7-27T ROCAD, we find that in an infantry rifle platoon under the ROCAD TOE two Radio Sets AN/-PRC-6 have been added. One set is for the platoon leader and one for the platoon sergeant. This is of particular significance when we realize that the platoon leader rides in the same vehicle as the first rifle squad and that the platoon sergeant rides in the same vehicle as the machine gun squad. TOE 7-27R authorized only one Radio Set AN/PRC-6 to be carried in each of these vehicles. This always brought up a question: who should get the portable radio when all personnel are dismounted? One or the other individual who required radio communications was unable to use the set so we can only conclude that adequate communication facilities did not exist under TOE 7-27R. The authorization of two additional Radio Sets AN/PRC-6 under TOE 7-27T ROCAD will alleviate this problem.

THE US ARMY ARMOR SCHOOL HONOR GRADUATES

The following students received top scholastic honors of their classes (listed in order of standing in the class):

Armor Officer Basic Course Class Nr 7

2d Lt Henry F. Perritt, Jr., 710 Tk Bn, Ft Stewart, Georgia; 2d Lt Joseph R. Wise, 9th Inf Div, Ft Carson, Colorado; 2d Lt Gary A. Cook, Co H 163rd Armd Cav Regt, Montana NG.

Armor Officer Basic Course Class Nr 8

2d Lt James B. Howell, III, USATC Inf, Ft Dix, New Jersey; 2d Lt Wilbur C. Bishof, Co A 644th Tk Bn, New Jersey NG; 2d Lt William J. Stronman, Co B 112th Armd Cav, Texas NG.

Armor Motor Officer Course Class Nr 2

1st Lt Donald E. Hansen, 4th Tk Bn, Ft Polk, Louisiana; 2d Lt John A. Schuyler, USMC; 2d Lt Everett L. Tunget, USMC.

Armor Track Vehicle Maintenance Course Class Nr 9

Pfc Robert M. Allen, 64th Tk Bn 3d Inf Div, Ft Benning, Georgia; Sfc Edgar D. Smith, Hq H&S Co 230th Recon Bn, Tennessee NG; Pvt Thomas F. Dallmann, OS Repl Sta (6020), Oakland Army Terminal, Oakland, California.

Armor Radio Maintenance Course Class Nr 8

Pvt Richard S. Semel, OS Repl Sta (1264), Ft Dix, New Jersey; Pvt Thomas L. Vowels, OS Repl Sta (1264), Ft Dix, New Jersey; Sp3 John R. Knight, H&S Co 160th Tk Bn, Georgia NG RENTZ Georgia.

Armor Turret Maintenance Course Class Nr 6

Sfc Joseph L. Durbin, Jr, Hq H&S Co 243rd Tk Bn, Kentucky NG; Pvt Pete L. Bauer, O/S Repl Sta (1264) Ft Dix, New Jersey; Sp3 Edwin F. Rabenold, Co C 2d Armd Cav, Ft Geo G Meade, Maryland.

The Book Section

GENERAL GEORGE B. McCLELLAN:

Shield of the Union

GENERAL GEORGE B. McCLELLAN: Shield of the Union. By Dr. Warren W. Hassler, Jr. 342 pp. Louisiana State University Press, Baton Rouge, Louisiana. $6.00.

Reviewed by
Colonel John M. Virden, USAF, Ret.

IT is one of the grimmer facts of history that the military leader who is entrusted with high command at the beginning of a war seldom survives more than the opening rounds of the contest, ere he is replaced by another man, and not infrequently a much weaker commander.

The case of General George Brinton McClellan is possibly the classic example of this rule.

In 1861 the 35-year-old McClellan, after some flashing success in a series of what were rather minor engagements, when measured beside the great battles that were soon to come, was ordered to Washington from West Virginia. He was hailed as the "Savior of the Union" and called "The Young Napoleon" to his face. Congress voted "Little Mac" its thanks "for the series of brilliant and decisive victories." Doddering old General Winfield Scott heaped praise on young McClellan in some of the most flowery language ever transmitted over the military telegraph.

The sad-faced, new and bewildered President Abraham Lincoln called him "George" and evidenced his confidence in the Civil War's first hero.

It takes a man made of very tough and stringy rawhide to drink this kind of heady wine and still keep his



Bill Coleman's

THE AUTHOR

Dr. Warren W. Hassler served in the United States Army Air Force during World War II. Subsequent to the War he attended Johns Hopkins University where he received his AB and PhD Degrees. He received his MA Degree from the University of Pennsylvania. Since the Fall of 1955 he has been on the staff of the History Department of the Pennsylvania State University, instructing in American Military History and lecturing to the Army ROTC on military matters. He also lectures extensively at Civil War Round Tables and leads tours of Civil War battlefields.

balance. Perhaps the cynical William Tecumseh Sherman, who once warned U. S. Grant that the Radical Republicans, who had the top hand in Washington, "will kiss you today and kick you tomorrow," could have taken this kind of boundless trust in his stride. But the ambitious, and very able, George B. McClellan was from a different breed of military cats. He was no embittered man like the redheaded, high-strung Sherman, who had been a failure all his life. Nor was he anything like the stumpy and stolid U. S. Grant, whom he had snubbed and humiliated when Grant had come to his headquarters to ask for a staff job.

Born to a well-heeled and highly respectable family in Philadelphia, George B. McClellan always had been fortune's darling. Appointed to West Point two years before he was old enough to go, he graduated high in the Class of 1846 and was, of course, assigned to the Army Engineers. He was just 20 years old. By the time George McClellan was old enough to vote he so distinguished himself in the War with Mexico that he had been elevated to the grade of Captain of Engineers.

Incidentally, it should be noted in passing, that the brilliant boy-engineer, McClellan, attracted the admiration and friendship of an older officer, a Major of Engineers, named Robert E. Lee. This old friend was to have considerable bearing on the course of the great war that proved McClellan's undoing some 15 years later on.



U. S. Army

President Lincoln visiting Gen. McClellan at his Potomac Army Headquarters.

In light of the obvious fact that General McClellan gave Lee two of the hardest battles of his life, at Malvern Hill and at Sharpsburg, the gray chieftain's respect for the brilliant engineer, who was his friend in the War with Mexico, and his foe in the Civil War, is entirely understandable.

But those battles were in the mysterious future, in July 1861, when Adjutant General Lorenzo Thomas messaged McClellan from Washington, with the express permission of President Lincoln, "Circumstances make your presence here necessary . . . come hither without delay."

This is the kind of "invitation to greatness" for which a professional officer prepares all his life. McClellan knew the knock of opportunity when it rattled his door. By the time he arrived at the Federal Capital he knew the reason back of this urgent order to hurry "hither" and save the

THE REVIEWER

Colonel John M. Virden, USAF-Ret., graduated from the University of Oklahoma. Commissioned a Second Lieutenant of Infantry in 1932, he was on continuous active duty until his retirement in 1953. Transferring to the Air Force in 1940, he served in Europe and the CBI during World War II. He attended C&GS and the AFSC. His last assignments were as Press Officer, SHAPE, and NATO historian. Since retirement he has been the editor of *The American Weekend*, a newspaper published in Europe for Americans residing in that area and adjoining countries.



Harris & Ewing



U. S. Army

Union soldiers are shown at Fort Totten, one of the defenses ordered by President Lincoln for defense of the Capital.

Union . . . the Confederates had, on 21 July, routed the raw Union Army, under General Irvin McDowell, at Bull Run. Washington was in panic, fearing Joe Johnston would send his howling gray lines close on the heels of the retreating Federals.

These fears were not without foundation. Brigadier General T. J. Jackson, who had lost a finger and earned an immortal name at Bull Run Creek, pleaded with Joseph Eggleston Johnston to do just that. One historian declares Jackson offered to lead his brigade, stark naked, if Johnston would give the word. Just why Jackson suggested the bare skin uniform is not clear, nor does it matter very much.

Washington, in July 1861, was a badly scared town. McClellan knew this soon after he received Adjutant General Thomas' peremptory order. And George B. McClellan, who was never short on self-confidence, believed Mr. Lincoln had sent for the right man to crush the rebellion. His presence in Washington was like a tonic to the jittery town. He looked like a soldier, he acted like a born leader, and he had his own ideas about what had to be done. One of these soldierly notions was that he must have a dependable, close-knit, well-trained army. He was not going to be pushed by the politicians into a major battle before he was ready to take on the best the Confederates had to offer. He knew Bull Run had been forced on McDowell, who was a first class soldier, despite the muddle at Manassas. Certainly, McClellan knew that McDowell's battle plan was far better than the sketchy Confederate scheme of defense. McClellan knew that it was the raw Union troopers who, having never heard a shot fired in anger, thought war was a jolly lark. McDowell's soldiers had absorbed a little too much of the windy oratory about "a three months' war." The grim realities near Manassas Junction horrified them. When they bolted there was no stopping until they were behind the ring of fortifications around Washington.

The dapper young General arrived in Washington, on 26 July; he noted the capital was crawling with disorganized soldiery, and refugees of all types, the backwash of the defeat at Manassas five days earlier.

This was the state of affairs when fate beckoned young McClellan to save the Union. Congress passed a resolution spelling out the objects and aims of the war. The resolution mentioned the preservation of the Union, but refrained from endorsing the Radical Republican move for the abolition of slavery. On the contrary the resolution promised noninterference "with the rights or established institutions" of the Southern States. As a staunch Democrat George B. McClellan had advocated these same mild views, and had advocated the gradual freeing of slaves by purchase. With this action of Congress, McClellan felt that his tenure of command would be in a sympathetic atmosphere in Washington.

A shadow of the trouble in store for McClellan appeared when he reported to the aged and infirm General-in-Chief, Winfield Scott. "Old Fuss and Feathers" was then 75 years old, incapacited by gout, dropsy, and the two English bullets he still carried in his huge body. He could hardly walk alone and could mount his horse only with the help of a strong aide-de-camp. But age and disease had not taken the edge off General Scott's vanity. Deep in his heart Winfield Scott resented this new General who was less than half his age. He took a peculiarly effective way of showing his displeasure.

General Scott introduced General McClellan to President Lincoln. Mr. Lincoln was gravely courteous and obviously much troubled over the state of the war that hot July day. He asked General McClellan to re-



U. S. Army

Headquarters of the Engineer Battalion, Army of the Potomac, which built the defenses that surrounded the Capital.

turn to the White House that afternoon to meet with him and the Cabinet. But Lincoln did not ask General Scott to attend this meeting. It was probably an oversight. In retaliation for this "slight" of his dignity General Scott kept the younger General in conversation all that afternoon over at the War Department. Mr. Lincoln and his cabinet waited in vain to hear McClellan's views on how he proposed to save Washington and crush the rebellion.

Scott had neatly boxed in the flashy young General from the West. Military etiquette precluded McClellan's explaining to President Lincoln why he had ignored his summons to the White House. McClellan's absence from this special meeting of the Cabinet, some members of which were Radical Republicans and didn't have much stomach for a Democrat General anyhow, planted a nightshade of distrust. McClellan never lived it down.

Doubtless, the bright and ambitious McClellan had run up against jealous and vain superiors before. And the Lord knows he was certain to encounter and clash with plenty of them within the first year after his arrival in the Union capital in July 1861. Old General Scott, who had been a national hero nearly all his adult life, was, in 1861, a rather pitiable figure. Virginia's secession from the Union broke his heart for he was a proud son of the Old Dominion. Knowing he was too old to lead the U. S. forces in the field, Scott had offered the Union command to R. E. Lee, another Virginian whom he trusted and admired as he did no other man. Lee, as gently as he could, declined this signal honor and resigned his Army commission, and tendered his services to the Southern Confederacy.

McClellan's letters to his wife, quoted by Dr. Hassler, show plainly there was little love lost between the aged General-in-Chief and the new Major General who had been called in to fight the North's war. In a matter of months General Scott had been quietly eased out and sent to West Point to rock gently on the porch of the officers' quarters. Only McClellan was at the train to wave goodbye to the old heartbroken warrior when he departed Washington.

But Scott left something behind. This was a campaign plan for the invasion of Virginia and the capture of Richmond. It was the work of Winfield Scott, and it was not a bad plan. Now it was McClellan's job to carry it out with the Army of the Potomac he had been so painstakingly building in the bivouacs, the drill fields and the rifle ranges around Washington.

To the everlasting credit of George McClellan it must be admitted that the army he constructed was a magnificent instrument of war. *It was far better than anything we had ever forged up to that time.*

Some said McClellan was slow. Nobody said he was not thorough.

But there were the powerful Radical Republicans who wanted a short war and an immediate abolition of the cancer of slavery. They had no patience with the young General who took his time in such things as musketry, battery drills, the collection of food, fodder and medical supplies, ammunition, and even Navy transports to haul his men to the Virginia capes. The politicians had promised their constituents an "On To Richmond" campaign. That is what they wanted. Their heckling drove McClellan almost crazy. They urged him to do what the ill-fated McDowell had tried to do, under the same whip, and who had drawn back a bloody stump and prolonged the war for three full years.

McClellan, for all his blind spots, was made of tougher stuff than was Irvin McDowell. He fought back at the politicians, with reason and with



Library of Congress

The wagon trains of the Army of the Potomac shown en route to the James River during the Seven Days' Fight.

bitter words. He made powerful enemies. But his men loved him and they fought well for him when the time came.

Up to this point in his book, Dr. Hassler kept his man in sharp focus. With the beginning of the Peninsula Campaign in the Spring of 1862, the author seems to have grown slightly overly fond of McClellan. He sees too much of Little Mac riding his big black stud horse through the seas of mud south of Richmond, his gaudy, mud-spattered staff trying to keep up with him. He forgets that these seemingly endless rains were falling on the Confederates, too.

It seems to have been George McClellan's fate to be loved by those who were very close to him . . . and that, through his exhaustive research, includes Dr. Hassler . . . and to be mistrusted by those who knew him only slightly.

Nobody would contend that the swamps, sloughs and thickets between Williamsburg and Richmond make a good place to fight a war. But this was a route far preferable to a drive overland across the rivers separating Washington and the Confederate capital. Two years later U. S. Grant tried a combination of both routes, and wound up doing what McClellan had tried to do two years earlier —take Richmond from the back door with a thrust up the James River.

Nobody can explain, and Dr. Hassler does not try very hard, why such an intelligent man as McClellan would place his trust in such a "Chief of Intelligence" as the slippery detective Allan Pinkerton. Pinkerton told McClellan that Joseph E. Johnston (and later R. E. Lee) had 200,000 men in his immediate front. McClellan with a straight face wired this information to Lincoln. At no time did the gray chiefs have even one-third that number of men, not even when they were fighting with their backs to the walls of Richmond and McClellan's men were setting their watches by the Richmond church bells.

Little Mac could have received more accurate information from the Richmond newspapers.

But then, it is just as amazing that Abraham Lincoln kept insisting that McClellan had 164,000 men in the Army of the Potomac when actually he could not count more than 89,000. Lincoln's sharp-crack that "sending reinforcements to this army is like shovelling fleas across a barnyard . . . half of them never arrive" did not help McClellan very much.

Dr. Hassler deals well with the confused fighting during the Seven Days' Battle, at Seven Pines, at Malvern Hill, and the political pulling and hawing that finally led to McClellan's being ordered to withdraw his Army from astride the James River and to his relief from command. The details are too lengthy for this review. But they are revealing. They show how worried politicians can wreck a campaign even when the army is literally within sight of its goal.

It should have surprised nobody that the fatuous John Pope proved no match for Stonewall Jackson in the Second Battle of Manassas. Pope commanded a portion of the Army of the Potomac, and the remainder of his troops were from the fat fortress garrisons around Washington. Jackson's lean rebels clobbered them. And the insufferable Pope pinned the whole blame on Corps Commander Fitz-John Porter, one of McClellan's finest lieutenants. Porter was dismissed from the service and was an old and dying man before he could get a new trial, be completely exonerated, and restored to his rank and pay.

But such were the suspicious times in which McClellan fought his war.

When Mr. Lincoln saw what the Confederates had done to the bombastic Pope, the darling of the Radi-



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The defeat of the Army of General Pope at Manassas, Virginia, located on the old Bull Run battleground.

cal Republicans, it is no wonder he called McClellan back to again command the Army of the Potomac.

Until the last old GAR went to Fame's Eternal Camping Ground, they remembered Little Mac riding his black horse across the Long Bridge, the hoofbeats muffled by a foot-deep layer of horse dung, ready to reassume command of the army he had built. They hollered their lungs out for McClellan that night. They never forgot him.

With McClellan off the Peninsula, and Pope soundly clobbered at Manassas, the Confederates had blood in their teeth. They tried their first invasion of the North. The politicians' cherished dream of taking Richmond from the front door would have to wait.

McClellan intercepted Lee at Sharpsburg, Maryland, in early September1862. There they fought the bloodiest single day battle in American history. McClellan had decided advantages. He had Lee's whole battle plan in his pocket. A sergeant had found it, wrapped around three cigars. Then McClellan had a superiority of about 2-to-1. But at the end of that deadly day the Army of Northern Virginia and the Army of the Potomac were in a "Mexican stand-off."

Then R. E. Lee slipped quietly back into Virginia. McClellan, his old friend from the Mexican war, sat in a rocking chair on a farmhouse porch and talked with his staff. He did not fall on Lee and destroy him. *That was George McClellan's greatest mistake.*

Abraham Lincoln, for the second time, relieved General McClellan from command of the magnificent army that McClellan had built. This Army was to pass through a series of hands . . . Burnside, who almost led it to slaughter at Fredericksburg, and hard-drinking Joe Hooker who, like Pope, learned he was no match for the team of Lee and Jackson when he was surprised by them at Chancellorsville. Then there was dour, cussing George Gordon Meade, who had been McClellan's friend in 1846, and who met another old friend at Gettysburg, in July 1863, and drove Lee back into Virginia for a second time. Finally there came from the West the stumpy cigar-chewer, U. S. Grant, the same man whom McClellan had once refused a brief interview way back when the war was young. And Grant took the wonderful sword McClellan had forged and with it beat the incomparable Lee back and back until Lee could retreat no further and came to Grant and asked for terms at a little crossroads place near Richmond, Appomattox.

Feature Reviews

Exclusive with

ARMOR

It is second guessing to say that George Brinton McClellan would have beaten Abraham Lincoln for the Presidency in 1864 but for the fact that his Army of the Potomac was then hammering at Richmond. And William T. Sherman had cut the Confederacy in half by his march to Atlanta and on to the sea.

McClellan finished out his days as he had begun them, in success, with the warm esteem of those who knew him best glowing around him. He was again the president of a railroad and finally a governor of New Jersey. His son became one of the best mayors the City of New York ever had.

But the greatest accomplishment of George McClellan's life was that he built the mighty Army of the Potomac that finally won the Civil War.

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Poague was an efficient, articulate, honest and discerning officer. He gives many close-up and revealing glimpses of the high brass, including Lee, Jackson, the two Hills and Longstreet. He also tells much of the lesser commanders, the enlisted men and the organization and use of artillery.

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THE TECHNICAL SERVICES

THE TRANSPORTATION CORPS: OPERATIONS OVERSEAS

by Joseph Bykofsky and Harold Larson

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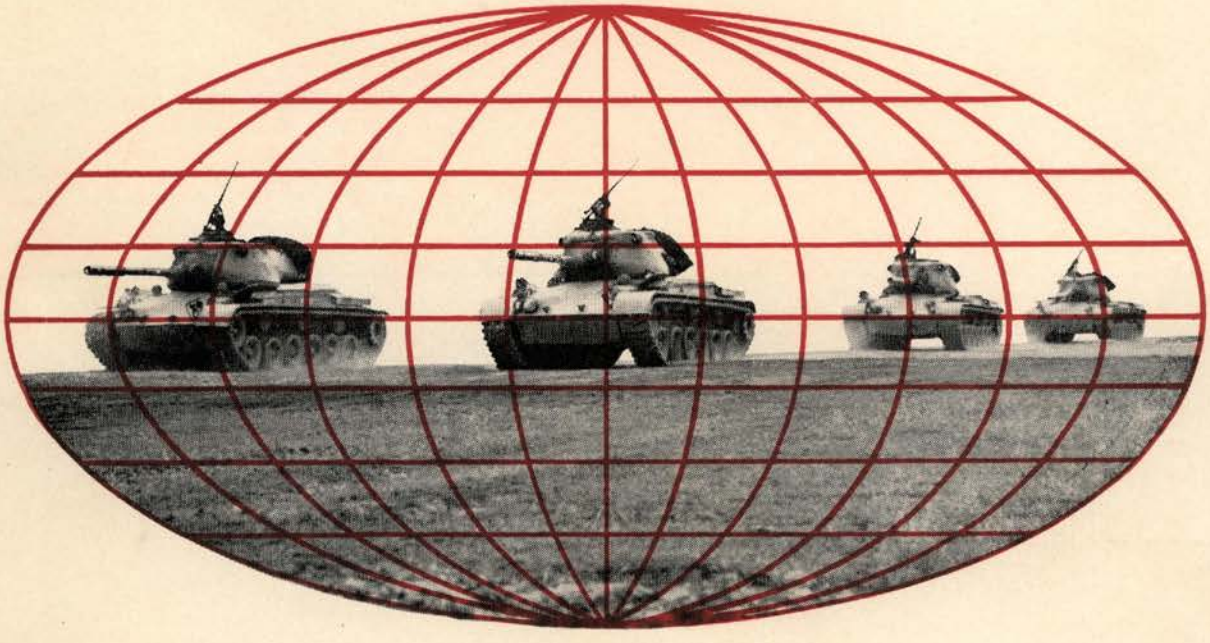
by G. R. Thompson, D. R. Harris, P. M. Oakes and D. Terrett

All students of military operations know that without good communications even the most brilliant commander is virtually helpless in battle. What is less well-known is the extent and complexity of the administrative communications systems which back up and tie into the tactical systems. For the higher Army headquarters the Signal Corps furnishes and operates all communications. For all tactical systems, the Signal Corps also develops and procures the equipment, trains a large proportion of the men, and establishes signal doctrine. *The Test* covers a span of eighteen months, from the "day of infamy" until mid-1943. In those months the Signal Corps was almost overwhelmed by the demands laid upon it. As General Albert C. Smith points out in his Foreword, these demands reached far greater proportions than the War Department had anticipated. How the Signal Corps met the challenges, the frustrations, the confusions and the problems in the period covered is the theme of this book.

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NATIONAL GUARD

SEPTEMBER-OCTOBER, 1957

THE BATTLE OF CASSINO

by

Fred Majdalany

A modern battle is not an isolated event existing in a vacuum. It is a phase in a continuous integrated process. It is a patchwork of tiny operations carried out by groups largely unaware of what similar groups on their right and left are doing. It is a way of life extending for days, weeks or months. This book is the story of a modern battle.

About halfway between Naples and Rome, the road bends around a mountain, emerges from its corridor of hills, and cuts across the three-mile valley of the Rapido River in a straight line. At the end it meets a great wall of mountains like a painted backdrop. One in particular is starker, more sheer, more majestic than the others and on its 1700 foot summit is a splash of white. This is the Abbey of Monte Cassino, founded by St. Benedict in 529. His choice of location was not accidental. Fourteen hundred years later, Monte Cassino, towering guardian of the road to Rome, for the *n*th time lay in the path of a war. A new army had reached the bend in the road. What we know as the Battle of Cassino started on the night of January 17, 1944. It ended June 4, when the Fifth Army entered Rome.

The story of this battle involves the massive design of military strategy translated into a limitless pattern of human ordeal. The complex plan, the problems of supply and communications, the chain of command are explained with clarity. The action takes on an epic grandeur in an almost classic atmosphere of tragedy. It is the joint tragedy of gallant men on both sides, and of the helpless monks and refugees caught up in the fury that destroyed their monastery shelter.



(U. S. Army)

Benedictine Monastery being bombed by Allied Air Force, to clear the enemy from Monastery and surrounding area.

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THE SEA WAR IN KOREA

by

Commanders Malcolm W. Cagle and Frank A. Manson

"A limited war," asserts Admiral Arleigh A. Burke, Chief of Naval Operations, "is the type of war most likely to occur in the thermonuclear age."

For this reason, the study of the Korean conflict is of great significance to every student of international or military affairs.

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LETTERS TO THE EDITOR

Thanks for the Award

Dear Sir:

I wish to express my sincere appreciation to you and the U. S. Armor Association for the award that was given to me as the outstanding Armor graduate from this university, which incidentally instructs in the General Military Science Course. I am sure that the books and the one-year membership will be a great help to me in my endeavors.

Further, I hope this award will be given continuously, because I believe it will serve as a great inspiration to those who follow me from here and will assist them as future officers.

JOSEPH E. HINES, III
Southern University
Baton Rouge 7, Louisiana

● *We have received many letters from the various PMS&Ts stationed around the country and have printed some of them. We do not have room to print them all but we want you to know that they are appreciated. This is the first letter this year from a recipient of one of the awards, and it is always a pleasure to receive such comments.* ED.

Artillery in Support

Dear Sir:

I have been reading your magazine *ARMOR* and I find it quite interesting; therefore, I am submitting a request for a yearly membership. I am an artilleryman, and since the Artillery is the primary supporting arm to the Armor and Infantry, I think it behooves every artilleryman to familiarize himself with both branches and keep up with the latest changes through reading current publications. I am already a subscriber to the magazine *Infantry*, being a former infantryman myself.

It is my feeling that I will become a better artilleryman by keeping myself informed on the latest changes and doctrine of my sister arms. If I am accepted, it will give me great pride to become a member of the Armor Association.

CAPTAIN NEHEMIAH E. RICHARDSON
Hqs, 1st Howitzer Battalion
8th Artillery
APO 25, San Francisco, California

● *We believe your feelings are correct that you will become a better artilleryman by reading ARMOR. Many officers of the other combat arms do not realize that they are eligible for membership in the Armor Association. This also applies to the members of the Technical branches. We also invite submission of material concerning the other branches. This gives our members a greater appreciation of the roles and missions of the other branches. We are always looking for new ideas and we hope that all our readers will take this little reminder to heart and submit material.* ED.

Fire and Movement versus Moving Fire

Dear Sir:

In reference to Lt. Col. Carroll McFalls, Jr's letter in defense of his recent article (see page 3, May-June issue of *ARMOR*) I must protest against his

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Rates: See bottom of contents page.

statement that the tests he initiated have revealed that high speed is no substitute for armor in tanks.

I certainly agree with him that the speed at which the entire tank crew can function in their respective ways is quite low. In fact it is far too low for speed and angular displacement to be an adequate protection against gun fire.

In my experience, however, in a given vehicle you can either cross a dangerous piece of ground at 10 miles per hour, the commander searching for targets and the gunner shooting, or you can cross it at 20 miles per hour everybody hanging on by their teeth.

Ever since the start of the last war British armored tactics have involved movement of tanks at maximum speed between cover, fire support being provided by other tanks of the same subunit firing from stationary covered positions.

As the British "Centurion" was the first NATO tank to have a fully stabilized gun-mounting for fire on the move it would hardly be fair to ascribe this to blind prejudice. As a matter of rough arithmetic, with 2 tanks you can have the following alternatives:

1. Both crossing @ 10 MPH firing;
(2 targets exposed for X minutes, fire equivalent to Y)

2. One crossing @ 20 MPH, one firing from cover;
(2 targets exposed for X minutes, fire equivalent to Y/2 x 3 because of increased stationary accuracy.)

As regards the rest of the letter, I should be interested to hear the writer proving that the French AMX13 either does not exist or else is hopelessly inferior to other 76mm gun tanks.

As a matter of fact the Israelei forces seem to prefer it to the 76mm M41 and even to have dealt quite easily with the 85mm T34. Possibly gun-power is not all?

Armor, after all, is only one method of protection. A low silhouette to decrease the chances of being spotted, and then of being hit is another. Possibly a second look at the views of the German Panzer commanders, as collected by Captain B. H. Liddell Hart in *The Other Side of the Hill* might help. After all, they represent a greater weight of experience than either of us.

PHILIP BARKER

99 Brentford Road
Kings Heath, Birmingham 14, England

On Organization and Equipment of our Allies

Dear Sir:

I have just received my July-August copy of *ARMOR*. It came via my home address in U.K.

I trust you have received my subscription for the next two years. Arrangements were made with Barclays Bank, Salisbury, England to send the required amount.

In the May-June issue was a photograph of an experimental airborne light tank. At a glance this appears to be very similar to the French AMX 13. Is there any connection? (No—Ed.)

I would like to see an occasional feature on the organization and equipment of other armies that may be fighting alongside the USA in the event of another war. Such features would be valuable to all who are concerned with the art of modern mobile warfare.

BRIAN S. BAXTER

LAD REME,
3 Company RASC,
GPO, Ipoh, Malaya

● *We would like to see material on the organization and equipment of our allied friends and hope that someone stationed in either a MAAG or embassy will take his pen in hand and write such an article for possible publication. We do have a short article on Pakistan in this issue. See page 66.* ED.



THE COVER

The artwork on the cover of this issue was expressly drawn for a recruiting poster for the National Guard Bureau which is being given nationwide distribution through the State Adjutants General. For securing this artwork we are indebted to the Chief of the Information Office of the National Guard Bureau, Lt. Col. James B. Deerin.

COMBAT ACTIONS IN KOREA

by

Capt. Russell A. Gugeler

Here is war as it looks to the rifleman, the tank commander, the gunner.

Here is war as it actually is.

You'll find some shocking things in this book. And you'll find some things that will make you proud you're an American, and that will renew your faith in American youth.

If you are a military student, you'll see just how tactics were applied, and how they differed from theory. You'll learn again that it is men, not blueprints, that win or lose wars.

Read the course of the small actions that never make the headlines, but where victory or defeat is gained.

This book is a must for every American, in or out of uniform.

$5.00



(U. S. Army)

24 HOUR FIREPOWER

By *LIEUTENANT COLONEL ERIC KOBBE*

SINCE the advent of the tank as a major combat tool in World War I, there has been a continuing effort on the part of its users to improve its night fighting potential. Some tangible progress was made during World War II. It was in the years following World War II, however, that major breakthroughs were made. These breakthroughs were in the field of infra-red and artificially produced visible light. It is in the field of artificially produced visible light that this article is written.

To advance the stage of the art, Combat Command C, 2d Armored Division in December 1956, conducted a series of tank mounted searchlight tests for Headquarters Continental Army Command. These tests were designed to check the validity of current training directives on the subject and provide a basis for issue and maintenance requirements.

As a background for the conduct of the test, let's first set the scene. Combat Command C, the testing organization, is stationed in Baumholder, Germany. This is a military reservation some nine miles long and five miles wide. The terrain for the most part is open and rolling. It is cut by innumerable steep sided and rather deep ravines. Located in the immediate vicinity of the site where the bulk of the testing was performed is a large trash dump. This ignoble installation, as we shall later see, introduced some rather pertinent facts into the test. The weather at Baumholder during December is cold, rainy and generally miserable. This combination results in heavy fogs or at best ground haze concentrating primarily in the ravines. With these nat-

LIEUTENANT COLONEL ERIC KOBBE, Armor, served in Europe during World War II with an Engineer unit. Subsequent to the War he served in the Carribean. Returning home he went to Fort Hood and in 1949 to the Far East. Graduating from the US Army Armor School in 1952 he remained there as an instructor until 1955. He was next assigned as a Tank Battalion Commander in the 2d Armored Division in Europe prior to his present assignment as ACS/G2 of the Division.

In order to fight around-the-clock we must supply our tankers with artificial light in order that they can produce around-the-clock firepower. Recent tests in the 2d Armored Division reveal our limitations and capabilities to give our Armored units this added firepower.

ural conditions at the testing site, we introduce smoke from the trash dump. We might term the resulting mixture truly representative of the battlefield.

Now let's look at the "props" used in the test. The searchlight used was an 18" light, employing a 2000 watt incandescent lamp. Electrically operated lens shutters were provided to prevent "before" and "after glow." The light is turned "on" and "off" and the shutters are operated from a control box mounted adjacent to the tank commander inside the tank. The light was mounted parallel to the 90mm gun tube on the gun shield. The mounting bracket provided a limited capability for adjustment of the axis of the light beam with respect to the axis of the gun tube.

The players of this test consisted of two tank companies from the 66th Tank Battalion and one tank company from the 29th Tank Battalion. All tanks in these companies except the two company headquarters tanks were equipped with the searchlight. The 43rd Armored Infantry Battalion furnished the necessary armored infantry attachments to support the test.

Now for the test itself. The conduct of the test can probably best be described in three parts; installation, maintenance and training requirements, capabilities of the light and tactical employment of the tank mounted searchlight.

From the installation, maintenance and training portions of the test it was determined that the lights were comparatively easy to install, use and maintain. A light required about eight man-hours to install. It was found, however, that initial installation must be performed by ordnance personnel. The mechanical operation of the tank and radio was not affected by electrical power requirements of the light although it was found necessary to run the main engine continuously when the light was in operation. Mechanical operation of the searchlight proved simple. Four hours of instruction and practical work proved all the training necessary to orient the tank crews on the operation and maintenance of the lights.

While those portions of the test designed to test the capabilities of the light brought out many interesting and diversified results, they all tended to support one primary fact. This fact is that observation with tank mounted searchlight was materially improved when light on the target was furnished by tanks other than the firing tank, positioned to the flanks or rear. Light furnished by the firing tank tended to blind the gunner when reflected back by ground haze, fog, smoke and dense vegetation. Although the ranging operation was little affected by the lights, it was found that the scales light should be turned down dim to better see the scales against glare on the reticle. The tracer element of shot ammunition showed up well in all sights although "burst on target" could not be applied with a light source from the firing tank. This again was caused by inability of the gunner to clearly discern the reticle pattern in the reflected glare of his own light. As in the case of shot tracer, it was found that machine gun tracer was not obliterated or distorted from any light source. It was determined by firing at different sizes and shapes of targets that the usable range of light as far as the gunner is concerned is 1500 yards. Target acquisition beyond this range is all but impossible due to the rapidly decreasing intensity of the light. In considering the determined capabilities of the light as a whole, it is estimated that from the gunner's point of view the tank and supporting ground weapons retain 75% of their daylight effectiveness within the range limitations of the light.

Now let's look at the searchlights from an enemy point of view. First and foremost, to look directly into the light beam will result in temporary blindness. This condition continues to exist for one minute upon looking away or upon the extinguishing of the light. As a result of blindness, vehicles, when they are within the light beam, cannot be detected until they are within 1600 yards. Personnel cannot be detected until they are within 700 yards. As is true when looking outside from a lighted room, vehicles and personnel approaching from outside the light beam cannot



(U. S. Army)

An M48 tank mounting an 18" light, employing a 2000 watt incandescent lamp.

be detected until they are almost on the position. Coupled with blindness is inability of an observer to estimate range when facing the lights. In fact, it was determined the closer the light, the more difficult it became to make even a "guesstimate."

During testing over 5000 rounds of 30 caliber ammunition were expended against the light by infantry employing rifles and machine guns. It was found possible to extinguish the lights but not at ranges beyond 400 yards, except when an unusually heavy volume of fire was employed. While the light was not always extinguished when hit, cracking and crystallization of the lens resulted in a loss of 75% of its effectiveness through diffusion. A light that has been hit normally requires a new lens bulb and reflector. Installation of these parts is a fairly simple procedure that can be accomplished in about an hour at company level. On the side of the enemy is haze, fog and smoke. These completely negate the blinding effects of the light against the enemy. The deliberate employment of smoke proved an effective searchlight countermeasure which "boomerangs" on the attacking gunner in the form of glare in his sight reticle.

The tactical employment of the lights must be considered in conjunction with the light's capability. First, it was found that the decision to use lights should rest with the battalion commander since their limited range has little effect on the operations of other units to the flanks. Once the decision to use lights has been made, the local control of lights should be delegated to company commanders since obstructing terrain and vegetation on their individual axis may differ greatly. The commander planning an attack employing tank mounted searchlights, must consider all those factors essential to planning an attack with conventional illumination. In addition however, because of the gunner's limited observation capability, special consideration must be given to the selection of intermediate objectives, character of the terrain and vegetation on routes of approach and weather.

The battalion commander and company commander must remember in the selection of intermediate objectives as well as base of fire positions, the range of his lights is limited to 1500 yards and that to acquire targets and maintain direction, the lights must be directed on an objective within range. Base of fire positions should be selected with a consideration toward making them a "base of light" position as well. The "base of light" then furnishes flanking "no glare" light to the attacking gunners of the maneuvering element. Badly "chopped up" ground and heavy vegetation on the axis of attack result in shadows which are confusing to the gunner and driver. Heavy vegetation also results in glare in the gunner's sights. A "light up" time should be designated by the battalion commander. This prevents units prematurely "tipping-off" the attack as well as the piecemeal commitment of lights as they come within range. Needless to say, as we have previously discussed weather may be the deciding factor of whether or not the whole show goes.

As in the case of the attack with lights, additional factors must be considered in planning the defense with lights. Employment of the lights must be carefully controlled or the location of the entire defensive system will soon become compromised. The lights should provide illumination for aimed defensive fires, although final protective fires must not be dependent upon illumination. Yes, we still need the range card. Illumination of the target area of one strong point with the lights from another, capitalizes on the "no-sight-glare" effect of flanking light sources. Consider massed lights pre-laid on likely "killing zones." One last consideration, don't light up your own outposts.

To arrive at a solution as to where to put the lights in armored organizations, we must consider the results of the test in its entirety. The simplicity, ruggedness and ease of use and maintenance of the light indicate that no special unit need be organized or designated to employ the light. All tank units can use this equipment any night the weather will permit. The comparatively limited range of the light points to its employment at company level. The fact that better observation is obtained from the firing tank when light is furnished from a source to the flank indicates that all tanks in a company do not need lights. The rigid control of lights required at company level point to mounting them on all tanks of one platoon. They need not be mounted all the time since they may be easily unbolted from their bracket.

In summary, I think you will agree that a tank with searchlight that retains at night 75% of its daylight effective fire capability at 1500 yards against an enemy that cannot estimate its range is truly *24 hour firepower.*



(U. S. Army)

Light on target is improved when furnished by tanks other than firing tank.

More Mobility for Our Army National Guard

During the past several years it has been this writer's good fortune to visit many of our Army National Guard Armored units while they were engaged in their two weeks of field training. The progress made by these various units cannot be measured in number of training hours versus tested results. One has to get out in the field to appreciate the enthusiasm exuded by the men in these units toward their two-weeks' training with these iron monsters and to witness the professional know-how demonstrated by these officers and noncommissioned officers on part-time duty. These observations are not limited to the Army National Guard units but all Reserve Component units. It is due to the preponderance of Armor in the National Guard that permits us to concentrate mainly on that segment of our Ready Reserve in this issue of ARMOR, however. In most cases the degree of progress by each unit shown through the years is in direct ratio to the interest shown by the commanders.

With the possibility of unit training in sight by the Fall of 1958 it is time that our staffs at Combat Command level function at that level in preparation for fulfilling the missions required of a Combat Command. To prepare these staffs for such functions many division commanders, with whom I have had the pleasure of discussing some of their problems, are concerned as to how to best prepare their staffs at Division and Combat Command level to be able to respond readily to the fluid type situation demanded by Armor type operations. During the year these staffs can function only at CPXs. They are unable to practice theories learned at these exercises during armory training. Hence they must rely on their field training periods to solve these problems.

None of these Divisions has sufficient organic transportation to move them complete to and from training sites. In the past they have had to rely on bus and rail transportation to move them. It was suggested by several commanders that if they had sufficient wheel type transportation they could move their whole units to field training and thus give their staffs better training in Combat Command type operations. Although there are insufficient tracked vehicles available, wheeled vehicles make a good substitute for this training.

At this time however, and with the password of the day denoting economy, we do not believe it feasible to assemble sufficient wheeled transportation to move an Armored Division to the training site. We do suggest that it might be possible to move, as a minimum, one Combat Command of a Division to and from the training site with the organic wheeled transportation within a Division. Additional transportation might be furnished from other unit sources within the State. One Armored Division habitually moves 50 percent of its personnel to and from the field training site. Air National Guard aviation could airlift small detachments which have a long way to travel. There are other possible solutions worthy of consideration and we invite any suggestions. If submitted to this office we will gladly publish any ideas for consideration by other commanders.

We feel that the staffs at all levels will get much-needed and valuable experience wherein they can apply this training to fluid type situations at a later date.

In such a way we all become mobile minded and thus develop better, more flexible, all-round Armored units. We believe that there could be even greater savings in transportation costs to the Army National Guard while it is also gaining much desired experience at a low premium.



(U. S. Army)

ARMOR in the National Guard

With the preponderance of Armor in the Army National Guard we feel it only fitting and proper that we spotlight this issue on this very important Reserve Component of our Army defense team. The material should be of extreme interest to all our members and unit subscriber readers, regardless of component. The Active Army furnishes approximately 1300 officers to the Army National Guard as unit advisors. Other support and the close relations between these two Army elements are discussed at some length throughout this special folio. We are deeply indebted to all who contributed to this feature. To single out one person is practically an impossibility. However, we would indeed be remiss if we did not express our gratitude to Lieutenant Colonel James B. Deerin for his untiring efforts. He is the Chief of the Information Office of the National Guard Bureau.

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In the National Guard

By BRUCE JACOBS

80,000 citizen-soldiers, almost one-fifth of the entire Army National Guard, are in Armor. Guardsmen operate more than 5,000 full track combat vehicles.

BEYOND a shadow of a doubt the most enthusiastic undertaking in the Reserve Component program in the years since the end of World War II has been the unprecedented development of a highly-mobile, heavy-firepower striking force in the National Guard of the United States.

Today, Armor in the segment of the Troop Basis that applies to the Guard, is at an all-time high. It is likely that the Guard's ratio of Armor to other elements may be even higher than the Active Army's. This potent panzer strength "in reserve" provides the promise of a follow-up punch without parallel in our military history.

Over 80,000 citizen-soldiers, almost one-fifth of the entire Army National Guard, are in Armor. The Guardsmen operate more than 5,000 full track combat vehicles.

A highly-placed officer stationed at Headquarters, United States Continental Army Command, returned from a field inspection trip and typed out his report on the Armor program in the Guard. At the end of his report he wrote, "The money is well spent."

What is now an important nationwide program actually began rather modestly after World War II when the troop basis provided for the Guard to organize two armored divisions, 33 tank battalions, and 15 mechanized cavalry reconnaissance squadrons. Since this time there has been a 300% increase in Armor in the National Guard and it is more than likely that additional units will be placed in Armor when the long-awaited reorganization of the Reserve Components takes place.

Currently, the bulk of the citizen-soldier armor power is concentrated in the Guard's six armored divisions, three armor groups, and nine armored cavalry regiments. There are tank battalions in each of the twenty-one infantry divisions and tank companies in each of the divisional and nondivisional infantry regiments. There are separate tank battalions, armored infantry battalions and armored field artillery battalions. All told there are more than 1,000 company-size armor units actively engaged in training at this very moment.

An early step toward the creation of this force was taken at Fort Dix, New Jersey, in the Summer of 1947 when the 50th Armored Division opened its command post for the first time. The 50th Armored was one of the first two armored divisions to be activated and actually the first to hold a Summer encampment. There were but 1,500 officers and men present for duty and not even the most ardent advocate of the "steel horse" could then foresee the tremendous swing to Armor that would take place in the Guard in the decade that lay ahead.

What of Armor in the Guard's past?

Historical Background

The trend to Armor is largely a post-World War II development. Yet this is not to say that the Guard is entirely without an historical back-



(U. S. Army)

MR. BRUCE JACOBS, the author of this appraisal of National Guard Armor, is a freelance military writer. He was an infantryman and combat correspondent in the Pacific during World War II. He is the author of a number of books on military subjects. His latest, SOLDIERS: FIGHTING DIVISIONS OF THE REGULAR ARMY, will be published by W. W. Norton & Company this Winter. He is a Reserve Officer with considerable experience in the information field. He has served several tours of duty with the Office of the Chief of Information, D/A, and has been on duty as Public Information Officer of the New Jersey Military District. In 1954 he was Special Consultant to the Secretary of the Army.

. . . IT'S ARMOR



(California National Guard)

ground in Armor. Tank elements existed in the divisions of the pre-war Guard and some of the old cavalry regiments had been designated "horse-mechanized" prior to Pearl Harbor. Nevertheless, it is safe to venture that few tracked combat vehicles were in the possession of Guard units prior to their federalization.

Following World War I the tank corps had been consolidated with the Infantry. Cavalry began to move into the picture in the '30s when the old 1st Cavalry became the 1st Cavalry (Mecz).

During the twenties and thirties tank companies were formed in each of the Guard's eighteen infantry divisions. Many were originally issued French "whippet" tanks of World War I vintage. During the middle thirties they received the M3A1 light tanks. Cavalry regiments which were partially mechanized received a few primitive "combat cars." On the whole the National Guard, like the Regular Army, suffered an acute shortage of modern combat vehicles.

Soon after the establishment of the Armored Force (July 10, 1940) and the creation of the 1st and 2d Armored Divisions in the regular establishment, the phased call-up of the National Guard began in accordance with the provisions of the Selective Service and Training Act of 1940. Events which followed, in the course of this mobilization, are an interesting study for anyone curious about the development of Armor in the Guard.

A number of important actions were taken by the War Department prior to the Guard's being ordered into federal service. The most significant redesignations made at the time (in respect to armor) were those which first turned seven of the Guard's 17 horse cavalry regiments into horse-mechanized units,[1] and secondly, created five antitank battalions, then a new type organization both to the Army and the Guard.

The divisions were called into federal service *without* their tank companies.

In November, 1940, the Armored Force School was opened at Fort Knox, Kentucky, and the tank companies which had been cut adrift were suddenly given new life as the War Department authorized the formation of four National Guard tank battalions, the 191st, 192d, 193d and 194th.

The 32d Tank Company (deleted from the 32d Division, Wisconsin-

[1]The Horse-Mechanized Cavalry Regiments called into service during this period (in order of entry into federal service): 106th Cavalry (Illinois), 102d Cavalry (New Jersey), 113th Cavalry (Iowa), 101st Cavalry (New York), 104th Cavalry (Pennsylvania), 115th Cavalry (Wyoming), 107th Cavalry (Ohio).

Michigan National Guard) became Company A, 192d Tank Battalion. The 33d Tank Company (formerly of the 33d Division, Illinois National Guard) became Company B. The 37th Tank Company (late of Ohio's 37th Division) became Company C.

The 192d was the first of these "GHQ reserve" tank battalions called into federal service, reporting for duty November 25, 1940. Its first station was Fort Knox and from there it proceeded to Camp Polk, Louisiana. Along with the 194th Tank Battalion (activated February 10, 1941, at Fort Lewis, Washington), the 192d was destined to be involved in World War II's bitterest campaign, the fall of the Philippines.

Both battalions had been equipped with M3 General Grant tanks (54 per battalion) and their rate of progress in training prompted the War Department to include them in the last shipment of reinforcements sent to the Philippines in late Fall, 1941. The two Guard battalions fought gamely in the first tank *vs.* tank battles engaged in by U. S. forces in World War II. The malarial survivors of Bataan were taken prisoner by the Japanese. Then followed the Death March, a succession of prison camps, the bombing and sinking of a prison ship on which they were passengers, and hard labor in Japan. Out of the old 37th Tank Company (Company C, 192d Tank Battalion) only ten men survived to return home to Ohio.

The 193d Tank Battalion went into federal service at Fort Benning, Georgia on January 6, 1941. A month later the 191st Battalion assembled at Fort George G. Meade, Maryland. These battalions, too, were destined to see extensive combat service. The 191st fought in five major campaigns from Naples-Foggia in Italy through Central Europe. It proved to be one of the key factors during a critical enemy armor attack at Anzio. The 193d Battalion went to the Pacific early in the war and was attached to the 27th Division for the Makin Atoll operations. Here it pioneered the use of LVTs (Landing Vehicles, Tracked), the versatile amphibian tractors which became a familiar sight on many Pacific beachheads.

All of the Guard's infantry divisions were represented in these four battalions and in the early antitank battalions.

There were five of the latter to begin with—the 101st, 102d, 103d, 104th, and 105th. Then the divisions in federal service were called upon to designate certain field artillery elements to form additional antitank battalions intended to be organic within the division.

The 28th Infantry Division, for example, formed the 28th Antitank Battalion; the 44th Division organized the 44th Antitank Battalion. It was intended that these battalions, whose principal armament would be flat-trajectory, self-propelled weapons, could smash attacks by enemy Armor. Toward the end of 1941 they were redesignated tank destroyer battalions since it was felt the term "antitank battalion" implied defensive operations. Some time later the battalions were taken away from their parent divisions and once again their numerical designations were changed.

For example, Artillerymen from the 32d Division had formed the 32d Antitank Battalion which became the 632d Tank Destroyer Battalion. Today this battalion's battle streamers are carried by the 132d Tank Battalion, an element of the current 32d Infantry Division, Wisconsin.

Similarly, the present-day 628th Tank Battalion of the 28th Infantry Division, Pennsylvania, stems from the wartime 628th Tank Destroyer Battalion. The wartime 636th Tank Destroyer Battalion (formed with personnel from Texas' 36th Infantry Division in 1941) is the parent of the 249th Tank Battalion and the 146th Tank Battalion of the Lone Star State's 49th Armored Division. The old 644th TD Battalion is the parent of the 644th Tank Battalion, 50th Armored Division, New Jersey.

The horse-mechanized cavalry regiments called into service in 1940-41 became tank-equipped during World War II and from them stem some of the armored cavalry regiments of today, as well as divisional tank and reconnaissance elements.

It is in this tangle of primitive tank battalions, horse-mechanized cavalry, and assorted antitank-tank destroyer battalions, that National Guard Armor has its roots. Furthermore, in the course of World War II service many a Guardsman who started out as an Infantryman or Artilleryman found himself channeled into the expanded wartime armored force. Guardsmen served in the Army's 16 armored divisions, in its cavalry groups, reconnaissance squadrons and in numerous types of separate battalion organizations.[2]

Armor, in negligible supply in the U. S. Army prior to World War II,



(New Jersey National Guard)
National Guardsmen conducting practical work in use of jeep-mounted AN/GRC-3.



(U. S. Army)

105 howitzer of the 49th Armored Division receiving orders prior to firing.

had truly come of age as the peacetime reorganization of the National Guard began in 1946.

But Armor suffered in the shrinking process that overwhelmed the Army. Between August 31, 1945 and April 26, 1946, 15 of the Army's 16 armored divisions ceased to exist. Thus, as the 49th Armored Division, Texas, and the 50th Armored Division, New Jersey, came into being their only counterpart in the Active Army was the 2d Armored Division then at Fort Hood, Texas.

It is a paradox that the real development of Armor in the National Guard began at a time when Armor in the Army was at its lowest ebb since 1940.

The Impetus

In the beginning two armored divisions were organized and like the early regular armored divisions they came out of a background of both Cavalry and Infantry. (The 1st Armored Division, it is recalled, came principally of a Cavalry background, via the 7th Cavalry Brigade, whereas the sister 2d Armored Division was built largely around the 41st Infantry Regiment.)

The 49th Armored Division Headquarters was created from the Headquarters, 72d Infantry Brigade, Texas. It was to consist, in the main, of units descended from pre-war Cavalry, Infantry, and Artillery outfits whose home was northeastern Texas. Headquarters, Combat Command A stemmed from the redesignation of Headquarters Troop, 56th Cavalry Brigade. For all but a few months of its existence the 49th Armored has been under the command of Major General Albert S. Johnson.

The 50th Armored Division gave New Jersey an entire Guard division for the first time. Prior to World War II the Garden State shared the 44th Division with neighboring New York. Consequently many of the 50th Armored units are descendants of 44th Division units. Still others once belonged to New Jersey's famed Essex Troop[3], now the 102d Armored Cavalry Regiment.

The 50th Armored, which went to Fort Dix with 1,500 officers and men in July, 1947, reported to Pine Camp, N. Y. (now Camp Drum) with a strength of 6,500 exactly one year later! The armor surge was beginning to manifest itself.

Needless to say, the 49th Armored and 50th Armored wrote the book in terms of Armor organization in the Guard. Both units were stripped of equipment during the Korean war but by 1952 both were resupplied—with brand new M47s and Walker Bulldogs (M41s). Out of their trials and tribulations came a pattern for others to follow. The real crowning of their efforts is the very fact that the Department of the Army embarked upon a program of expanding the armor power of the Guard.

Guard Armor, Phase II

The Army turned the mechanized cavalry reconnaissance squadrons into armored cavalry regiments, created armor groups, and by 1954 it was ready to build another armored division in the Guard. California was asked to convert one of its two infantry divisions to Armor. The Governor promptly nominated the 40th Infantry Division, one of the eight National Guard divisions called into federal service during the Korean War. The 40th had served on the battle line in Korea and had reverted to State control on June 30, 1954.

To add spice to this first conversion of an infantry division to Armor there were only six weeks until the reorganized division was to commence Summer field training at the Hunter Liggett Military Reservation. In those few weeks the 40th Division staff achieved an "administrative miracle" which would seem at first glance to have been an impossibility.

"Perhaps," a member of the Army Advisory Group said, jokingly, "the way to build a new armored division is to start with a partially-organized infantry division!"

[2]Of little significance in the development of Armor in the National Guard, but worthy of mention in passing, is the *motorized division* of 1942-43. This was an infantry division beefed up with sufficient organic transportation to move all its elements, simultaneously, by motor. None existed until April 1942 and no National Guard division was ever motorized. The divisions designated as motorized were redesignated infantry divisions before any had an opportunity to test the concept in combat. One of the reconverted divisions was the 8th Infantry Division which numbered the 121st Infantry Regiment, Georgia, among its organic elements. The Old Gray Bonnet Regiment became the 121st Infantry, Motorized. Although this designation was changed just before the Regiment entered combat in France the 121st was frequently utilized as a mobile combat team and it served with several armored divisions during the course of the war. Today the Regiment is Headquarters, Combat Command B, 48th Armored Division, Georgia.

[3]Popular legend has it that General Joseph Swing, wartime commander of the 11th Airborne Division, once remarked, "Were I not a graduate of West Point I would be a member of the Essex Troop."

The task was immense. Ground rules had to be written to cover recruiting, promotions, transfers, resignations, excess personnel, disposition of unit records and files and new strength accounting procedures.

"We made mistakes," says Major General Homer O. Eaton, Jr., the Division Commander, "but we like to think we held them to a minimum under the circumstances."

The new armored division absorbed the 111th Armored Cavalry Regiment which, with the old infantry division's 140th Tank Battalion, and the regimental tank companies, provided the 40th Armored with a nucleus of experience in the armor field.

"Every effort," says General Eaton, "was made to simplify training problems by reassigning officers and men to similar units and even similar TOE positions."

When it was possible, existing units were converted and redesignated without personnel changes. For example, the artillery units remained virtually intact but for the fact that they were redesignated armored field artillery battalions.

The former Infantrymen, accustomed to having regiment as an intermediary headquarters, were at first baffled by the role of Combat Command Headquarters. There was some discussion as to whether or not to attach battalions to Combat Command and Division Train Headquarters for administration.

In this respect the book (FM 17-100, Armored Division and Combat Command) is most explicit. [1] *Each battalion in the division (both combat and service type) is organized for independent administrative operation;* [2] *The mission of the Combat Command Headquarters is to provide for command and control of elements of the division attached to the Combat Command.*

As it developed a middle-of-the-road policy was adopted. The 40th Armored stuck to the rules but found there were instances when adherence had to be something less than 100%.

The Division policy called for all routine logistical matters to be handled directly between Division G4 and the battalion. "We felt that the battalion should learn to operate logistically independent of the Combat Command," Lieutenant Colonel James C. McPhaill, Division G4, explains.



(California National Guard)

40th Armored Division in defense of an air base during "Operation Minuteman."

It turned out, in the beginning, that on matters other than routine supply functions it was sometimes necessary for the Combat Command S4 to expedite and coordinate matters. From habit battalions tended to lean on Combat Command much as they had relied on Regiment in the past.

"This, possibly, is a drawback in converting an infantry organization to Armor," says General Eaton. "But gradually everyone in the battalions began to realize what was expected of him. Now when we saddle Combat Command with an administrative responsibility it is to expedite things —not because we're worried about our battalions."

A distinct disadvantage of the approved system is that Division Headquarters is required to operate directly with a sizable number of administrative headquarters. The factor of distance, frequently 200 miles or more, between administrative headquarters is a source of aggravation. Recently the 27th Armored Division of New York State took steps to remedy the situation with a "ground rule" of its own.

After 18 months of sticking to the book in the matter of keeping the Combat Command Headquarters aloof from administrative cares, Brigadier General Almerin C. O'Hara, the present 27th Armored Division commander, declared, "By this time every battalion commander and the battalion staffs understand the proper relationship of the battalion to the division and to Combat Command in the matter of administration. They know how they are supposed to operate under active duty conditions.

"Division Headquarters, in this case, cannot actively or adequately supervise the activities of units hundreds of miles away. For this reason we're giving *complete control* of attached units to the Combat Commands. This includes administration.

"If our Division was concentrated in New York City we would not do this," General O'Hara acknowledges.

The principle of employing Combat Command Headquarters as a "little division" headquarters was recently utilized by the 40th Armored. This Summer some of the tank elements of the division spent their annual field training at the Army Armor Combat Training Center at Camp Irwin, California, while the remainder of the 40th was at Camp Roberts and Hunter Liggett. The battalions engaged in the rugged tank-fighting course at the famed desert camp were under complete operational control of Combat Command C.

Under the circumstances CCC also furnished the tankers all required logistic support.

"We think this is a realistic solution," says General Eaton, "although it may appear to violate armor concept."

Three More Divisions

Following the establishment of the 40th Armored Division on the West Coast, Tennessee was authorized to form the 30th Armored Division, October 27, 1954. For years Tennessee and North Carolina had shared the 30th Infantry Division and each felt it could support an entire division. The infantry division retained the old numerical designation and became a North Carolina outfit. The Volunteers wasted little time in moulding an armored division around a nucleus including the 173d Armored Cavalry Regiment, the 278th Regimental Combat Team, and the 196th Field Artillery Battalion. Tennessee's part of the old infantry division fortunately included the division tank battalion.

"We had no problem laying our hands on branch-qualified officers and men," says Major General Paul H. Jordan, the retired division commander, "because as you can see, we had all 'the makings' even before the Division was born."

New York's 27th Division made the switch to Armor on February 1, 1955, and thus became the fifth armored division in the Guard. The New York Division's conversion was made under the sure hand of Major General Ronald C. Brock, now Chief of Staff of the State. General Brock and his staff approached the subject with two guiding principles:

1. Units that required heavy equipment for armory training should be assigned to armories that would require a minimum of alteration.

2. Units should be assigned in such a way that existing training and skills would be utilized to the utmost.

Accordingly, the 27th Armored followed the pattern established by the 40th as its infantry division tank battalion became the heavy tank battalion in the armored division. The regimental tank companies became units of the medium tank battalions. The armored infantry battalions were formed from existing infantry battalions. Officers whose original or basic branch was Armor were assigned to tank units, geographical location permitting.

On November 1, 1955, the sixth armored division of the Guard came into being when the 48th Division of Georgia and Florida was converted. This is the only instance of an armored division divided between two states.

"This has its disadvantages," Major General Patrick E. Seawright, the incumbent division commander, says. "Technically I do not even command the Florida part of the Division until we get to camp. Fortunately, we have coordinated our efforts closely and no one is mad at anyone else."

The 48th is composed of two-thirds Georgia troops and one-third Floridians. Interestingly, the Division is larger now than it was as an infantry division although its current authorized strength is less.

Command of the Division is based upon an agreement made back in 1946-47. Georgia, Florida, Department of the Army, and the National Guard Bureau, were all parties to this unique plan. By the terms of the agreement Georgia was given the Division Commander, Chief of Staff, and the "G"-staff for a ten-year period. During this period Florida would have the Assistant Division Commander and the Assistant "G's."

Effective October 1, 1957, the situation will be reversed as Florida gains control for a period of five years as the command of the 48th Armored will pass to Brigadier General Maxwell C. Snyder, the present ADC. Florida will retain control for five years.

Organization for Training

A survey of the six armored divisions of the Guard indicates that most of the division commanders try not to involve Combat Command Headquarters in administration, but do normally attach battalions to Combat Command for training. No effort is made to assign well-balanced combined arms to the Combat Command. The Guard is too much a prisoner of geography to afford this training luxury. Battalions are attached to Combat Command on the basis of geographical proximity—except that all field artillery battalions come under Division Artillery and in most cases the service and support units come under Division Trains.

In general Combat Commands retain the same battalions for annual field training.

"At this stage in our development



(New York National Guard)
27th Armored Division training in operation of twin forty antiaircraft guns.



(Tennessee National Guard)
30th Armored Division members on the firing range during Summer encampment.

it seems to make sense," says Major General Robert E. Frankland, recently appointed commander of the 30th Armored. "But in another year or two we should be able to vary the composition of Combat Commands in field training. That will be an important milestone."

The 40th Armored has experimented using Combat Command Headquarters to run bivouac areas. On at least one occasion elements of the Division were camped in five widely-dispersed locations and each Combat Command acted as a sort of sub-Post.

The 27th Armored Division utilized its Combat Command and Trains commanders to support a program of centralized training during annual field training at Camp Drum, New York, in 1957. The Division's four tank battalions were placed under Combat Command A. The reconnaissance battalion, engineer battalion and basic training group were under CCB. The four armored infantry battalions were under CCC. The armored artillery battalions were under the Division Artillery Commander, while Division Trains supervised ordnance, QM, medical, MP Company and Signal Company.

Armored Division Strength

A rather prominent New York publisher likes to display on his desk a little volume titled, "How to Lie with Statistics."[4] It is his contention that you can manipulate figures to prove —or disprove—anything. From a military standpoint, on the other hand, numbers have a tendency to take on a pristine simplicity that can sometimes be misleading.

True, established Tables of Organization lay down the numerical criteria for any given organization, and a unit which is not up to TOE strength is *understrength*. In the military lexicon "Understrength" manages to imply that a unit is not quite up to snuff.

Where, precisely, does this leave the Guard? Measured by the standards of the full-strength columns in the TOE the larger part of Guard Armor falls in the understrength column.

In a discussion of the popular pastime of probing and reading meaning into strength figures Major General Ellard A. Walsh, president of the National Guard Association, declared (before the Senate Armed Services Committee, July 1955), ". . . the finger is pointed at the National Guard that (it is) not up to full war strength and it is made to appear we are at fault. We would like to clear up this matter of strength once and for all. Each year the strength of the Army National Guard . . . is fixed by Congress in the National Defense Appropriations Act. . . .

"We concede it would be very fine indeed if the Army Guard could be brought up to 80% of war strength."

General Walsh went on to point out what most Guardsmen and Army men have known for years, that the Army National Guard would reach its strength objectives *only when and if Congress so determined.*

During the 1955 hearing he added words that bear no less weight today, ". . . it should be borne in mind that the annual appropriations will have to be vastly increased and notably in the matter of providing the necessary installations and facilities."

It is all too reminiscent of a period in U. S. military history discussed by Major William Addleman Ganoe in his authoritative, *The History of the United States Army,* published in 1924. In his discussion of the Militia's conformation to the organization of the Regular Army, Ganoe commented on the requirements for high efficiency and noted, "Both the Army and the National Guard had done all it could without the help of Congress."

It would sometimes seem that entirely too much emphasis is placed upon *assigned strength* in evaluating the mobilization readiness of the Guard's Armor. There is a tendency to compare divisions on the basis of aggregate strength figures and then to consider these figures in relationship to the authorized strength of a TOE division in the Active Army.

Realistically, however, the Guard armored division can be in a high state of readiness even when its numbers are far fewer than those called for in a division. It all depends upon how the numbers are distributed, how many are qualified in key NCO or cadre slots and how many qualified crews and teams are in being.

The Guard armored division's authorized strength is based on the reduced strength column of the TOE, roughly 11,650. A recent check with the state adjutants indicates that the armored divisions are pegged at around 75% of this figure. Three divisions stand at 80% or better.

This makes for a much higher readiness potential than most people

[4] "How to Lie with Statistics" by Darrell Huff and Irving Geis, W. W. Norton & Co., New York, N. Y., 1954.

realize. To begin with, reduced column strengths take into account the requirements for specialization in armored units. Hence, the reduced column figures are very close to full TOE strength in many organizations where a high degree of specialization is to be found. Headquarters Companies of Combat Commands and armor units are authorized figures very close to full TOE strength.

Under certain conditions a few units may be authorized full TOE strength. These are outstanding exceptions to the general rule.

Units in which specialized skills are not as predominant frequently are authorized only 50% of TOE strength. In these units it is anticipated that a minimum number of crews and/or teams can provide a professional cadre for the maximum or required number of crews and/or teams in the event of a wartime expansion.

This has been spelled out neatly by Major General Maxwell E. Rich, Adjutant General of Utah. In an appearance before the Subcommittee No. 1 of the House Armed Services Committee last February, General Rich expounded the theory that in order for the Guard to be mobilization-ready it is not necessary for every man in a unit to be a specialist.

"The Army provides in its Tables of Organization," he explained, "a cadre structure for specially trained individuals to be available as a nucleus for new units in expansion of the Army. These cadres vary from 13% to 24% of authorized strength figures . . . The cadre provides specialist training within the unit.

"A fiber of specialists is necessary for an efficient unit. The majority of the personnel comprising a unit, however, are individuals needing little more than basic training."

In the case of a section serving a 155mm self-propelled artillery gun in an armored field artillery outfit there are 11 individuals. Of this number, according to General Rich, only *two* are considered to need specialist training to perform their assigned duties.

Unit Supply

For purposes of supply as well as determining strength the Guard uses the same tables of equipment and tables of allowances as the Active Army. Distribution of heavy equipment (*i.e.*, tanks, self-propelled artillery) is made on the basis of current availability, actual requirements for training, a unit's status of training, and its ability to maintain equipment and provide the proper security.

An average tank company in a typical National Guard armored division has at least two M47 tanks available at its armory site; the average armored field artillery battalion is signed out with six modern self-propelled howitzers. Additional vehicles and weapons are generally maintained at concentration sites located at field training camps.

Unit supply rooms are well stocked with individual and organization equipment. When a Guard Supply Sergeant has size problems he rarely heads for the USF&PO (U. S. Fiscal and Property Officer). He attempts to solve it by "lateral supply activity."

"When you need a 34-short fatigue jacket, that is when you find out how many friends you have in the battalion," a company Supply Sergeant explains.

How effective is the current supply program?

"At this point," says Major General Donald McGowan, the Chief of the Army Division of the National Guard Bureau, "our training is in no way hindered by failure of the Active Army to provide the equipment we need."

CONARC Gives Guard the Word

If everything proceeds according to plan a most significant milestone will soon be reached when the Guard need no longer shoulder the burden imposed by requirements to administer an unwieldy basic training program. In recent years this has been a costly operation from the twin standpoints of manpower and money. Born out of the necessity to give new Guardsmen with no prior service a standard level of military training[5] the program will soon be a thing of the past.

This program was manifestly necessary until the recent extension of the RFA-55 program which provided for six months of active duty for all new members of the Guard. This will relieve the Guard of the requirement to administer basic training since the recruit will get 1,000 hours of active duty training before he takes up his duties in his hometown outfit. This promises a much better deal for Guard units than the old basic training arrangement, a system which doomed

[5]Training Memorandum Number 1, Headquarters Continental Army Command, 31 August 1955 (National Guard Training Guide), indicated need for special attention to nonprior service men and indicated definite stages of progress as follows: (1) basic individual training, (2) advanced individual or specialist training, (3) basic unit training, (4) advanced unit training.



(Georgia-Florida National Guard)

48th Armored Division firing on one of many tank ranges at Fort Stewart.

an armored division to perpetual basic with little likelihood that it would ever get beyond the advanced individual phase.

Now, however, the door is open to the Guard to push its status of training far beyond anything it has ever achieved in the past. Today all six armored divisions and the nondivisional armor units are redoubling their efforts to stay on the schedule which CONARC has established[6]—and which calls for the Guard to be engaged in basic *unit* training beginning October 1, 1958, a little more than one year off.

This fateful decision was reached in a small office which occupies a few square yards in a one-story office building which sits in the shadow of the plush Hotel Chamberlin on Old Point Comfort, Virginia.

Within a stone's throw of historic Hampton Roads where the *Monitor* and *Merrimac* ushered in the era of armored naval vessels, this office is, *for training purposes,* the Army's direct line to the 6,000 federally-recognized elements of the National Guard.

Direction and guidance for all National Guard training falls within the purview of Headquarters, United States Continental Army Command (USCONARC) located at Fort Monroe, Virginia. This command, descended from the old GHQ and Army Field Forces, is in the capable hands of General Willard G. Wyman.

At his right hand, in a relatively new office, is Lieutenant General Ridgely Gaither, Deputy for Reserve Components.

On an advisory level another important principal with reference to National Guard Armor is Major General L. L. Doan, a 1927 graduate of West Point, an ex-cavalryman who has led an armored regiment, a combat command, and who more recently commanded the 2d Armored Division in Europe. He is the chief of CONARC's Armor Section.

The actual directives regarding training activities stem from G3, the bailiwick of Major General O. P. Newman.

The chief of the National Guard Branch of G3, and the actual occupant of the "small office" is Colonel Alva L. Fenn, who sets the pace for a staff of busy officers. A former Guardsman from Kansas, Colonel Fenn knows "both sides of the street." His branch monitors the entire Army National Guard program.

"Armor doesn't pose any special problems," he said in reply to an obvious question. We evaluate all units against the same criteria used in judging the combat readiness of similar organizations in the Active Army."

CONARC's judgments on a Guard organization's progress toward a state of readiness develop out of special reports by staff observers and from the mobilization evaluation report submitted on NGB Form 115.

The actual preparation of this report, it must be emphasized, is not made by CONARC representatives. Each Army Area commander appoints inspection boards whose members are assigned, down through battalion level, to conduct daily inspections at the field training site.

The inspectors grade the efficiency of a unit's training on a daily basis (Superior, Excellent, Very Satisfactory, Satisfactory, Unsatisfactory) and this information is published each day.

Far more important, however, is the information which goes on the NGB Form 115. It describes the comparative number of people actually present in camp against the unit's wartime TOE strength, the actual number of MOS-qualified officers and men; the quality and efficiency of teams and crews and the degree to which individuals are weapons-qualified.

When this form is completed, by the end of the annual field training period, it is processed through Army Headquarters with copies furnished to the Chief of the National Guard Bureau as well as CONARC.

Using its own criteria the National Guard Bureau assigns an adjectival rating to each unit. It should be pointed out that *this* rating carries no meaning insofar as the CONARC evaluation is concerned.

An officer in the National Guard branch at CONARC explains, "We do not know what criteria are employed by the Guard Bureau. That is entirely their concern[7]."

The criteria used by CONARC and the conclusions which it reaches in the course of evaluating an organization are both highly confidential matters. How the six armored divisions of the Guard are rated, mobiliza-

[6]Training Memorandum Number 9, Hq USCONARC, 1 May 1957.

[7]Ratings assigned by the Chief of the National Guard Bureau enable a unit to see how it is scored in comparison with other like units within its state. These ratings are also utilized by the States and Bureau in determining winners of the Eisenhower Trophy each year.



(Idaho National Guard)

Training in the Guard is continual to insure the greatest degree of readiness.



(Idaho National Guard)
During Summer encampment the Winter armory training is put to practical use.

tion-wise, is a closely-guarded secret. It is safe to speculate only that each of the divisions is assigned a mobilization category which reflects CONARC's judgment as to the time that would be required for the division to be ready for commitment to combat in the event of hostilities.

In reply to the suggestion that it is unrealistic to evaluate a National Guard armored division against the same criteria that apply to a Regular armored division Colonel Fenn maintains, "It is our responsibility to develop an Army for employment in wartime. It is essential that we have an accurate picture of the level of training of all forces on hand in the continental United States. We must know which divisions can be counted upon to move out first. As for the divisions which cannot move out at once—we have got to know how much additional time they will require in order to be able to move out."

This is a tough credo in view of the fact that Guardsmen normally engage in only 200 hours of training every year (*including* 104 hours of annual field training). Yet the CONARC logic is inescapable. There cannot be separate standards of readiness. In this instance it is up to the Guard to do its best to conform to the Army's standards.

The Chief of the National Guard Bureau has repeatedly declared, "Emphasis on training in the National Guard will be continued in order to assure the greatest degree of mobilization readiness possible."

Among officers and key NCOs of the Guard's armored elements *training* is the principal consideration, with emphasis upon the postulate that, "you must start with good platoons."

Faced with the directive to get into basic unit training by next year the Guard has its work cut out. The key factor of course, is the continued existence of the RFA Program. Assuming that this program will insure every division of a flow of trained men, the Guard's first order of business is to bring up to this level the last batch of Guardsmen who enlisted prior to April 1, 1957, and were therefore not faced with any requirement for active duty training. How this is to be accomplished in the case of the 50th Armored Division is explained by Major General Edward O. Wolf, commanding general of the "Jersey Blues."

"Our basic training program during 1957 field training was conducted for men who enlisted prior to the RFA deal and those who had not been to field training last year. All of them will continue in a basic training cycle during armory training this Fall and we hope to have all individual basic training in the Division completed by January 1, 1958."

The 50th Armored and most of the others will conclude the major portion of their advanced individual training during Summer camp in 1958 and should, therefore, meet CONARC's deadline for progression into unit training.

So it would appear that aside from all partisan considerations the National Guard, particularly the armored elements, will reap the benefit of the program which touched off last winter's bitter fight between the National Guard Association and the Department of Defense.

The six months training program means not only that the Guard has a ready-made source of men who have completed Active Army type basic training but even more important is the fact that the program provides a steady flow of *trained specialists* in a wide variety of MOS's that would be difficult to develop in armory training.

School Training

The Guard today is more "school-conscious" than ever before in its history. It still remembers that it was sourly regarded by the regulars for the fact that only 6,800 of its 21,074 pre-World War II officers had attended an Army service school.[8] There is a heavy emphasis upon service school attendance and this appears to be especially true in the armor field where, some feel, education must be of a high order.

This is rather reminiscent of a postulate often expressed in a negative sense by the late General Leslie J. McNair who might have been thinking of the peculiar problems of the tankers when he declared, "Inadequately trained officers cannot train troops effectively."

Thus, in some units, commanders insist that new officers sign a pledge that they will attend an appropriate branch school at the earliest possible moment. Others simply have "an understanding"—but it boils down to the same thing. Guard officers, particularly those who aspire to command as-

[8] "The Organization of Ground Combat Troops" (U. S. Army in World War II Series) by Kent Roberts Greenfield, Robert R. Palmer, and Bell I. Wiley. Historical Division, Department of the Army, Washington, D. C., 1947.

signments, have got to stay current.

What has come about as a result is interesting in itself. This is the outstanding relationship between the citizen-soldier tankers and their Active Army counterparts. There is a strong bond here which does not seem to exist elsewhere.

In part this splendid relationship may be attributed to the efforts of the Armor Association which, from the start, advocated strong ties between the active and reserve. Right now, for example, its 24 man Executive Council includes eight representatives of the reserve forces—six of of them Guardsmen. Also three vice-presidents, one active and two from Reserve components.

Even more important to the Guardsmen has been the attitude typified by a succession of Commandants at the US Army Armor School. Several years back a Commandant of the School told a group of departing Guardsmen, "You're never any further from Fort Knox than the range of a three-cent stamp."

Actually, he understated the case.

As a result of its enthusiasm for the Guard Armor program, Fort Knox has become a sort of focal point for the citizen-soldier tankers. Officers and men wearing the armored insignia of the Guard's armored divisions, armored cavalry regiments and armor groups are continually streaming in and out of the sprawling western Kentucky post.

Nor does the school's support consist of leadership training alone. There are important courses for NCOs and enlisted specialists. In most cases RFA trainees who have been enlisted in armor MOS slots undergo training at Fort Knox during their six months of active duty.

In every instance when a Guard armored division was created the School acted quickly to establish special two-week courses to, "provide a basis of understanding and spark the enthusiasm of the suddenly enlarged official family."

This short course wasn't designed to make tankers out of doughboys but it gave the new Armor officers a concentrated dose of familiarization. General Eaton, an educator in civilian life, calls the course an outstanding example of covering a lot of ground in a little time.

"The important thing," said Colonel Henry C. Newton, former Director of Instruction, "is that the 'convert' begins to develop the thought processes that go along with the concept of true mobility, to grasp the meaning of shock action and the remarkable capabilities of Armor to disperse with ease and concentrate with speed, and to measure distance in miles and not in yards."



(New Jersey National Guard)

Members of the 50th Armored receiving tank training instruction in the armory.

Guardsmen regularly attend associate company and advanced officer courses and officer-specialists are enrolled in the Armor Motor Officer Course (15 weeks), and Armor Communications Officer Course (10 weeks).

Key noncoms and enlisted specialists are encouraged to attend Fort Knox schools for communications supervisors, radio maintenance, track vehicle maintenance, turret maintenance and automotive supervision. NCOs may be enrolled in the 15-week Advanced Noncommissioned Officer course.

Currently undergoing active duty training at Fort Knox are many of the Guard's RFA trainees who, during the course of their six months' active service, become MOS qualified by the tough armored standards in the Active Army.

All of this intense preparation by way of training individuals is the prelude to the main event—the day when unit training begins in earnest. It will probably be a painful transition for many units.

The least of the problems is that of the reorganized armored division, under the pentomic concept. Strengthwise it will number 14,617, a negligible change from the aggregate column in the old Table of Organization.

From a tactical viewpoint there are several important differences. The principal one is the increase in firepower in Division Artillery. A composite artillery battalion replaces the 155mm battalion. Under the new concept the armored division loses its organic Antiaircraft Artillery battalion, gains a Signal battalion in place of the current Signal company, and supposedly consolidates most support functions under Division Trains.

For the most part the Guard will experience little difficulty in conforming to the new concept—and the troubles it does encounter are likely to be strictly geographical in nature.

Hint of the likely upheaval is found in an editorial in the July, 1957, issue of *The National Guardsman*. Under the title, "The Shape of Things to Come," the editor of *The National Guardsman* notes that, "Big changes in organization, and in ways of doing things . . . are imminent for the National Guard."

This Guard spokesman points

"(1) the prospective switch to the Pentomic form of organization, (2) the trend away from time-honored weeknight drills to multiple or weekend training assemblies, (3) and the coming year's gearing-up to the unit training level."

The Trend Away from Weeknight Drills

Armory drill is the backbone of the Guard. Once the armored outfits get into unit training however there are few armories suitable for drill. Armory floors are scarcely adequate training grounds for Tank Platoon, Reinforced; for Armored Infantry Assault; for Armored Field Artillery problems.

An average, or typical, armored unit in the Guard must face up to the fact that the typical armory floor is not suited to the needs of unit training. This factor has been recognized not only by Guardsmen but by top Army officials as well. It is recalled that at the Armor Association conference at Fort Knox last April Secretary of the Army Wilber M. Brucker declared the shortages of armories to be so serious that he and the entire Army staff are working on it.

Furthermore, the Secretary remarked, "No easy solution is in sight."

Isolated units have come up with temporary solutions by way of outdoor training areas. Company B, 215th Tank Battalion, New Jersey, operates out of the crowded Teaneck Armory but an aggressive company commander, Captain Lloyd E. Antonides, made a deal for the use of an undeveloped tract of land at the Northern end of a nearby town.

With the wholehearted cooperation of town officials the Guardsmen laid out a tank course that is the envy of many other units. Not a few Guard officers believe that, insofar as Armor units are concerned, outdoor training sites are the inevitable answer in view of the virtual non-availability of funds for new armory construction. Naturally, this sort of training does not lend itself to the two-hour drill on a weekday night.

Weekend Training Assemblies

Reserve components may schedule multiple-drill days and/or all day drills on weekends. The former involves two four-hour drills on one training day in lieu of two evening drills of two hours each, while the latter consists of one eight-hour drill on a Saturday or Sunday.

Most commanders on the high level find that weekend training or multiple drill sessions are invaluable, there's no substitute for a full eight-hour training day.

Nevertheless, not all Guardsmen are "sold" on the multiple drill idea.

Opposition thoughts were presented recently in a letter to the *Grizzly*, publication of California's 40th Armored Division. Author of the letter was Captain Gardner L. Thurman, commander of one of the largest company-size units in the Division.

A University of California graduate and veteran of the Korean war, Captain Thurman gave considerable thought to the problem. Noting a drop in attendance since the Sunday drills (in place of Monday night meetings) were scheduled, Captain Thurman wrote:

"If the men do not attend drill you cannot reach maximum efficiency no matter how long the drill period lasts. I feel one of the major causes of this drop in attendance on Sundays is the lack of regularity of drill dates. When drill was every Monday night you just kept the night free. As it is now you have a hard time keeping your dates straight. Our ASMT spends entirely too much time on the phone explaining the drill schedule to the unconscientious. Others, perhaps with beautiful wives or girl friends, sometimes aren't so conscientious and don't bother to phone or show up.

"We do gain from the multiple drill but only if the time is used for just those classes and problems that cannot be accomplished during the night, such as range estimation, maintenance, meal preparation, etc.

"I think that these drills are like a Christmas dinner—in moderation it's the greatest but if you make a hog of yourself you're bound to get a belly-ache. So, my suggestion would be to continue the multiple drill but to cut down on frequency to say one a quarter."

To back up his contention Captain Thurman could point to the fact that in 15 months he had gained 111 new men but showed only a slight increase because during the same period he lost 78 men.

A 27th Armored Division officer interviewed at Camp Drum in the course of the New York Division's third field training since its switch to Armor, remarks that, "We sometimes lose sight of the fact that we are dealing with *citizen-soldiers*. Their military careers are of necessity secondary to their private lives. Most of our men signed up on the basis of an



(Georgia National Guard)

Members of the Georgia National Guard drawing their weapons on a drill night.

ARMORED UNITS IN THE NATIONAL GUARD

Armored Divisions

Unit	State
27th	New York
30th	Tennessee
40th	California
48th	Georgia-Florida
49th	Texas
50th	New Jersey

Separate Tank Battalions

Unit	State
131st	Alabama
152d	Alabama
160th	Georgia
161st	Georgia
240th	Kentucky
241st	Kentucky
242d	Kentucky
243d	Kentucky
750th	Mississippi
773d	Louisiana
250th	New Jersey
252d	New Jersey
253d	New Jersey

Tank Battalions (Infantry Division)

Unit	Division	State
126th	26th	Massachusetts
628th	28th	Pennsylvania
197th	29th	W. Virginia
130th	30th	N. Carolina
198th	31st	Mississippi
132d	32d	Wisconsin
106th	33d	Illinois
195th	34th	Nebraska
135th	35th	Missouri
136th	36th	Texas
137th	37th	Ohio
138th	38th	Indiana
206th	39th	Arkansas
803d	41st	Washington
142d	42d	New York
143d	43d	Connecticut
245th	45th	Oklahoma
246th	46th	Michigan

Tank Battalions (Infantry Division)

Unit	Division	State
194th	47th	Minnesota
149th	49th	California
263d	51st	S. Carolina

Armor Groups

Unit	State
103d	New Jersey
149th	Kentucky
160th	Georgia

Armored Cavalry Regiments

Unit	State
101st	New York
102d	New Jersey
104th	Pennsylvania
107th	Ohio
108th	Mississippi
112th	Texas
116th	Idaho
150th	W. Virginia
163d	Montana

Armored Field Artillery Battalions (Non-Divisional)

Unit	State
130th	Kansas
157th	New Jersey
161st	Kansas
176th	Pennsylvania
188th	N. Dakota
201st	W. Virginia
286th	New Jersey
300th	Wyoming
349th	Wyoming
350th	Wyoming
351st	Wyoming
443d	Montana
452d	Kentucky
631st	Mississippi
695th	New Jersey
737th	New Hampshire
967th	Pennsylvania
987th	Ohio

evening, or even two evenings, a week.

"Suddenly we spring Sunday drill sessions on them. We call for more weekend training to go along with the firing weekend and an annual CPX. Some of the men will justifiably feel that they signed for one thing but are, in fact, getting another."

A spokesman for the New Jersey 50th Armored says, "I would guess that we have done more with multiple drill sessions than any other armored outfit in the Guard. As I see it two factors stand out.

"First—you can't beat it for training value. Second—unless it becomes an across-the-board National Guard policy it will create ill-feeling and morale problems."

A reporter's strictly unofficial survey tends to indicate that the average armored unit (battalion-size) in the Guard scheduled a minimum of six multiple drills during the past 12 months. Some units scheduled as many as 12. The day most frequently utilized for a multiple-drill day is Sunday. Many units schedule Church Call during the noon-hour break.

Just for the record the writer checked with the National Guard Bureau whose spokesman declared that the use of multiple drills has, "neither decreased attendance nor has it reduced enlistments." He conceded that "there have been some growls" from the rank and file but pointed out that, "there's always some resistance when you're pushing a new program."

"The Bureau is pushing multiple drills but it is up to the States and commanders," he added "We let them know they are authorized to conduct multiple drills and it is up to them to determine how it fits into their training plans."

To an outside observer the multiple drill makes sense. The value of training conducted along the lines of a normal military day surely outweighs whatever disadvantages exist. In terms of hours it represents an operational bonus. A multiple drill day of eight hours is in lieu of two evening drills but has greater value than four two-hour night training assemblies. During the last 12 months the number of multiple drills tripled.

"There are advantages you can't measure in terms of hours," an armored infantry battalion commander says. "A multiple-drill day means the scattered units of a battalion can be brought together for combined training. Under the old drill-night set-up the only time I could look forward to getting the entire battalion under one roof was field training and our firing weekend on the range."

A veteran First Sergeant of a tank company says that multiple-drill days give an outfit an opportunity "to operate."

"There's more to it," he says, "than the eight hours of instruction. There's time for everyone to give his particular MOS a workout—mess and supply personnel, for example. And you have the time you need to work on administrative matters."

A severe drawback is the fact that it does destroy the "meeting every Monday" continuity which has been so important to the Guard over the years.

There are those who feel that the loss of continuity will ultimately reflect itself in lowered attendance. That may be true during the transitional period but in the long run the unit commanders must solve this problem as they have solved tougher ones. That has been the experience of the Air National Guard where multiple drills have been eminently successful.

In terms of the training that can be accomplished this is what multiple-drill days can mean to the commander of a tank battalion, an armored infantry battalion, an armored field artillery battalion, or any of the elements of the Guard's armored forces:

An average of one multiple-drill day adds up to ninety-six hours of training time.

This is equal to the training time for an entire year on the basis of 48 drills of two hours each.

Since these 12 multiple-drill days are charged off as two drills per day this still leaves open sufficient time for 24 weeknight drills of two hours each. This represents a bonus of 48 training hours every year.

Guard for Maneuvers?

Now that a sort of timetable for progress has been established the armored elements of the Army National Guard can look forward to a period of important development. By the Fall of 1958 all armored organizations will be engaged in unit training and thus on their way to the highest degree of combat-readiness ever attained by reserve components of the United States Army.

The next step will be for the Guard's Armor to take part in actual Corps maneuvers under Active Army command. This may occur as early as 1960 if the Guard is deemed ready —and if the defense budget can foot the bill.

In recent years there has been considerable emphasis upon staff work by means of high-level Army area Command Post Exercises (like CLOVERLEAF in Fourth Army and RAINDROP in First Army) but the art of handling men and material in the field is something major unit commanders cannot simulate.

Much remains to be accomplished in the months and years that are ahead. New concepts must be adopted, for the National Guard, like the rest of the United States Army, must gear its thinking, its very being, to the likely demands of warfare in the nuclear age.

This involves not only the harnessing of the power which yields mobility, but also the development of a mental outlook capable of thinking in terms of rapid movement and swift response to any set of circumstances.

"We like to think that we in Armor best typify these qualities," Major General L. L. Doan remarked during an interview at Fort Monroe. "And this goes for our National Guard Armor soldiers. They have an amazing sincerity of purpose and will measure up to everything that is expected of them!"

"The National Guard is in Armor —right up to its hips," says Major General Donald McGowan, Chief of the Army National Guard.

"It's darned good Armor, too, with some of the finest young men in our country in the tank crews, its weapons teams, in its supporting elements. They're good because they are trained —and because they are proud.

"They are proud to be part of the Armor Team of the finest Army in the World."

With its six armored divisions, its armored cavalry, its tank battalions, armored artillery battalions, National Guard Armor is, indeed, a part of the Armor Team of the United States Army.



The Regular Army Support of Armor's Growth in the National Guard

By MAJOR GENERAL DONALD W. McGOWAN

ARMOR in the National Guard has grown from an infant in the early days of 1946 to a full-grown member of the Army team during the past eleven years. As a combat command commander of the first National Guard armored division to be activated, subsequently as a division commander, and (soon to be completed) two years of experience as Chief of the Army Division of the National Guard Bureau, I feel I can speak with some authority as to the development of the "Combat Arm of Decision" in the National Guard.

If limited to one contributing factor as responsible for the phenomenal growth, both professionally and numerically, of the armored divisions, armored cavalry regiments, armored groups, separate tank battalions and separate tank companies in the Guard, I would have to say that it is the support rendered by The United States Army Armor School. From the activation of the first unit in 1946, and continuing to the present, nothing has been too small or too large for the School to accomplish in assisting Guardsmen. There are other factors, as I will point out, but I sincerely believe that this one outstanding contribution has accomplished more in making National Guard Armor such a vital part of the combined arms team and in turn a potent contributor to the Army's overall mission.

In August 1946 the 50th Armored Division, New Jersey National Guard, was activated under the command of Major General Clifford R. Powell. In 1947 the 49th Armored Division, Texas National Guard, was activated under the command of Major General Albert S. Johnson. Since July 1954 we have witnessed the conversion of four other National Guard divisions from Infantry to Armor: The 27th Infantry Division, New York; the 30th Infantry Division, Tennessee; the 40th Infantry Division, California; and the 48th Infantry Division, Georgia-Florida National Guard. All National Guard divisions are now equipped with M47s and it is hoped in the near future to re-equip them with our latest M48-A2s.

General Johnson, the 49th commander, stated in the July-August 1948 issue of the *Armored Cavalry Journal* that the Regular Army's 2d Armored Division, then stationed at Fort Hood, had been especially cooperative and had "greatly facilitated the 49th's progress." As each of the four Infantry divisions was converted to Armor, similar accolades were rendered by Guard commanders at all levels. The regular establishments at Camp Irwin and Camp Roberts, California have been called on many times, and have assisted the 40th Armored Division. The same statement applies to the permanent complement at Fort Stewart in furthering the progress of the 30th and 48th Armored Divisions. And in the First

MAJOR GENERAL DONALD W. McGOWAN saw service on the Mexican Border and in World Wars I and II. He commanded the 102d Mechanized Cavalry Regiment during the invasion of Normandy. A very active vice-president of the U. S. Armor Association. He is presently the Chief of the Army Division, National Guard Bureau.

Army area the personnel at Camp Drum have always fully supported the 27th and 50th Armored Divisions.

While Army National Guard commanders are happiest when they are making the least demands on the Active Army for support, it was the splendid support rendered by the Army in all areas of the Guard program which made it possible in a relatively short period of time for the Army National Guard to achieve today's high level of training.

The excellent relations that exist between the Citizen-Soldiers of the Guard's armored units and those who serve in the "Arm of Decision" in the Active Army is a source of keen satisfaction to us all. This relationship also applies to the many Army advisors, which is discussed elsewhere in this issue. (See page 26.)

With the activation of the Guard's first two armored divisions, the 49th and 50th, in 1946-47, there came an immediate and pressing requirement for service school training of the officers and enlisted men of the two divisions. With the subsequent conversion of four of the Guard's Infantry divisions to Armor and the activation of other armored units in the Army National Guard, The U. S. Army Armor School at Fort Knox was again called on to give accelerated school training to Guard personnel. This time the heavy demand was met by the establishment of special orientation type courses which were attended by hundreds of officers and enlisted men of the converted divisions.

The U. S. Army Armor School continues to provide school training for officers and enlisted men of the Guard's armored units. The extent of this type of support is reflected in the attendance of National Guard personnel at the School. In the fiscal year which ended June 30, 1957, more than 900 officers and enlisted men attended schools at Fort Knox. In addition, some 2,500 Army National Guardsmen were enrolled in the many and varied extension courses conducted by the School.

These figures reflect also the interest of the Guardsmen in maintaining or increasing their professional capabilities by participation in the service school programs.

Refresher courses conducted for Army National Guard personnel by The U. S. Army Armor School each year constitute still further support.

School training for officers in the other branches and services represented in the armored divisions is, of course, adequately provided by the Army's other branch and technical service schools. This schooling includes the National Guard Division Refresher Course conducted annually by the Command and General Staff College at Fort Leavenworth. This is a one-week course usually attended by each division commander and his staff.

Support by the Active Army for the Army National Guard in other phases of its program encompasses training aids, the assignment of advisors and the conduct of command inspections. In some instances special support, in the form of special instruction and demonstration teams, is provided to make more effective Armor training in the Army National Guard.

The rapid expansion of Armor in the Army National Guard understandably created training and logistical problems which had to be ironed out to assure smooth transition in the conversion of Infantry and Artillery units. The spirit with which the Guard approached these problems was summed up by Major General Edgar C. Erickson, Chief of the National Guard Bureau, in the film "Attack, the Story of Armor in the National Guard" which was recently released by the National Guard Bureau.[1] General Erickson stated:

"The present troop basis of the Army National Guard provides not only for six armored divisions, but also for four armored groups, nine armored cavalry regiments, 36 separate tank battalions and 72 regimental tank companies. This adds up to 276 tank companies in the Army National Guard.

"This represents a large increase in Armor in the Army National Guard. We knew right from the beginning that you could not turn doughboys into tankers at the stroke of a pen. We knew we could count on enthusiasm and willingness on the part of our Army National Guard soldiers. And we knew we would have available to us the best facilities of the United States Army, such as those at Fort Knox, Kentucky."

There is one other factor that I desire to include as one that has materially assisted the Guardsmen. The United States Armor Association, through its pages in ARMOR and the NEWSLETTER, and material disseminated at its annual meetings, has made available a wealth of professional information to assist all commanders of National Guard Armor units.

In travelling about the country and visiting all type units, I am continually impressed with the professional attitude of all Armored units. Some of the questions most frequently asked are: "When do we get our M48s?" "Can we have more Armored Personnel Carriers?" "Are we going to be equipped with M59s soon?" And the most prevalent question at this time is: "When are we going to convert to the Pentomic organization?" So it is easy to see that these part-time soldiers are interested and dedicated to doing the best job they know how in case the exigency again presents itself.

While the main part of this article deals with the six National Guard armored divisions, I do not want to slight other type armored formations. The armored cavalry regiments, armored groups, armored field artillery units, and separate tank battalions and tank companies have also come a long way during this expansion period over the last eleven years. Their attitudes are as professional as any professional soldier; hence, their units are on a par with any other unit. Their desire to stay abreast of their part-time profession are proved through their interest in continually bettering themselves and their units. For it is with this spirit and professional attitude that the Guard overcomes its multifarious problems, and keeps as prepared as humanly possible should they again be called to join their brothers of the active establishment in the defense of our great country. It is this kind of *esprit* that produced our militia. Their traditions and honors have been carried down through the years, and today are perpetuated and preserved in our Army National Guard.

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[1]Copies of this film are located in each State. Also, a copy of this film is available on a loan basis from this editorial office. It is a 16mm sound film and the running time is 12 minutes.

By MAJOR WILLIAM R. JACQUES

ARMY NATIONAL GUARD ADVISORS

THE assignment of advisors is one of the more important means of support furnished the Army National Guard by the Active Army. Advisors are active Army officers and enlisted men assigned to duty with the Army National Guard in accordance with the military laws of the United States.

So that the reader may comprehend fully the volume of advisor support, a few statistics are in order. Some 1300 active Army officers are required as Army National Guard advisors. Of this number, approximately 135 Armor officers are required for the six Armored Divisions, three Armor Groups, nine Armored Cavalry Regiments and the tank battalions in the 21 Infantry Divisions of the Army National Guard. An additional 96 officers (Infantry, Artillery, Signal, Ordnance, Medical Service, Engineer, Quartermaster and Army Aviation) are required to round out advisor support for the Guard's Armored Divisions. The Department of the Army is currently fulfilling these positions at more than 90 percent of the requirement.

It is apparent that a substantial proportion of Army National Guard advisors are either Armor officers, or officers of other branches assigned as advisors to units organic to Armored organizations.

The primary mission of the Army National Guard advisor is to further the efficiency of the unit (normally battalion or higher) to which he is assigned by assisting and advising the responsible National Guard commander. A fully effective advisor should possess many qualifications. Two qualifications that are particularly important are professional experience and a suitable temperament.

Professional Experience

The commanders of Army National Guard units for which advisors are furnished are for the most part senior officers with extensive experience. At the present time most of them have served on active duty either during World War II or Korea; many have seen service in both conflicts. In general, they have completed an advanced course at their branch school; many have attended a course at the Army's Command and General Staff College at Fort Leavenworth.

The experience of Army National Guard commanders at battalion and higher level dictates the necessity for the advisor being professionally qualified. The advisor should have had recent experience with a similar type active Army unit as a commander, executive officer, or training officer, or should have attended a recent course at his branch school.

The implication of the foregoing is that the advisor should be informed of the latest tactics and techniques for the employment of the type unit he is to advise. Armed with the best information currently available, he can more readily gain the confidence of the Army National Guard commander. The absence of sound professional guidance or guidance contrary to established doctrine can only serve to destroy the confidence of the Army National Guard commander in his advisor. Under such circumstances, the advisor can contribute little, if anything, to the improvement of the unit.

The requirement that the advisor be professionally qualified gains added importance when the present and future training programs of the Army National Guard are considered.

Current training efforts of the Army National Guard are being directed toward qualifying all individuals in their assigned MOS's so that all Army National Guard units will enter unit training no later than the first of October, 1958. The requirement that new enlistees participate in an active Army training program will, with few exceptions, eliminate basic

MAJOR WILLIAM R. JACQUES, Infantry, enlisted in the 26th Infantry Division in 1936 and was called on active duty with that Division. Graduating from OCS he served in Europe with the 94th Infantry Division. Returning to civilian life he rejoined the 26th. His present assignment is Chief, Advisor Section, National Guard Bureau. He has attended the US Army Infantry School and The Command and General Staff College.



(U. S. Army)

Colonel William B. Nelson, Division Artillery Advisor, (boxed left) sits in on a map exercise of the 40th Armored Division.

combat and advanced individual training as separate training programs within Army National Guard units. The trend is toward fewer armory drills and more outdoor training assemblies, where emphasis can be placed on unit training. This adds up to a necessity that the advisor be conversant with all aspects of unit training as they apply to the particular type unit he is advising.

Temperament

The best professionally qualified officer ever produced by the United States Army would encounter difficulties and would, in fact, be of no value to the Army National Guard, if he were unable to "get the ear" of the Army National Guard commander. Without compromising principles, the successful advisor can, without being dogmatic, influence considerably the progress of the Army National Guard unit to which he is assigned.

Two factors, a *"do not"* and a *"do,"* come readily to mind which will provide sound guidance to the advisor. Other factors, such as tact, patience and firmness, are important and necessary, but practice of the two discussed below will eliminate many pitfalls.

Do not attempt to assume command prerogatives in your dealings with the Army National Guard. The only personnel the advisor commands are subordinate members of the advisor group. Army National Guard commanders are generally reasonable individuals, patriotic and dedicated to their jobs as commanders. They take as much pride as an active Army commander in seeing professional improvement in their units. They resist, as an active Army commander would, outside intrusions upon their command prerogatives. When faults are brought to their attention tactfully, the expeditiousness with which they are corrected will normally amaze the advisor. When problems arise which in the mind of the advisor require solution, the wise thing to do is to discuss it with the commander or the appropriate staff officer on a man-to-man basis. Never issue orders to the staff or to individuals in the Army National Guard unit.

Do identify yourself with the Army National Guard unit. The advisor should be concerned with all activities of the unit. He should take pride in its accomplishments and feel a sense of responsibility for its failures. While retaining complete objectivity, the advisor should be as quick to commend as to criticize. Criticism of Army National Guard units, as of active Army units, should be a private matter between the advisor and the Army National Guard commander concerned and should not be offensive. Public criticism or any other matter which would serve to destroy the confidence of subordinates in superiors must be avoided. The advisor who considers himself as an additional staff officer who is as morally responsible for the accomplishments of the unit as the Army National Guard commander is legally responsible, will normally be successful.

In summary, it can be stated that an assignment as an Army National Guard advisor is among the most challenging of an officer's career. The opportunities for improving the mobilization readiness of the Army National Guard are limited only by the extent of the advisor's knowledge and his ability to "sell" himself and that knowledge to the Army National Guard commander.



(U. S. Army)

ARMY NATIONAL GUARD FIELD CONCENTRATION SITES*

WITH the organization of the Army National Guard's first armored divisions in 1946-47, it became apparent that provision would have to be made for the storage and maintenance of a large portion of the division's heavy equipment at field training sites. For several years prior to development of vehicle concentration sites at field training installations, heavy equipment for the armored outfits was shipped by rail or convoyed over the road from home stations to training camps.

This was done, not only at a tremendous cost, but in the case of rail shipments there was an excessive loss of other training time because of the many hours required to unload the equipment on arrival at the training site and reloading for shipment back to home station. Prior to departure for field training considerable time was required, usually of full time maintenance personnel, for delivery of equipment to rail loading sites and the actual loading of vehicles on the flatcars.

Not only was this costly and time consuming, but few of the Guard's armored units had the facilities for properly storing and maintaining the equipment at home stations, nor was there an armory training requirement for more than a fraction of the heavy equipment needed at field training.

The obvious solution was storage and maintenance of the bulk of this heavy equipment at the field training site. The first of these sites was established at Camp Drum, New York, for equipment of the 50th Armored Division, New Jersey National Guard. The development of the site, and the storage and maintenance program was directed by Major General Donald W. McGowan, then Commanding General of the 50th.

Arrangements for the concentration site, an extensive fenced-in area on the post with maintenance and

*Prepared by the Information Office, National Guard Bureau.

SAVINGS FROM THE OPERATION OF CONCENTRATION SITES FOR CALENDAR YEAR—1956 TRAINING

SITE	NUMBER OF STATES UTILIZING	SAVINGS
Camp Drum, New York	8	$1,021,000
Fort Stewart, Georgia	7	531,000
Camp Shelby, Mississippi	3	262,000
Camp Grayling, Michigan	1	170,000
Camp Ripley, Minnesota	5	411,000
Fort Lewis, Washington	2	62,000
Fort Harrison, Montana	1	100,000
Gowan Field, Idaho	1	54,000
Camp Roberts, California	1	164,000
Camp McCoy, Wisconsin	5	97,000
Fort Hood, Texas	2	439,000
		$3,311,000

The concept of equipment concentration at field training sites is to save transportation costs of the heavy equipment, necessary for training, from home station to the training site. The states training at the site utilize the pooled equipment to the maximum extent.

storage sheds, was worked out by General McGowan with Headquarters, First Army.

In addition to storage and maintenance sheds, the site included a small shop building and shop office.

Once the site had been established, it was necessary to provide a complement of National Guard full time technicians to perform the maintenance work required while the vehicles are in storage over the winter. These personnel also issue the equipment to units at the outset of each divisional field training period and at the end of the period take it back and prepare it for storage. The personnel assigned to the concentration site all belong to the National Guard of the State and are not a part of the post complement. They retain their active National Guard status, and arrangements are made for the conduct of training during the armory training year.

Personnel employed at the site are responsible for organizational maintenance within their capability and in-storage maintenance, including the exercise of guns, care of batteries and engines.

The establishment of the concentration sites has not only eliminated the costly rail and over-the-road shipment of heavy equipment for Guard training and eased the storage and maintenance problems for Army National Guard units at their home stations, but by considerably reducing the time required to issue and turn in the heavy equipment during and after the field training periods adds to the training time.

Shortly after the establishment of the New Jersey site at Camp Drum, a second site was established at the same camp for the New York National Guard. With the conversion of the 27th Infantry Division of New York to Armor in 1956, there was an expansion of the New York site to ac-

commodate the increase in armored vehicles. Five divisions and many non-divisional armored units in the First Army Area now use during field training, on a loan basis, the equipment stored by New York and New Jersey at the two sites.

Additional concentration sites have since been established at Fort Stewart, Georgia, North Fort Hood, Texas, Camp Ripley, Minnesota, and other locations as shown in the chart on the preceding page.

While outdoor vehicle storage of the tanks presented some problem, for at Drum long and heavy snows are normal, the storage and maintenance of batteries and certain other on-vehicle material require greater attention. Experience proved that radios, small arms and optics require a heated building, dry and reasonably dust free. Still more room is required for less sensitive equipment. It was found also that not all OVM is required during the field training period. A list of items required for field training was printed and this reduced OVM list is used as a check list by the drivers when drawing and turning back vehicles and equipment. It likewise serves as a memorandum receipt.

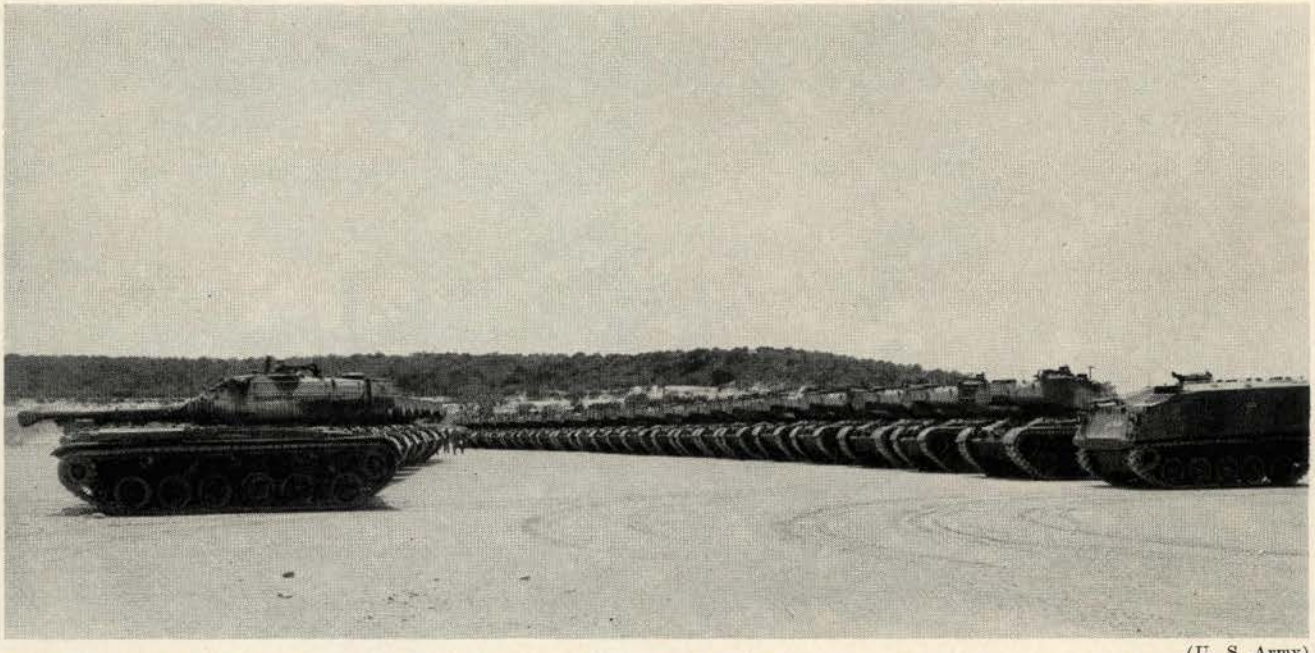
Warehousing of the OVM and the use of the check list as a memorandum receipt make it possible for drivers to draw vehicles and equipment, and clear the storage yard rapidly. At the end of the field training period vehicles are cleaned and serviced for turn-in on an assembly line basis. And the turn-in for the entire division is accomplished, usually in a matter of hours, on the final training day before the Guardsmen head for their home stations.

National Guard regulations provide for the training of these year-round technicians who are employed by the State, and who must be members of the Army National Guard. For example, the New Jersey detail at Camp Drum is the Tank Maintenance Platoon, 122d Heavy Maintenance Company, New Jersey National Guard. Armory drill is conducted through the year under the supervision of the officer in charge of the concentration site.

One advantage which this Army National Guard operation has over similar activities of the active Army is that its personnel situation is much more stable. There are no transfers overseas, no movement of units to another station. As an example, a large number of the original complement that opened the Camp Drum site are still on the job. The concentration site staff includes the site supervisor (an experienced Ordnance field officer), a foreman (warrant officer), a parts man, and artillery, track and radio mechanics. This staff in the case of the New Jersey site is currently responsible for the maintenance of 396 tank and self-propelled artillery vehicles, 6 towed 8-inch howitzers and 188 general and special purpose vehicles.

A continued study of concentration sites with a view to expanding the activities to other states is being made under the direction of the National Guard Bureau.

An example of the savings resulting from the storage of vehicles at concentration sites are these figures on the New Jersey operation: Rail transportation of the track laying vehicles, which New Jersey concentrates at Camp Drum, from home station to the field training site and return would be approximately $536,548 per summer encampment. In view of the fact that the equipment must be maintained regardless of location, this savings is considerable. A chart showing savings in other states utilizing concentration sites is shown on the chart on the preceding page.



(U. S. Army)

At the end of the field training period vehicles are cleaned and serviced for turn-in on an assembly line basis.

In its nine armored cavalry regiments the National Guard has a core of mobility which nicely complements the heavy armor striking power of the armored divisions and the armor groups

ARMORED CAVALRY IN THE NATIONAL GUARD

By BRUCE JACOBS

OLDTIME tradition plus modern design makes the big difference in a highly-colorful segment of today's National Guard —its nine armored cavalry regiments. Memories of the hoofbeats of yesterday are stirred by a glance at the roster of regiments that drill in the armories where gasoline fumes have replaced odors once so familiar to cavalrymen.

The armored cavalry—and this means light gun tanks, medium tanks, self-propelled howitzers, personnel carriers, pneumatic assault boats and L19 aircraft—has firmly taken over in the onetime stamping grounds of illustrious forebears whose names are synonymous with the Golden Age of the horse cavalry—Squadron A of New York, The Essex Troop of New Jersey, The First City Troop of Cleveland to single out a few.

Today these are the 101st Armored Cavalry, the 102d and the 107th, representing the states of New York, New Jersey and Ohio. Their equally tradition-laden colleagues currently in armored cavalry status include the 104th, Pennsylvania, 108th, Mississippi, 112th, Texas, 116th, Idaho, 150th, West Virginia, and 163d, Montana.

Nearly all* were horse cavalry regiments prior to World War II. For some the period of 1941-45 was spent in tanks. The 101st and 102d, for example, became Cavalry Groups and both saw considerable combat in the ETO. The 112th of Texas, on the other hand, went to the Pacific as a cavalry regiment destined to fight, as one War Department historian has written, "dismounted—and disgruntled." The post-war reorganization of the Guard found many of the old regiments formed as cavalry reconnaissance squadrons and groups until 1949-50 when D/A authorized a number of them to be redesignated as armored cavalry regiments.

Now sentimentalists are eagerly looking forward to reorganization of the regiments under the pentomic concept so that battalions will once again be Squadrons and companies will once again be Troops. But they are not losing sight of the mission—to develop fast-moving, far-ranging outfits capable of engaging in combat, reconnaissance and security missions.

National Guard armored cavalry regiments are organized along the same lines as their Active Army counterparts. None has yet been authorized to regroup under the new TOE, however. An ACR in Guard status is authorized an aggregate strength of 2,418 as compared with full TOE strength of 2,797. The differential is 379. Reduced column strength is fairly close to full or wartime strength for elements which require a large number of functional teams and crews. Reconnaissance Companies are authorized 147 men, only one less than full TOE strength. Tank Companies are authorized 105 men, again only one less than full strength. Howitzer Companies are authorized 88 men as compared with 109 at full strength. There are currently more than 13,500 Guardsmen in armored cavalry regiments. The regiments range in strength from a low of 1,200 to several up around the 2,000 mark.

Training problems suggest themselves when you consider the make-up of each regiment's 21 units. Four are headquarters type (one regimental, three battalion), one is a Service Company, one a Medical Detachment. There are tank companies employing M47 mediums, and three Howitzer Companies armed with the M37 self-propelled 105.

Nine reconnaissance companies (three per battalion) really present a combined-arms appearance. Each contains light gun tank elements

*Exceptions are the 108th, 116th, 150th and 163d ACRs. The 108th stems from the former 108th Cavalry Group and traces its history from the wartime 750th Tank Battalion. The 116th was the 183d Infantry Regiment until its conversion to armor in 1949. Both the 150th and 163d continue to bear the same numbers they had as National Guard infantry regiments.

(76mm, M41s), riflemen, scouts and halftrack 81mm mortars. A newly-assigned lieutenant in one of the regiments remarked, "This is just about the only outfit where you get involved in combined-arms activity at the company and platoon level. It shakes you up some when you have just come back from two years of active duty in a straight tank outfit."

This combined-arms activity tends to create, "the most outstanding command assignment for a lieutenant or a captain, in the entire United States Army," according to Colonel Claude F. Clayton, commander of Mississippi's 108th Armored Cavalry. "And I might add," says Colonel Clayton, "I think an armored cavalry regiment is the finest troop command for a colonel. It's got versatility. Consequently you need truly high-caliber officers . . . a special breed of cat . . . to fill the bill."

"It follows," says Lieutenant Colonel Lloyd O. Michaels, Jr., Executive Officer of Pennsylvania's 104th ACR, "that the training problems which confront a tank company and a howitzer company are not in the same category as those facing a reconnaissance company."

The Pennsylvanian goes on to explain that the tank company and howitzer company stress one principal weapon.

"The reconnaissance company commander," he adds, "is up to his neck in tanks, personnel carriers, halftracks and a variety of small arms and heavy weapons."

Reconnaissance companies have been forced to schedule as many as ten different subjects on one drill night, a pretty rugged evening for the limited pool of officer and NCO instructors. Colonel George A. Thompson, commander of the 104th, is especially proud of the fact that one of his reconnaissance companies was selected as the No. 1 unit in Pennsylvania in 1957—Company E, commanded by Lieutenant Charles D. Fink.

An experienced campaigner and veteran of the armored cavalry program is Colonel Frederick H. Weston, a vigorous San Antonio eye specialist who entered the Guard in 1947 to activate the 56th Cavalry Group, forerunner of the regiment he now commands. He is, in all probability, the senior National Guard officer in the armored cavalry field and his 112th ACR is one of the best-drilled units in the Guard.

"The main principle in any military organization," says Colonel Weston, "is *control*. In a National Guard organization this requirement is complicated by geographical dispersion of units—commanders rarely assemble an entire organization except during annual field training. When the distances involved are considerable this becomes a serious factor and it can cause you to lose control."

The distances are "considerable" in the case of Colonel Weston's own regiment, there being a span of 750 miles from Company A in Brownsville to Howitzer Company, 2d Battalion, located in Brownfield, just West of Lubbock. To overcome this handicap the regiment operates a radio net which keeps it in touch with its three battalion headquarters. Each battalion, in turn, has a radio net that links it with units under its control.

To help him make his rounds the commander of the 112th also makes use of his eight organic L19 aircraft (there are 14 qualified pilots on duty with the regiment) and he thus manages to visit each company-size unit at least twice a year.

While none of the other ACRs is as widely spread out as the 112th none is working out of one city or town. This was once true of New York's 101st Armored Cavalry which has its headquarters and one of its battalions right on Madison Avenue in Manhattan and another battalion in Brooklyn. Now Lieutenant Colonel Walter R. Kohnle has a battalion strung out in upstate New York with headquarters at Utica. There are hints that eventually the entire regiment may leave New York City and head for the wide-open country of New York State.

How about the others? The 104th covers a large segment of Pennsylvania from Altoona East to Harrisburg and from Danville in some 140 miles to Waynesboro in the South. The Ohio 107th is concentrated around Cleveland, Cincinnati and Toledo, but it is nearly 250 miles from regimental headquarters to the furthest unit.

The 116th ACR covers the Southern portion of Idaho and fortunately its headquarters in Twin Falls is centrally located in relation to its three battalion headquarters. Nevertheless it is 230 miles from regimental headquarters to Company C at Weiser, Idaho, and Colonel James C. Leighton, regimental commander, estimates he covers 1,800 miles in visits to all 21 units.

The 150th ACR covers the entire state of West Virginia. The distances here are not as great as elsewhere but



(Idaho National Guard)

The 116th Armored Cavalry Regiment in training at Camp Irwin, California.



(U. S. Army)
Members of the 163d Armored Cavalry Regiment cleaning tank gun after firing.

the terrain is rugged and at least one battalion commander has an all-day trip from his headquarters to his most far-flung company. New Jersey's 102d ACR is well-situated with its headquarters in Newark and all three battalions close by.

Since distance serves to prevent regiment from close supervision of its units it appears that *battalion* must be utilized more fully as the control element. This is especially true now that unit training is on the horizon. The commanding officer of the 108th ACR (which includes units from the northern tip of Mississippi to the state's southern extremity) gives voice to this thought.

"Take multiple-drill days," says Colonel Clayton. "I like 'em, fine, *except* when we cannot properly prepare and present instruction for an eight-hour training day. Consequently I have urged battalion commanders to establish battalion training when geography permits two or more companies to meet together, especially if it can be arranged so that there is no excessive travel involved. This gives us better supervision of training, and also eases the burden on instruction by creating a battalion 'pool' of officers and NCOs who can teach common subjects. This also gives the company officers the advantage of some support by battalion staff officers."

The 112th of Texas has also encouraged its battalions to assemble for training as frequently as possible. "We've done some good battalion training down in the Rio Grande Valley," Colonel Weston explains. "We have some fine training areas there."

Colonel Francis J. Skidmore has managed to assemble his battalions of the 102d ACR for firing on New Jersey ranges and he has also developed a battalion tank-course on property near his armory in West Orange.

The importance of outdoor training areas speaks for itself, in consideration of the weapons and vehicles which the regiment normally operates. The Army has supplied the Guard's armored cavalry regiments with the weapons and equipment it needs to conduct effective training. There are few—if any—shortages noted. Enough TOE equipment is on hand and in the matter of tanks, personnel carriers and self-propelled howitzers, most of the Guard armored cavalry company-size units are equipped on the basis of full TOE equipment for a platoon to each company. In many cases more weapons and vehicles are maintained at State concentration sites.

Field Training in 1957 found most ACRs doing a lot of firing with tank units concentrating on the appropriate service tables for gunnery qualification. Pennsylvania's 104th and Ohio's 107th reported the "best yet" Summer camp at Fort Knox. The 101st and 102d of New York and New Jersey made the long trek to Camp Drum, New York, near the Canadian border. They worked with regulars from the 1st Armored Division instruction team up from Fort Hood, Texas.

North Fort Hood was the scene of the 112th ACR training. The 108th went to Camp Shelby, Miss. The 116th (less its 2d Battalion) once again utilized state facilities at Gowen Field, Boise, Idaho. The 163d (less Tank Companies) trained at Fort Harrison, Helena, Montana. The three tank companies, like the 2d Battalion, 116th ACR, trained at Camp Irwin, California.

Attendance at field training for the ACR members of the National Guard, ranged from 92% to 96%.

To an observer it appears that the armored cavalry regiments of the National Guard are largely functional. Not every man is individually as skilled as he might be but the units have done a good job of training teams and crews who can move into the field and operate. Where men do fall short in basic military skills steps have been taken to remedy the situation.

An extensive testing program was undertaken this year in the 112th. Colonel Weston, nevertheless, takes this stand. "My young tank gunners have been trained for their job—they can qualify as gunners by exacting Army standards and can perform the combat job with the best of them. A tank gunner is not basically armed with an M1 rifle, hence has not been trained in assembly, disassembly and use of the M1. There hasn't been time. So he may fail on M1 requirements—but I guarantee you he knows the use of the weapons with which the TOE says he is to be armed!"

In its nine armored cavalry regiments the National Guard has a core of mobility which nicely complements the heavy armor striking power of the armored divisions and the armor groups. These are versatile organizations composed of extraordinarily enthusiastic young men who seem especially well-motivated.

"We've got the men, we've got a running head start on this training thing," one regimental commander says. "What's more we can fight when and where the Army wants us!"

Several of the National Guard's armored divisions have been emphasizing tactical training of its service units by putting trains units in the field each time the major portions of the combat commands are out.

DIVISION TRAINS

By LIEUTENANT COLONEL JAMES DEERIN

THE eager young guardsman looked out over the stack of rations piled on the warehouse platform. Rolling by were the combat units of his National Guard armored division, headed out into the reservation for training in the field.

"That," he muttered as the heavy stuff rolled by, "is my idea of soldiering."

"And this," he continued, turning back to the ration pile, "ain't."

This, although somewhat over-simplified, sums up the problem of holding the interest of Army National Guardsmen training in the service units of the Guard's armored divisions. It is not by any means an insurmountable problem.

No less than the new battlefield concepts and techniques, mothered by the rapid development of nuclear weapons, have brought changes in the training of combat units, they have dictated a new approach to the training of the division service units —mainly a need for greater emphasis on realistic tactical training.

Actually, these changes, rather than creating new problems for the guard units, give the imaginative trains commander, and the commanders of the service units, opportunity to "spice-up" their training.

Let's look again at what changes have been wrought by the development of tactical nuclear weapons.

Immediately recognized was a need for much greater dispersion, not only of combat units but of service outfits, as well. What was adequate as passive defense in World War II against air attack and artillery fire would not, of course, approach adequacy in any future war, even for the least potent of nuclear weapons. Dispersion brings a requirement for better communications and increases the problem of security for the service units.

The secondary mission of service units today is to "fight as infantry" when required. With the increased guerilla activities encountered in Korea and the development of that type of warfare to the point where it can be expected to be a major problem in future combat, and the greater probability of envelopment by air drop, the time has come when trains commanders and commanders of service units must give more attention to this secondary mission.

As a tactical officer, the trains commander is responsible for the movement, security and training of all the service units attached to Division Trains; he does not become involved in the technical missions or problems of the commanders of these service support units.

In the case of the National Guard armored divisions in a training status, he does have greater training responsibilities. Normally the technical training for the Medical, Ordnance and Quartermaster Battalions is given, for the most part, during the armory training year. Come field training and these service organizations are expected to carry out the support mission as a service team.

The trains commander has been likened to a mother hen who gathers her chicks under her wing for protection, or flutters about with watchful eye as she guides them from one point in the barnyard to another. This again, of course, is a "nutshell" description, but it seems to sum up the role of the trains commander. Dispersion and the additional problems it creates, of course, demand that the trains commander be a mother hen with not only a tremendous wing spread, but considerable tactical experience.

Normally, Division Trains will have attached for security a combat outfit, frequently a company of the reconnaissance battalion. In a situation where the trains units must be widely dispersed this may not be adequate, or the situation may be

LIEUTENANT COLONEL JAMES B. DEERIN enlisted in the 102d Cavalry Regiment. Graduating from Quartermaster OCS in 1942 he served in the South Pacific and the Philippines during World War II. Returning to civilian status he joined the 50th Armored Division and was Division Quartermaster for three years. He is presently the Chief, Information Office, National Guard Bureau.

such no line outfit will be available for trains security.

These problems are not necessarily new; for by the very nature of the organization and operations of the armored division, the trains elements are more free-wheeling and flexible than the service units of the infantry division. But they are problems compounded.

However, these are problems that the mother hen of the service units could well turn into golden eggs in the form of greater opportunities to organize more interesting training.

Let's go back to the young Guardsman who was left behind at the ration pile. It may take considerable doing to impress on him the importance of service support and to convince him that the role he plays is equally as important as the job being done by the tanker, the infantryman or the man behind the 155 howitzer. Or, you may convince him of these things, but he still would like to do a little different type of soldiering.

Most trains commanders in the Guard's armored divisions are aware of this and have done something about it. They have attempted, within limits, to make the training of the service units, particularly during the field training period, as realistic as possible.

The medical battalions have moved into the field with the combat troops to provide close up medical support and gain realism in training, the quartermaster battalion has broken away from the warehouse and handled its supply mission in the field in many instances. This is done usually under fully tactical conditions, including night attacks on installations by aggressor forces and after dark issues. The same is true of some ordnance units with the Guard armored divisions.

The trains commanders have encouraged this realism in training and have worked it out, usually with no letdown in the supply of service mission.

Realistic training gives a good measure of satisfaction to the young Guardsmen who want to soldier all the way. It has been found that the Guardsman who can participate in this kind of training is more willing to accept the fact that, although his job may not be as interesting as that of the tanker, it is equally as important in the overall team effort.



(U. S. Army)

The technical training for the Medical, Ordnance and QM Battalions is given during the armory training year. Come field training and these units are expected to carry out the support mission as part of the armored team.

Several of the Guard's armored divisions have been emphasizing the tactical training of its service units for the past six years by putting trains units in the field each time the major portion of the combat commands are out in the boondocks, and demanding that the units, assisted by trains headquarters, set up their own defenses, including adequate cover and concealment, fire cover of critical approaches and disciplined movement of supply vehicles in and out of the supply points.

This type of operation requires that the quartermaster battalion haul its bulk supplies to division supply points where the rations are broken down and "tailgate" issues made to division organizations. On occasion the Division Quartermaster will set up several supply points in support of the various combat commands and battalion trains are directed to these points for "tailgate" issues. Distribution of Class III supplies is handled in the same manner.

This type of operation gives a real sense of realism. How far in this direction the trains commander may go is limited only to sound tactical doctrine and the commander's imagination.

Anything that the trains commander does to stress tactical training of his units is bound to pay off twofold. First, it will spark greater interest in the young Guardsman who feels that stacking rations "ain't" real soldiering. Second, it will train the service units for the type of operation in which they would be involved in wars that may come.

Armor Logistics, Maintenance and Communications in the National Guard

By BRUCE JACOBS

Logistics

AN army marches on its stomach according to the old bromide, but an armored division of the National Guard finds it more expedient to use its rolling stock. Every Summer the six armored divisions of the Guard rack up around 2,500,000 miles on the speedometers of 7,200 vehicles, in motor marches alone. To accomplish this, someone has observed, you need considerable logistic support, and one helluva lot of gasoline.

It is reckoned that the convoys of the six armored divisions burn up some 352,000 gallons of gasoline on the roads to and from camp—and another 820,000 gallons during the field training period. This is roughly comparable to the amount of gasoline that would be used by a full-strength wartime armored division in a 500-mile advance.

For some units gasoline re-supply has been a bothersome item both on the road and at camp. The business of wrestling many thousands of five-gallon cans can be a time-consuming, manpower-eating routine. When all you have got is two weeks it can be a definite thorn in the side. Several years ago someone got a bright idea and, as a result, many of the armored units now accomplish their refueling by means of 1,000-gallon tanks mounted in 2½-ton trucks.

The tank-trucks are strictly unofficial and non-TOE. They are generally issued through State channels on the basis of two per combat type battalion. At the training site the



(U. S. Army)

The five-gallon can method of refueling vehicles is slow.



(U. S. Army)

Many units now use truck mounted high capacity gas tanks.

gasoline is issued to the Division G4 who in turn fills the tank-trucks and sends them out into the field. Gasoline is thus taken to the track and wheel vehicles engaged in training and the fuel is pumped at the rate of 30 gallons per minute.

Although the principal use of tank-trucks is at the field training site some outfits use them for refueling on the way to camp. Refueling stops thus require far less time than was needed when five-gallon cans had to be broken out when trucks needed more gas.

In the Guard's armored divisions the same principles apply with respect to logistical responsibilities as those in an Active Army division. The Division G4 formulates logistical policy, initiates logistical planning, supervises logistical plans and operations and maintains close coordination with the Division Trains Commander who has the service and technical outfits directly under his wing.

The Guard's armored people, no less than those in the Active Army, stress self-sufficiency and the importance of logistic doctrine that the impetus of supply is toward the front.

"The very best thing that we can do," says General Eaton, commander of the 40th Armored, "is to make sure we can 'do' for ourselves. If we are called again it figures to be on a hurry-up basis. When we report for duty there isn't going to be anyone to run our camps, distribute our POL or ammunition. Those are jobs we will have to do ourselves—so we might just as well get accustomed to the idea right now!"

Because this is an accepted fact the service and technical outfits of Guard armored divisions stress training in the field under realistic tactical conditions, so that those who are involved in the logistical support of the division may gain an appreciation of the factors confronting the division's combat elements.

Maintenance

"When our first tank arrived soon after we became an armored outfit, we were excited as kids. We stood around and admired it for awhile, then someone said, jokingly, 'Did they send along a book on how to take care of the durned thing?' We all laughed—and then we began a frantic search for the book!"

The speaker was a company commander in a National Guard armored cavalry reconnaissance company. He might have been speaking for any number of Guardsmen who suddenly found themselves in positions of responsibility in Armor when the Guard launched its program of converting Selected Infantry and Artillery outfits to the arm of decision.

The company commander in this case recalls that he shivered and remembered that, "Maintenance is a command responsibility." Then he got to work. Like many another Guardsman he found that his maintenance problems became more complicated owing to the switch to Armor. He found it was necessary to put additional emphasis upon the need for preventive maintenance and he devoted a considerable amount of training time to the subject. He also learned that there were limitations to



(Georgia National Guard)
Men pull an inspection on a unit jeep prior to using it.



(Georgia National Guard)
Guardsmen are replacing a battery unit that has worn out.

what could be accomplished at the company level.

The key to the Guard's efforts to solve the problem is found in, first, the means available to it to train personnel through active army schooling, and secondly, certain aspects of the civilian technician program. The latter are fulltime Guardsmen—members of the National Guard who are employed during the daytime on a Civil Service basis.

It is virtually impossible to accomplish intensive organizational maintenance at the company level. Here there is only one fulltime administrative technician on duty. He is usually First Sergeant, Supply Sergeant, Armorer Artificer, and general factotum. The next logical step is to battalion level—and this is where the Guard places its emphasis on operational maintenance.

Why the *battalion* was selected as the best level for maintenance stems from the Guard's thoughts in connection with the impending reorganization.

"A year and a half ago we still did not know which way the reorganization of army combat elements would go," explains a spokesman of the National Guard Bureau in the Pentagon, "and so we determined that we could best concentrate on improving the combat entity *which we have now* which figures to most closely resemble the future requirement. Consequently we decided to concentrate on improving the self-sufficiency of *battalions.*"

Service centers have been established at the battalion level and within the past year two additional men have been added to each center. In its Guard status the service center staff may be the nucleus of a Service Company or Battery or a headquarters outfit—depending upon the area and the TOE of the parent organization. In their Guard status the service center men fill corresponding TOE slots. Thus, in the event of a mobilization they provide each battalion with a core of maintenance specialists with a good background of on-the-job-training.

The battalion service center provides the armored elements of the National Guard the means for the performance of organizational maintenance for wheel and track vehicles as well as for the armament, heavy-equipment, fire-control and communications equipment of the battalion.

"This program makes it possible for us to conduct effective training," an assistant division commander has remarked. "Without this backing we would be foolhardy to accept the sort of equipment which you have to have to train an armored division."

Work beyond the realm of second echelon maintenance is accomplished at the State level where Field Maintenance Shops are established. Here, again, civilian technician-Guardsmen are on fulltime duty as fire-control electricians, artillery mechanics, welders, shop foremen and radio repairmen.

Fort Knox has played a vital role in the development of the Guard's maintenance know-how. Civilian technicians as well as other Guardsmen have been Army-educated in a number of important specialties. For commissioned personnel there is the Armor Motor Officers Course (14 weeks) and for NCOs there is an eight-week Armor Automotive Supervisors Course. There are courses in track vehicle maintenance and turret maintenance. At the Ordnance School there are courses in artillery turret repair, armament maintenance, and automotive repair to name a few.

The problem of year-round upkeep and maintenance of track vehicles naturally involved a vastly greater work-load in the maintenance shops.

"The personnel authorized in the service centers is not adequate to the amount of work," says a battalion commander, "the greatest thing that we've got going for us is the fact that we have people who are willing to work hard."

This hard work pays off for the service center personnel and for an outfit's motor officer, when a Guard outfit rolls off to Summer camp.

To a Motor Officer's ears the happiest words are his Sergeant's, "Well, sir, we made it without a single breakdown on the road!"

Communications

"The point we try to make throughout our division," says Lieutenant Colonel Walter Hensel, Signal Officer of the 50th Armored Division, "is that training in radio communications must not be confined to the signal and communications personnel. With the ever-growing dependence of the armored commander upon his communications every officer and the driver of every radio-equipped vehicle should have a working knowledge of the sets, and the nets."

This, most signal officers agree, would be a most ideal state of affairs.

"The trouble is that a lot of people look at signal equipment and they throw up their hands in horror," says



(New Jersey National Guard)

A relay section furnishes link in tactical areas not feasible for wire laying.



(New Jersey National Guard)

Members of a National Guard unit receiving instruction on a power generator.

a communications officer from the 49th Armored. "If you can remove some of the air of mystery from signal equipment you can get the job done. Too many people let themselves be completely overwhelmed by communications equipment because it *looks* so formidable."

Another communications officer from the 27th Armored Division, says, "We've got some people who've had some very fine training and have become quite skilled—the main job is to keep them using radio on a year-round basis."

The current division armored signal company, which is to become a battalion under the ROCAD reorganization, actually operates only three percent of the radio sets in the division. The present company's job includes signal supply, maintenance, construction, teletype, radio relay and photographic operations in addition to radio operations.

In at least one of the Guard's armored divisions the signal officer stole a march on the new TOE several years back when he reorganized the company on a "battalion" basis with two units of approximately equal strength. In this instance Company Headquarters retained the principal sections and the radio platoon. The separate detachment included the Divisional Signal Supply and Maintenance Platoon and the Construction Platoon.

"It has worked out quite well," says the Signal Officer. "We can easily phase into battalion operations just as soon as we get the word."

If the present reduced column ratio is preserved the new armored signal battalion in the Guard will probably be authorized a peacetime strength fairly close to actual TOE wartime strength. The company, for example, is authorized 286 now as compared with 344 on the TOE.

For the armored elements that have been "in the trade" since the period immediately after World War II (the 49th and 50th Armored Divisions and certain armored cavalry regiments) the importance of radio as the principal method of communication is ingrained. Some of the newer outfits, on the other hand, think in terms of wire, and commanders constantly strive to make personnel more radio-conscious. This is not true of the artillery elements of the former infantry outfits since they have been radio-conscious right along and for them the transition to a place in the armor picture was accomplished with little or no sweat insofar as communications are concerned.

The signal officer of a former infantry division says, "the switch to Armor would have been a lot more complicated from the communications viewpoint a few years back, when radio parts were not generally interchangeable."

During World War II this was one of the drawbacks of the radio sets then in general issue and repairmen generally needed special training on each type of set. Post-war progress resulted in an entirely new family of radios incorporating the principles of inter-changeability of parts. Thus, when the 27th Division became an armored outfit radios within the Division were converted by the substitution of component parts rather than through a wholesale exchange of sets."

The school facilities of the Active Army play an important role in the training of communications and signal men for the Guard's armored elements. Fort Knox, Kentucky, Fort Monmouth, New Jersey and the Southeastern Signal School at Camp Gordon, Georgia, train Guardsmen for specific MOS assignments in the armor communications field. A man who returns from a school course automatically becomes an outfit's principal consultant on current "school thinking" on a given subject, RFA trainees who enlisted in specific MOS vacancies which call for signal or communications training get Army schooling during their six months of active duty service.

The year-round activities devised to encourage continued use of radio communications equipment includes armory radio nets and the use of radio in command post exercises. The 48th Armored Division recently completed a highly-successful CPX in which exclusive use of radio was featured.

Communications gets its most effective workout during the annual field training period.

Radio is utilized to control the march serials of the convoys. Many units employ aerial reconnaissance methods to route convoys around local traffic jams en route to camp. Radio nets are constantly operative in camp areas with radio and radio relay being used most extensively when the elements of the division move into bivouac areas.

"Our responsibilities will become more extensive under the reorganization," a signal officer in the Guard agrees, "but the basic missions remain the same. We know what they are, and we know how to carry them out."

NATIONAL GUARDSMEN TAKING SIX

Under the Reserve Forces Act of 1955, more commonly known as RFA, young men about to graduate from High School were encouraged to sign up for six months of active duty training. They would then return to their home town Reserve Component unit to continue to serve out their military obligation and still be able to go to College or pursue the civilian endeavor of their choice. The Active Army in conjunction with the National Guard Bureau and the Office of Army Reserve and ROTC affairs did much to publicize this program. However, as predicted, the best salesmen for the program are the men who have taken the training. Depicted here are some RFA trainees in various stages of training during their six months. At the conclusion of their six months training they join the team as shown in the last two pictures on the next page.

(All photographs U. S. Army except as credited)



RFA Trainee fires from behind log during basic training conducted at The US Army Training Center, Fort Knox, Ky.



Trainee preparing to move out after crawling under the barbed wire during tactical exercise while on bivouac.



These two RFA trainees are shown manning a .30 caliber machine gun during a tactical exercise while on bivouac.



These two RFA trainees are shown in training on a patrol exercise conducted in a wooded area while on bivouac.



An RFA trainee directs an RFA tank driver through some rough terrain during basic unit training in Armor.



This is an aerial view of one of the tank driving ranges which the RFA trainees use when learning to drive a tank.



RFA trainees planning a tactical maneuver during the final phase of their six months active duty training.



(New Jersey National Guard)

Upon completion of six months training they return to their hometown unit where they receive Armory training.



(New York National Guard)

Also they receive field training during their two-weeks' encampment where they learn to become team members.

THE SIGNIFICANCE OF MILITARY HISTORY IN THE EDUCATION OF OFFICERS

Military history has been at the base of tactical and strategical instruction in service schools and colleges of the United States Army almost from their inception.

By BRIGADIER GENERAL PAUL M. ROBINETT, USA-RET.

EVEN before there were any military histories, the sagas and epic poems recited by the learned men served to shape the careers of the heroes of ancient times. Then came the first truly great military history, written by Thucydides, a minor general in the Athenian Army, in about 400 B.C. Since his time the books have increased into a veritable flood wherein nearly every aspect of military affairs has been critically examined and meticulously recorded.

No one can become a master of the vast storehouse of knowledge already found in military histories, and the books are now multiplying so rapidly as to be beyond the reading capabilities of any man. Nevertheless, today as before, the peace years of military men must be devoted to the study of older wars if they are to be professionally qualified when next called into the field against an enemy. Peacetime training is of first importance in preparing for the next war, but it cannot suffice. Regardless of all efforts to introduce realism into training, maneuvers are never like battle. Only the best military memoirs, biographies and operational accounts can provide a slight insight into the realities of combat.

If history is so important in professional preparation, it is necessary to have a clear understanding of the terms military history and military historian at the very beginning. For the purpose of this article the terms are defined as follows:

Military history: A systematic presentation of military events accompanied by an analytical explanation of their causes.

Military historian: One versed or well informed in military history.

If these definitions are accepted,

BRIGADIER GENERAL PAUL M. ROBINETT, Retired, a frequent contributor to these pages, served as a Combat Command Commander with the 1st Armored Division in North Africa during World War II. He is presently with the Office of the Chief of Military History, Department of Army.



(Library of Congress)



(Library of Congress)

then all professionally qualified Army officers at least must be military historians, for they are constantly developing, arranging and analyzing facts bearing upon military problems which inevitably leads them to become "well versed in military history." Besides, service personnel are constantly making military history, good or bad, throughout their active careers. Conversely, by the terms of the definitions, if accepted, it is obvious that an officer who has not become a military historian would be a poor risk in any position of great responsibility in the Army. Apparently, the Army has always recognized this but without laboring the point.

Military history has been at the base of tactical and strategical instruction in the service schools and colleges of the United States Army almost from their inception. For instruction in minor tactics the older wars are no longer of great value because of the radical changes that have occurred in weapons, communications and transportation. But the study of the grand tactics and the strategy of older wars and of the fighting men and their leaders who fought them is as useful today as ever before. From these points of view it is doubtful that any war in American history can be studied with more profit than the Civil War.

Histories of older wars are also important to an understanding of the great forces that have actuated nations, sometimes to their ruin, in conflicts for power. An example is the work of Thucydides. Lieutenant General Stanley D. Embick, who was a close adviser to General Marshall during World War II, once remarked that he constantly referred to Thucydides' book because the conflicts between the Greek states during the Peloponnesian Wars were so similar to the conflicts in Western Europe that it could serve as a guide.

In these critical times, when the cherished beliefs, principles and institutions of the free world are being attacked by unscrupulous enemies, it really seems important that military affairs in Ancient Greece should be understood. Exhausted by the Peloponnesian War and divided by intrigue, jealousy, opposing ambitions and discordant and dissimilar governmental systems, the Greek states were exposed alike to the corrupting influence of Philip II of Macedon. Under the mask of friendship for those who had taught him the art of war, he was in fact the most deadly enemy of Greece. Philip bought Greek leaders with gold, set state against state by skillful diplomacy, and conquered when these measures failed. He propagated the idea of joint action against Persia and was selected as commander of the Hellenic League. The Greeks eventually became the mere tools of Alexander, his son and successor. As a political force in the world their race was run.

From ancient times to the present countless military men of many nations have devoted their lives to the development of the art and science of war. Their efforts have kept this aspect of human affairs abreast or ahead of the contemporary civilization of their various nations and epochs. Military men also have been responsible for the accomplishment of the historical research, analyses and development of the principles applicable in strategy, logistics and tactics, and for the development of the administrative, organizational, training, weapons and technical systems necessary for the application of the basic principles. Since the time of Thucydides, the wisest military men have been seekers of the truth, the whole truth and nothing but the truth. Jomini, Clausewitz, Ardant du Picq, Mahan, Von Schlieffen, Foch, Douhet and Fuller, to mention only a few of the seekers of more recent times, are military men whose intellectual efforts have had a profound influence on the course of history. Their work has been largely responsible for the development of the so-called immutable principles of war, which are the guide lines included in the field service regulations of all nations.

An understanding of American military history is vital to the development of morale and *esprit de corps* among the troops, for without it no great results can be achieved. At the very base of the problem of morale and *esprit de corps* is patriotism or love of country—the cement that binds a people together and sustains their armies. According to British General Sir Ian Hamilton patriotism is "a plant whose best nutrients are blood and tears: a plant which dies down in peace and flowers most brightly in war. It does not calculate,



(Library of Congress)



(U. S. Army)

does not profiteer, does not stop to reason: in an atmosphere of danger the sap begins to stir: it lives, it takes possession of the soul."

For the United States the founders of the Republic laid a solid spiritual foundation in two great documents—the Declaration of Independence and the Constitution. In these papers are recorded the ideas and principles upon which American patriotism must be built. Inspiration gleaned from them should be reinforced by a knowledge of American history, particularly of American military history. The importance of this instruction is illustrated in the report of an officer, who examined all the former prisoners of war on his post who had successfully resisted the Communist enemy's efforts to break them down. There he states, "All those interviewed, when asked what fortified them most against capitulating to the inducements or tortures of the enemy, unanimously placed the knowledge of American history uppermost." Army officers, who are responsible for national security in event of a national emergency, can no longer take it for granted that young men called to the colors are spiritually and morally prepared or imbued with a love of country which will sustain them in case they are subjected to the tortures of a cruel and barbaric enemy. They must include such instruction in their own program.

But alas, both the basic documents and American history have been neglected, even by the Army itself. Too many times in the past the solemn oath of an officer has been taken by those who have never even read the Constitution, and few officers and fewer men have really understood the glorious accomplishments of the fighting men of the United States. The Office of Military History has recently completed the preparation of a ROTC Manual, "American Military History." This new text, although a mere primer, should prove of value to all officers of the Army.

Today, every element of national strength—ideological, spiritual, psychological, political, financial, economic, technological and military—becomes involved in war and in the preparation for war. Accordingly, military men who are responsible for advice on national defense and strategy should be versed in the broader aspects of peace and war and should bring to their task a balanced judgment. As Jacob Burchardt has suggested in his book *Force and Freedom,* the history of a country should be considered in parallel with that of others and in relation to world history and its laws—a part of a greater whole. This will require not only an understanding of the histories of existing nations but of those, once powerful, now gone forever. Above everything else, however, American military men should have knowledge of their own land and its people and of its military history. Without this fundamental knowledge decisions might sooner or later transcend the practical and realistic.

In the United States, the direction of the armed forces is vested in the President and policy matters concerning national security in the Congress. The President and the Congress are elected to office and often have not been trained or soundly experienced in military affairs. Unfortunately, future statesmen are rarely sure of their place in sufficient time to make even basic preparation in military affairs. Officers of the armed forces are in much better position to foresee their future roles in war than the unknown civilians who will some day be their superiors. Officers should, therefore, conscientiously prepare themselves for the supporting role of advisers to the higher civilian authorities and as instructors of the American people.

As the British general, Sir Frederick Maurice, pointed out in his book *Governments and War,* much of the difficulty in the relations between statesman and soldier has arisen in the past because of a misconception of what is meant by the conduct of war. Too many military men have thought of it as merely the direction of the armed forces in actual operations. Today, however, it implies the preparation in peacetime and the actual direction in wartime of the entire power and resources of the nation in pursuit of national objectives and their coordination with allies. The soundest preparation for an understanding of the delicate relationship of statesman and soldier and of their mutual problems in conduct of military affairs can be made by studying history, particularly military history of the periods preceding, during and following national emergencies.

Colonel Matthew F. Steele, who is best known for his book *American Campaigns,* has noted that military students "do not study with the determination of fitting themselves for some particular duty, either of the present or the future; not even for knowledge or the power there is in it." He concluded that "we should always have some special object to study for." Although a student of war in a broad sense, General George S. Patton agreed with Steele and specialized in leadership. Here are the ideas he expressed in 1931:

> In acquiring erudition we must live on, not in our studies. We must guard against becoming so engrossed in the specific nature of the roots and bark of the trees of knowledge as to miss the meaning and grandeur of the forests they compose. Our means of studying war have increased as much as have our tools for waging it, but it is an open question whether this increase in means has not perhaps obscured or obliterated one essential detail; namely, the necessity for personal leadership.

Military instructors have a splendid opportunity to direct their students to books of lasting value that should fit into any worthwhile reading program.

Regardless of emphasis upon specialized study, important though it is, there is a minimum basic preparation in American military history which should be made by all military men. This study should be progressive throughout their military service and should be based on a solid understanding of the Army's past accomplishments, the American soldier, the leadership of American troops, and small unit actions. Having made such initial preparation, the military student can build upon his own experience vastly greater experience acquired from others which he can immediately apply to his daily work. The study should be extended to the higher commands and more complex subjects as the military student's experience and rank advance him into assignments of greater responsibility or his studies involve him in the more complex problems of peace and war.

To emphasize the importance of further study, it is interesting to note that three of the most omnivorous



(Fabian Bachrach)
General Eisenhower



(U. S. Army)
General Wainwright



(U. S. Army)
General Patton

readers of fine history books in their service days were Generals Eisenhower, Wainwright and Patton. Speaking of General Wainwright, Major General Guy V. Henry said: "He was a student of military history. There was little time for recreation at the Cavalry School, but when there was Wainwright would likely be found seated in his big red leather chair studying his bible—not the bible of the church—but the life of General Robert E. Lee." Major General Robert M. Littlejohn, an associate of both Eisenhower and Patton, has indicated that Eisenhower's reading was more general while Patton's was more strictly military, and concluded: "Any college graduate . . . must first realize that he is uneducated; he has only the key to knowledge. This key he must use by reading good books in various fields of endeavor in order to mount the ladder to high command and worthwhile accomplishments."

Among the books worthy of careful consideration is that of Field Marshal Wavell, a British soldier-philosopher, entitled *Soldiers and Soldiering*. In this book he has said that "Military history is a flesh and blood affair." All authorities agree with Wavell that it is man, the wielder of weapons and the master of machines, who makes war. Whether war is waged on the grand scale or in the form of guerilla activity, the quality of the fighting man and his leaders will determine largely the effectiveness of any military force. History shows clearly enough that the best results can be achieved only when superior weapons are properly integrated into organization and manned by well-trained, courageous troops inspired by skilled leaders. Books dealing with man as the elemental force in war, such as Le Bon's *The Crowd,* Ardant du Picq's *Battle Studies,* Bolton's *The Private Soldier under Washington,* Bell Wiley's *The Life of Johnny Reb* and *The Life of Billy Yank* and S. L. A. Marshall's *Men Against Fire,* should be carefully studied by all military students. But in using such books a word of caution is in order. Anyone familiar with personnel records will recall that fighting men who have been investigated or tried by court-martial leave voluminous records behind them, while soldiers who have consistently done their duty leave very few. Therefore, books which purport to picture the private soldier are apt to be heavily loaded on the side of the derelicts instead of upon the better soldiers.

If the literature dealing with fighting men is to be studied with profit, the student must analyze, evaluate and judge the qualities of both fighting men and their leaders with due regard to the circumstances and conditions under which they labored. According to Spenser Wilkinson, who wrote the book *The Brain of an Army,* "This judgment must never degenerate into mere negative criticism. . . ." Rather, it is generally agreed, that the thoughtful student should be able to determine and identify in others the desirable traits of soldiers and of leaders in both staff and command positions.

Knowledge gleaned from books and experience in command positions should enable a military man to become a practical psychologist as envisaged by Clausewitz, who has pointed out in his monumental work, *On War,* that a commander "need not be a close observer of men, a sharp dissector of human character, but he must know the character, the feelings, the habits, the peculiar faults and inclinations of those whom he is to command." This brings us to the paramount question which concerns all military students—the question of leadership.

Leadership is the very foundation upon which a successful military career is built. All military students should therefore study it assiduously, for as Major General Freytag-Loringhoven, who first developed the technique of teaching leadership by the applicatory method, wrote in his book *The Power of Personality in War:* "There is no profession in which personality training is more important than in the military." In presenting this subject to military students the general principles of leadership should first be taught and then the biographies and memoirs of past military leaders should be critically evaluated with a view to determining the reasons for the successes or failures of the individuals concerned. It should be pointed out, however, that the traits and methods of each leader are unique to himself and are not entirely

suitable for anyone else. Nevertheless, a military man of judgment can learn from earlier leaders what to avoid and what to emulate which in turn should enable him to shape and develop his own qualities for the better.

Most men in the Army have heard lectures on leadership by men who have made their mark in the military profession and have read some of the vast literature on the subject. Rarely, however, is it possible to read the views of a major on leadership and later observe him carry out his ideas in actual war as a field army commander. General Patton not only charted the role of a great military leader in an article entitled "Success in War" published in the *Cavalry Journal* of 1931 but later demonstrated the role as an army commander in World War II. Those who knew the general can visualize the warlike gestures he must have used as he drove home the thought:

> Hannibal, Caesar, Heraclius, Charlemagne, Richard, Gustavus, Turenne, Frederick, Napoleon, Grant, Lee, Hindenburg, Allenby, Foch and Pershing were deeply imbued with the knowledge of war as practiced at their various epochs. But so were many of their defeated opponents: For . . . success in war lies not wholly in knowledge. It lurks invisible in that vitalizing spark, intangible, yet as evident as the lightning—the warrior's soul.

Those who served under General Patton believe that he drew heavily upon the pages of history to reinforce both his knowledge of war and his warrior soul. But without minimizing his outstanding performance, Patton might have done better if he had read a little more carefully American military history and had modeled himself on the pattern of General Washington.

There is an old adage in the Army to the effect that a commander should be seen and heard by his men. Whether this old proverb is accepted or not, American military history reveals clearly enough the importance of visiting and speaking with the troops. Apparently this was also true in earlier times, for Machiavelli noted it in his book *The Art of War*. Experience shows, however, that success in this higher art of leadership requires great skill, self-control, common sense and human understanding. For best results, a leader must acquire a correct understanding of the intelligence and character of the average American soldier. This should enable him to bring out the best that is in his men or gain control of their collective soul. General William T. Sherman, one of the most successful American field commanders, noted this in his *Memoirs*, in which he said: "There is a soul to an army as well as to the individual man, and no general can accomplish the full work of his army unless he commands the soul of his men, as well as their body and legs."

Much evidence could be produced to show that Sherman did command the soul of his men. Private S. G. Bundy, 32d Wisconsin Volunteer Infantry, who later became a missionary and preacher, has left the following impression of his army commander:

> How we still love to think of him as we—one day in particular—saw him riding by. We were resting on the bank of a stream, when he suddenly approached from around a bend galloping along with his staff. Cheering first reached our ears, and looking in the direction, "There's Uncle Billy," said the boys. He rode so kindly by with hat in hand smiling and waving, looking so nobly on his old war charger as he passed, and I wondered if his arms were not weary with so much effort to respond to all.

It would require extensive historical research to prove that the estimate of the intelligence of the average American soldier by some commanders has been too low. At any rate the remarks made by Private David L. Thompson, Company G, 9th New York Volunteers, after the Civil War, are indicative of the perception of men in ranks at that time:

> So uniformly does the mass [of a marching column] move on, that it suggests a great machine, requiring only its directing mind. Yet such a mass, without experience in battle, would go to pieces before a moderately effective fire. Catch up a handful of snow and throw it, it flies to fluff; pack it, it strikes like stone. Here is the secret of organization—the aim and crown of drill, to make the units one, that when the crisis comes, the missile may be thoroughly compacted.

Too much, however, has been



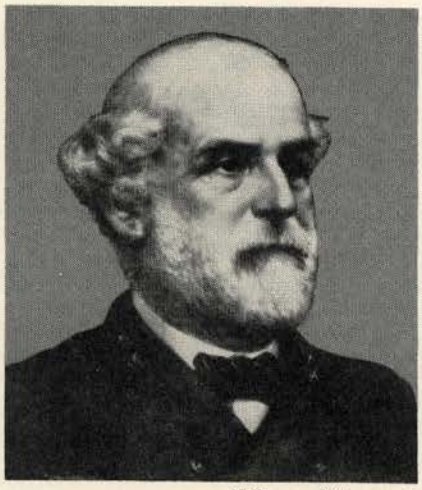
(Library of Congress)

General Sherman on his march to the sea.

claimed for theoretic discipline —not enough for intelligent individual action. No remark was oftener on the lips of officers during the war than this: "Obey orders! I do your thinking for you." But that soldier is the best whose good sense tells him when to be merely a part of a machine and when not. . . .

The military student should be warned that histories or biographies written either during the lifetime of the participants or too near their era are generally watered down accounts of events, tinged with prejudice, colored by self-interested flattery, or influenced by the selective treatment of source material. On the contrary, histories or biographies written too long after the time of the participants are frequently fictional or sentimental. History or biography, therefore, cannot serve as an entirely satisfactory basis for instruction in leadership until it portrays the participants whole —their merits, weaknesses, temperaments, ambitions, tensions and Janus faces, and their physical and mental conditions. The histories of operations against Germany in World War II produced in the Office of the Chief of Military History of the Army are based upon the documents of both sides in the conflict, supplemented by interviews of the principal participants. In this respect these books are unique in military literature. They are as definitive as can be produced, but they still fail to fully record the strain of battle upon leaders and fighting men or its effect upon the outcome of campaigns.

Very convincing lessons can be learned from military defeats, but it is infinitely better to learn from the defeats of others. It is, therefore, advantageous to study and analyze the records of the vanquished and to observe what some have done to prepare for the next war. The victors, in their conceit, are apt to pass over unfavorable matters and take the position that no mistakes were made. For example, what a false sense of might pervaded the French and British as they faced newly rearmed Germany in 1939. It even impressed American observers who reported the French Army as the strongest in the world on the eve of the disaster of May 1940.



(Library of Congress)
General Lee

The impressive German victories at the beginning of World War II grew out of the application of lessons learned from a series of historical studies undertaken to determine why Germany had lost World War I. Based upon these studies a new model army was created while France and Great Britain, the United States too for that matter, maintained outmoded armies similar to those with which they had won World War I.

One of the most important lessons a military student can learn from history is the necessity of quickly recognizing and making the changes in the Army that are indicated during the course of a war and especially during the meeting engagement. The effect of secret or more powerful weapons and differences in organization, tactics and techniques shows up most clearly in actual operations. The initial contact of American armored troops with German troops, who were equipped with more powerful guns, in North Africa during World War II is a good example to illustrate the point. In the future adjustments must take place in far less time than in the past because of the ever increasing power and range of weapons. Even in World War II France and Great Britain did not have a chance to make the adjustment in 1940, and only the English Channel and the productive capacity of the United States made it possible for Great Britain to make the adjustment at all.

Military men should understand that the facts of history can be turned to advantage in a struggle with an enemy. Soviet Russia in its drive for world power has demonstrated an uncanny use of history, particularly since the end of World War II. The Communists, under Soviet control, have consistently exploited every old rivalry, claim, or hate in pursuit of their objective. Too often the nations of the Western World have relied upon some superficial expedient or deterrent instead of going to the bottom of the historical barrel to find the basis for a counterpolicy.

In conclusion it can be said that the military system of the United States has developed as a result of national experience and necessity. The form of government, the traditions of the people, and the nature of the country and its geographical position in relation to other powers have had a profound influence upon American institutions, which in turn have faithfully reflected the American philosophy and way of life. Initially the United States, taking advantage of a favorable geographical position behind the ocean barriers and the balance of power existing in the outer world, based its military system on a small standing army bulwarked by citizen-soldiers and temporary alliances in extraordinary emergencies. Later a modern navy was included in the system. But since World War II the intransigence and military might of Soviet Russia and the destruction of the balance of power in Europe and the Far East have compelled the United States to completely change its military system. The United States must now maintain large air, sea and land forces, ready for immediate employment, and permanent alliances with many other nations. It has also been forced to participate in an arms race that imposes an enormous burden upon all American citizens. These revolutionary developments increase immeasurably the responsibilities of American military men—responsibilities that can be met only by dedicated individuals who are thoroughly grounded in American history and constantly in the pursuit of knowledge that can be applied in practical affairs. This is the challenge that faces the men of the Armed Forces of today. The future of our country and of the free world may well depend upon how successfully the challenge is met.

Since the 4th Armored Division was reactivated at Fort Hood, Texas in June of 1954, it has been assigned many and varied type missions. One of the most important was recently completed prior to the preparation of the Division for its Gyroscope transfer with the 2d Armored Division in Germany. This interesting story covers the various aspects in

TRAINING

THE 3D ARMORED DIVISION OVERSEAS PACKET

By MAJOR GENERAL VERDI B. BARNES

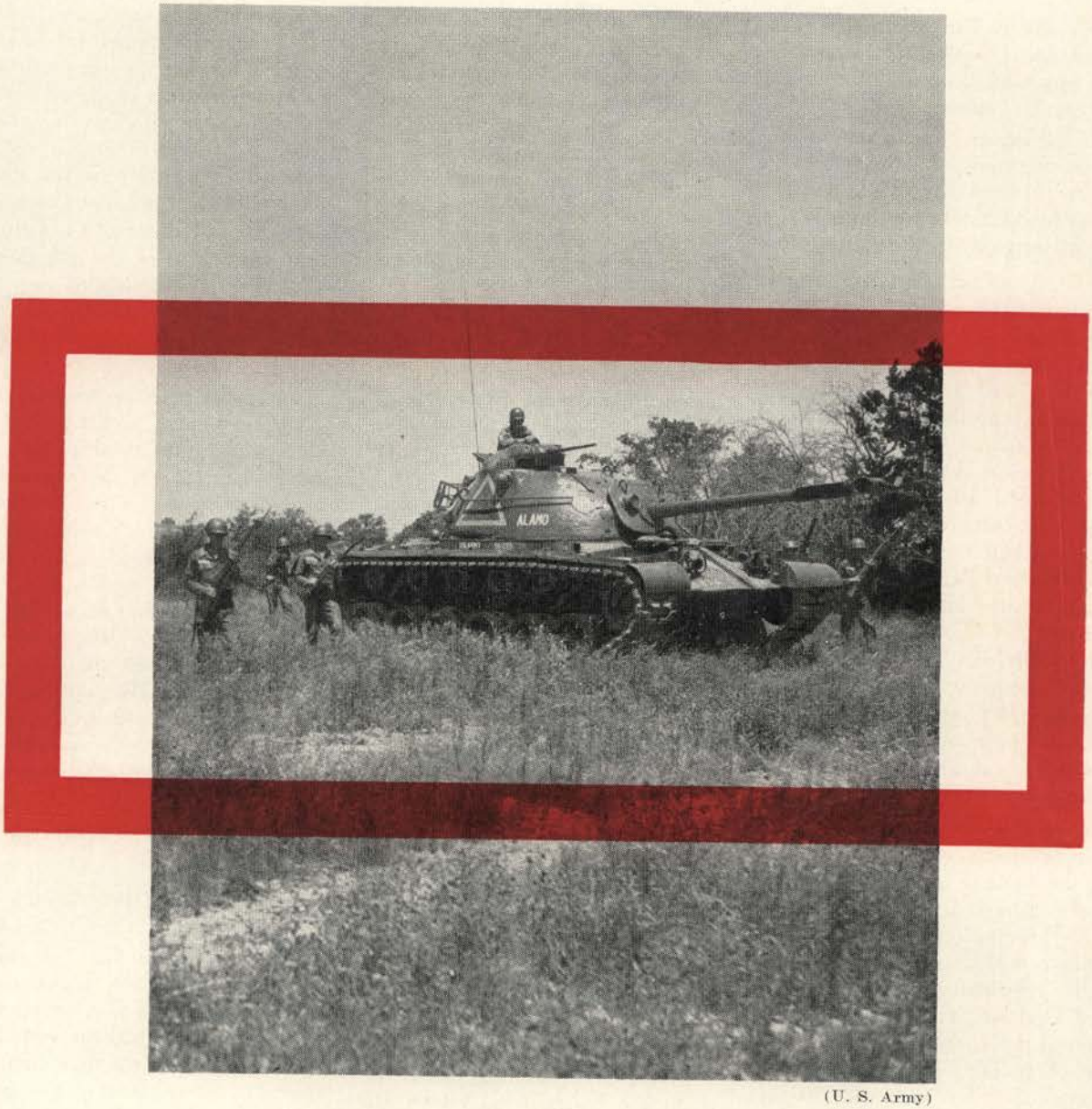
THE 4th Armored Division at Fort Hood, Texas was selected to train the overseas packet for the 3d Armored Division in Germany. Both Divisions are participating in *Operation Gyroscope*. In April, May and June, 1957, the selective service personnel in the 3d Armored Division must return stateside for separation. The 4th Armored Division furnished their replacements.

Reactivated at Fort Hood, Texas, 15 June 1954, the 4th Armored Division engaged in its mobilization training program and post cycle training through September, 1955. In October, November and December, 1955, the division distinguished itself on the extensive Louisiana maneuver—Exercise "Sagebrush." Returning to Fort Hood in time for Christmas, the division began preparation for a new mission in 1956—the training of 18,000 individual "pipe-line" replacements under basic individual combat training programs, and advanced armor, infantry and artillery programs. In January, 1956, the 4th Armored Division was designated to train the overseas packet for the 3d Armored Division.

Planning was begun immediately for the reception and training of the packet. The requirement for about 7,500 replacements, representing all arms and services found in the Armored Division, and virtually all MOS's as well, meant that every element of the division would be engaged in the training program.

With a total of six months available, but with two weeks leave plus

MAJOR GENERAL VERDI B. BARNES, a 1928 USMA graduate, served in Europe during World War II with the 1st Infantry Division. He was Division Chief of Staff during the Battle of the Bulge and ensuing operations. Following the War he was assigned to JCS. Next he instructed at the National War College and was assigned as Division Artillery Commander, 3d Infantry Division, Korea. He became Deputy Commandant of the Army War College. He was Chief of the MAAG in Spain prior to commanding the 4th Armored Division. He is presently enroute to Washington, D. C. for another JCS assignment.



(U. S. Army)

travel time overseas deducted, a 20-week training cycle was indicated. The problem was to devise a 20-week program which would produce the desired degree of proficiency and meet all requirements for mandatory training and POR qualifications. The standard of proficiency to be attained required that trainees be able to take their MOS places in 3d Armored Division units upon arrival in Germany, to function as members of such units on field exercises immediately upon arrival, or in combat if necessary. This requirement is quite understandable when it is considered that the 3d Armored Division, like all our forces in Germany, has a status requiring continual readiness. The overseas divisions cannot take time to train individuals arriving as replacements; these must be ready when they arrive to take their places in units which are already functioning. This is particularly necessary when a large proportion of the trained personnel in the overseas unit turn over in a short period of time while the Division is under *Gyroscope*.

Planning

In order to speed up coordinated planning for the training of the packet, as Division Commander I formed a planning board headed by the Assistant Division Commander and having representation from all division general and special staff sections, Division Artillery, the Combat Commands, Division Trains and Division Troops.

The first step was to firm up the organization for training to be used during the packet training period and then to plan for the phasing of units into the training cycle. After considering a number of plans, the Division Commander decided in the interest of simplicity, and particularly, in view of the shortage of trainer personnel (permanent cadre) within the division, to place all battalions training tank replacements under one combat command, all battalions training infantry replacements under another combat command, and the reconnaissance battalion, engineer battalion

and the 508th Tank Battalion (designated for a separate mission, the heavy gun tank troop test) under the third combat command.

The subsequent loss of one of our combat command headquarters to support Exercise "King Cole" caused another readjustment resulting in the following alignments for training:

To CCA—all tank battalions and the reconnaissance battalion.
To CCB—no attachments; this command to "King Cole."
To CCC—all armored infantry battalions and the armored engineer battalion.
To Division Artillery—all armored field artillery battalions and the antiaircraft automatic weapons battalion.
To Division Trains—ordnance, quartermaster and medical battalions.
Under Division Troops control—signal company, military police company, headquarters and headquarters company, replacement company and the 4th Aviation Company.

The plan for phasing of units into training cycles was developed considering the planned input of trainees as announced by DA, the current situation of the division as to availability of units completing pipeline training and the requirements of the 3d Armored Division. This plan projected the input dates, the periods for each phase of training and the expected shipping dates for each unit in the division engaging in training.

The division concept for training responsibilities was announced as follows:

1. As far as possible, each battalion and separate company of the 4th Armored Division would be identified with and train the replacements for a like unit of the 3d Armored Division.

2. All basic individual combat training would be conducted in tank, infantry, artillery, reconnaissance and engineer battalions. Ordnance, quartermaster, medical, signal, military police and headquarters units would be responsible for only the advanced individual and basic unit training of personnel for their sister units of the 3d Armored Division. This was necessitated by two overriding factors: the service elements of the division were understrength, but had to administer and supply the entire division which, with trainees, constituted a full division to clothe, feed and support. During advance individual and basic unit training, many of the technical specialist trainees would be away at service schools, so that the remainder would not be such a training load on the fully-operative, but reduced strength service elements.

3. Reconnaissance platoon personnel for tank and armored infantry battalions would be trained in the reconnaissance battalion.

4. Mortar platoon personnel of tank battalions would be trained in armored infantry battalions.

5. Tank crew members of armored infantry and headquarters units would be trained in tank battalions.

With the exceptions noted above, every effort was made to train as a unit. This method was required and aimed at two points: *first*, to enable the men to become cohesive as a unit since they would go to a comparable unit in the 3d Armored Division as a body of men who had been trained together; and *secondly*, it maintained the unit integrity of 4th Armored Division officers and NCOs against the day fast approaching when they would have to train their own filler replacements as units for the division gyroscope move to Germany. Deviations from unit training were invariably brought about by lack of sufficient cadre specialists in each unit caused by attrition or levies, or to insure uniformity of training in a particular field.

The providing of personnel to fill the many highly technical military occupation specialties requested by the 3d Armored Division posed no little problem. Originally, it was expected that many of these individuals would be provided by the Department of Army. However, this proved not to be the case, and as a result, requirements for attendance at schools of all types had to be revised at the last moment. I will discuss school arrangements in more detail later in the article.

Another important factor affecting all of the division plans for the packet training mission was the requirement for troop testing of the heavy gun tank. The preparations for and the conduct of this troop test ran concurrently with the packet training mission of the other battalions of the division. The main effect of this was that only three of the 4th Armored Division's tank battalions were available for training packet replacements for four battalions in the 3d Armored Division.

All of the problems encountered in planning for the packet training mission point up the need for early planning when a division is assigned this type of mission. In the 4th Armored Division, preliminary planning started in January, 1956, as soon as the information of the mission was known (nine months before input date). Initial planning was based mostly on assumptions within the outline provided in Army Regulation 220-20. Three important elements of information did not become available until about two months before input date:

1. Exact numbers of replacements to be trained, and by MOS.

2. Training programs to be followed.

3. Exact numbers of inductees to arrive and arrival dates. Actually, this was not completely answered until the actual arrival of the three increments of inductees in weekly groups in October, November and December, 1956.

Training Programs

Training programs were developed by the Assistant Division Commander assisted by the G3 and committees formed within the division. Original responsibilities for the development of training programs were assigned as follows:

1. Tank programs—CCA

2. Armored Infantry programs—CCB

3. Reconnaissance and Engineer programs—CCC

4. Artillery programs—Division Artillery

5. Ordnance, Quartermaster, Medical programs—Division Trains

6. Signal program—Division Signal Officer

7. Military Police program—Division Provost Marshal

It was desired to develop programs with adequate periods of basic individual combat training, advanced individual training and as much basic unit training as possible. Due to the restricted training areas at each Kaserne, the need for basic unit training was emphasized during the visit of the Division Artillery Commander of the 3d Armored Division.

Army training programs prescribe eight weeks each for basic individual and advanced individual training. This 16 weeks taken from the 20 weeks available thus allowed only four weeks for unit training. This was not believed to be sufficient. The problem was compounded by the input in *weekly* groups to each of the three increments, while the three *increments* were scheduled to ship out in April, May and June, 1957, respectively. Thus, the units receiving later arrivals in each increment would have less time for training than the units receiving earlier arrivals. The difference could amount to as much as three weeks. For these reasons, the training cycle for all increments was announced as:

1. Basic individual training—7 weeks.

2. Advanced individual training—7 weeks.

3. Basic unit training—5 weeks.

4. Post cycle training—3 weeks (or less) for those units having trainees for only 21, 20 or 19 weeks.

The Post cycle training consisted of additional unit training, make up of POR qualifications, when required, and those subjects on which commanders wished to place additional emphasis as a result of analysis of proficiency testing.

Basic unit training exercises for the Fort Hood reservation were written for platoon and company by the Combat Commands and Division Artillery Headquarters, reviewed by the G3 section and Assistant Division Commander, and approved by the Commanding General.

Trainee Input

Approximately 2700 inductees arrived in October, 1956, about 2800 in November and about 2100 in December. A small number of Regular Army non-prior service personnel were also assigned to the packet.

The Division Trainee Processing Center greeted all trainees and took them through their initial processing. As a rule, each trainee was assigned on arrival to a company or battery to which he would belong during his entire stay at Fort Hood. Thus, during the five months the trainee spent with us, he had a genuine feeling of being a member of a team. In most cases, he trained with other trainees who were to be members of the same organization on arrival in Germany.

Actual input dates to the division were coordinated as closely as possible with Headquarters Continental Army Command (through III Corps and Fourth Army), and The Adjutant General. However, it was found that due to fluctuations in rates of induction and other factors, a good deal of flexibility had to be kept in plans for the exact times of receiving trainees and beginning of their training.

Scheduling

Fort Hood is one of the finest training posts in existence; however, durthe Summer months it is also host to many other activities including the training of several National Guard and Reserve divisions and regiments as well as smaller units, and a large Reserve Officer Training Corps encampment. This resulted in a strain being placed on the available training facilities, so that schedules for ranges, rifle instruction circles, gas chambers and other critical facilities had to be worked out well in advance and adhered to.

This was accomplished by centralized control. A scheduling branch was organized under the training division of the G3 Section for this purpose. This branch, consisting of two officers and an operations sergeant, coordinated the schedules for training facilities with the post range officer. Large schedule boards, showing every training company in the division, were maintained throughout the training cycle. As soon as input and training starting dates became firm for each unit, the scheduling branch plotted and maintained the schedule five weeks in advance. This information was then furnished to major command and battalion S3s around which to build their detailed weekly training schedules.

Orientation

A special need was found to exist for orienting the trainees thoroughly on Germany, the missions in the United States Army, Europe and standards of conduct. This need was emphasized by the Division Artillery Commander of the 3d Armored Division when he visited Fort Hood. Several means were used to accomplish this task.

The importance of the proper attitude and soldierly conduct was pointed out to newly arrived trainees by the Commanding General each week as each group arrived in the Division. The intensive training was helped and the exceedingly low delinquency rate can be attributed to these ceremonies. The address by the Division Commander was given in the best theater on the Post. The Division band, appropriate colors, and presence of key staff officers on the stage made an effective background for his address of welcome and orientation. The reason for their being at Fort Hood, what sort of training they would undergo, the mission of the 3d Armored Division under NATO in Germany, the conduct expected of them in Texas and the need for being healthy were explained in detail to each group on Saturday morning of "Zero" week.

Following the Division Commander's address, the Division Chaplain, Special Services Officer and Red Cross representative explained their services to the new recruit. Printed handbooks covering activities on the Post and "Do's and Don'ts" for the young soldier were handed out and discussed. With appropriate honors, martial music and the National Anthem, the trainee was made to feel that he had a home, he was not forgotten, he had a real mission and the intensive training would be worthwhile. The address and ceremony also acted as a departure point for subsequent lectures on military justice, life in Germany, conduct overseas, hobbies and handicrafts to be started at Fort Hood and carried on in the Kasernes of the 3d Armored Division.

A training memorandum on this important subject was prepared by

the G3. It prescribed a mandatory nine-hour orientation program to be given to all packet trainees before their departure from Fort Hood. The G2, TI and E officer and the Surgeon assisted in the preparation of the lesson plans for this program. The nine hours were:

1. Orientation on Germany, her people and their customs.
2. NATO missions, training in Germany and off duty activities.
3. Good conduct in Germany and jurisdiction of civilian courts.
4. Intelligence reports and messages peculiar to USAREUR.
5. Protection of private property and maneuver damages.
6. Food and water discipline.
7. Our NATO Allies.
8. Travel restrictions and travel hazards in Eastern border areas.
9. The Soviet soldier and army.

To assist drivers of vehicles being trained for duty in Germany, European type road signs were erected on Fort Hood roads and streets alongside the American version as well as on the driving and testing range for wheeled-vehicle drivers.

In order to further acquaint trainees with their new duty stations, copies of the 3d Armored Division newspaper, "Spearhead" were distributed to the trainee day rooms each week.

Schools

The School plan was developed to make maximum use of available schools for the training of specialist personnel of the packet. Army service schools, the III Corps Academy at Fort Hood and Division Schools all came into the picture. The aims in the training of specialist personnel were first, to train as many persons as possible in the division within our capabilities; then, to secure school quotas for the remainder. In addition, it was planned that in accordance with *Gyroscope* regulations, "long lead time" specialists (those requiring more than eight weeks of school training and up to as much as 20 weeks or more) would be secured as graduates of service schools who had originated from the Army pipeline rather than from the packet. This would have fitted in with our plan to have all specialist personnel present with their units for basic unit training. Before the plan could be put into execution, several things occurred which affected the school plan.

First, it was learned that we would have to request additional quotas for courses up to 20 weeks—this was no great problem; it simply meant revising our school quota requests and adding to them where necessary. Secondly, we found that the number of people we had requisitioned as individual specialist replacements for the packet would not be furnished except in very small numbers due to Army-wide shortages. Finally, the policy on school training was revised by Department of Army to the effect that specialist personnel graduating from service schools would not return to Fort Hood for Basic Unit Training, but would be shipped directly overseas to the 3d Armored Division upon graduation. This last change meant that these specialist personnel would get no Basic Unit Training, but by securing later reporting dates for schools, we could give them greater periods of Advanced Individual Training. This latter was done, but nearly every one of our 900 requested service school spaces had to be revised as to dates of attendance.

In asking for service school quotas, entrance prerequisites had to be considered. However, since at the time of requesting the quotas, most of the people to attend the schools were not under our control, in fact, had not even entered military service, it was impossible to tell whether all the requirements could be met. When the time came to select personnel to fill the quotas, it was found that there was little difficulty selecting men to meet the requirements with the exception of the entry MOS. Waivers were requested and most of the service schools, realizing our problem, granted waivers where necessary. Where waivers could not be obtained, it was generally possible to find a man with enough civilian training in the desired field to award an MOS based on background and on-the-job training.

Service schools and personnel of all headquarters should realize that the processing of school requests for gyroscope units differs from those of other units in that most of the gyroscope personnel are non-prior service men with only seven to 14 weeks military training prior to entering the service school, but may have a civilian background and GT score sufficiently high to absorb the instruction.

One problem concerning the sending of students to service schools was that of obtaining funds. Post funds were not adequate and only the



(U. S. Army)

Facilities of the III Corps Academy were used for courses in communications.



(U. S. Army)
Trainees must function as members of units in the field and be combat ready.

change in DA policy (to ship the school graduates directly overseas) prevented a real crisis in the money field. The best solution for this would be to have an adequate fund set aside for a division at the same time it receives the mission to go into Gyroscope Organic or Overseas Packet Training.

The facilities of the III Corps Academy were placed at our disposal and some of the courses were specifically tailored to meet our requirements in either type or length of course. Some 1030 students were trained in the Academy, including clerks, mechanics, supply personnel and communications specialists. This school made an outstanding contribution to the successful training of the packet.

Division Schools were set up to train Communications Personnel, Drivers and Mechanics' Helpers. A total of 1010 men were trained in division schools. The Division Signal Officer and the 144th Signal Company set up courses of instruction in four separate fields: low speed radio operator, message center operation, field wireman and switchboard operator. Attending signal courses were personnel destined for the signal company of the 3d Armored Division as well as personnel for the communications platoons and sections of other units of the 3d Armored Division.

Drivers schools and mechanics' helpers courses were supervised by Division Trains. The 4th Quartermaster Battalion operated the drivers school and the 126th Ordnance Battalion operated the mechanics' helpers school. Both these units trained personnel for their sister units in the 3d Armored Division and also personnel for other units of the 3d Armored Division.

While it is believed that the requirements for school training presented our greatest problem in Packet Training, solutions *were* found and as *Gyroscope* grows this problem probably will disappear.

Summary

Prompt, efficient processing and proper selection of personnel for specialties in which to be trained were the aims as new men were brought into the division for training. A Trainee Processing Center had been organized for the handling of pipeline personnel early in 1956. The Division Commander decided to retain this activity for the 3d Armored Division packet. This relieved the unit commanders of much of the burden of processing the trainees. All of the unit personnel sections were called upon to support the Processing Center with administrative personnel.

The classification and assignment function performed by the Processing Center was a most important one. The selection of individuals for the many MOSs for which we conducted training required a careful consideration of the qualifications of each individual. Selections were based on test scores furnished by reception centers, on civilian backgrounds, and on interviews. Unit commanders were afforded the opportunity to confirm or to recommend changes in the initial selections after a period of observation of the trainees.

Major G4 activities concerning the training of the packet fell into the following fields: utilization of weapons, ammunition and balancing the budget. In order to make the maximum numbers of weapons available at the proper time, a weapons pool was operated under the supervision of the Division Ordnance Officer. The large volume of ammunition expended in the packet training program necessitated careful control over credits and issues. This proved to be a full time job for a member of the G3 section.

Theoretically, all inductees receive a full issue of clothing at reception centers. However, many trainees arrived at Fort Hood lacking items which had never been issued. These had to be obtained without delay for the trainees through the Division Quartermaster; particularly, because of the cold weather at the time. These issues were then charged against the 4th Armored Division budget and caused a serious shortage of funds for other activities. This matter was finally adjusted, but only after an "austerity" period which included POL rationing.

The 4th Armored Division enthusiastically indorses the *Gyroscope* plan. Minor kinks will be worked out and in the long run the program should prove highly beneficial to the Army. Officers, Noncommissioned Officers and Trainees of this division have responded very favorably to *Gyroscope*. Particularly, in the *Packet* training program as compared with the *pipeline* training program it was noted that the Packet trainees know where they are going and why, and seem more eager to get the job done right. The 4th Armored is proud of the job accomplished in training the 3d Armored Division Packet, and looks forward eagerly to its own training and rotation under *Gyroscope*.

PREPARING FOR THE PAYOFF AT BELSEN HOHNE

By BRIGADIER GENERAL JAMES H. POLK

GUNNERY is the battle payoff—and the Belsen Hohne Ranges are ideally suited to prepare for it. Belsen Hohne refers to a modern British tank firing range situated in the North German lowlands between Hannover and Hamburg. A range devoted exclusively by U. S. tank battalions to practice and qualification with the 90millimeter cannon, it accomplishes a vital role in an integrated program for tank gunnery in Germany. For approximately two months a year, American Seventh Army tank gunners use its facilities to blast away at various targets.

Student gunners participate under a Seventh Army program so organized as to permit sole concentration on tank gunnery. Groups from the Seventh Army, normally 934 men strong, travel to Belsen Hohne for a week's training. A carefully planned schedule permits expert training of this large group of men. Some of the men have been training in Germany for over a year. Others, for instance those recently attending from the 3d Armored Division, had been in Germany only two weeks before they went to Belsen Hohne. Both new and old men are commanded and instructed by school troops which this year are selected from units of the 4th Armored Group.

The Germans used Belsen Hohne before and during the war. The inspiration for the present range goes back to 1935 when a battle run facsimile of the Maginot Line was constructed and used for extensive and realistic rehearsals. Over two years ago, the British started modernizing and extending the range into its present form. The work, consisting of deforestation, scraping and construction, was completed a year ago at a cost of 24 million marks.

Today the range is a permanent British base consisting of numerous camps for the various British units. Each camp has its own mess hall and barracks, and is near to the numerous facilities that are available. Three camps are set aside for other NATO tankers who then use the



(U. S. Army)

The ranges at Belsen Hohne are ideally suited for concurrent firing of all tables.

BRIGADIER GENERAL JAMES H. POLK, a 1933 USMA graduate, was commissioned in the Cavalry. During World War II he rose to the command of the 3d Armored Cavalry Regiment. Following attendance at AFSC he was Executive of the G2 Section, Far East, later G2 of X Corps and held the same position in Eighth Army. Returning Stateside he attended the National War College and then instructed at the Army War College for three years. He just completed a tour as Assistant Division Commander of the 3d Armored Division and is G3, Allied Land Forces Central Europe.

The aim is to qualify as tank gunners three men from every tank crew in Seventh Army. The majority of gunners fire all tables on one range. They use the same tank, work with the same students and receive criticisms and training instructions from one instructor. This continuous association offers the instructors a chance to observe and work with an individual's problems as they develop. The stabilized program also serves to improve the scores.

range for nine months a year. Bids for training dates are submitted by each of the NATO countries, and subsequent negotiations produce a calendar. Operation of the range is financed with NATO funds. The British serve as the controlling element for coordination and over-all supervision, repair and operation, maintenance and safety. But each group of visitors organizes its own school program and advises the British as to how and when they want to have the ranges operated.

Belsen Hohne is not the only site in Germany where the main armament is fired. At Grafenwohr, for instance, both maneuver training and heavy armament firing are conducted. But the training at Belsen Hohne represents an ideal rarely attained in firing ranges. Particularly important is the opportunity to fire at moving targets. Unlike Grafenwohr, the ample opportunity provided at Belsen Hohne for firing Table VII is not made available at the expense of concurrent use of the other ranges. In a land where training areas are limited, training can not be conducted at one large site. But Belsen Hohne is geared with other major training areas, miniature ranges and home kasernes to form an integrated program of thorough gunnery training.

What then is Belsen Hohne? Its success may be primarily attributed to the excellent facilities which the British have constructed there, as well as to the organization which the 4th Armored group set up this spring. 20 ranges comprise Belsen Hohn, each with a capacity of a company of 18 tanks. Arranged around the circumference of the 17 x 8 kilometer area, they all fire towards the center. The tanks reach the firing position via the "Grand Circle" of a hard-surfaced highway. The firing positions themselves are concrete surfaces which eliminate the mud, ruts and rocks typical on less formal tank firing ranges. A specially constructed gravel bed stretches out before each firing position, reducing the obscuration common to other ranges when the cannon is fired.

The four standard tables, all different target exercises, are fired by each of the participating gunners. Though not used this year by the United States forces, three of the ranges can be converted into battle run ranges.

Each range can be set up for at least one of the tables used to qualify the students as tank gunners. Each student must attain a minimum score



(U. S. Army)
An M48 loader receiving 90 millimeter shells for storage in ammunition racks.

on the four tables in order to qualify, having already qualified on the sub-caliber tables at his home station. Every student is rated according to the proper use of his instruments, his firing speed and accuracy. The rating which the students receive on the basis of their scores permits determination of the relative efficiency of the individual tank crewmen. It gives the men an additional incentive to excel in the performance of gunnery duties.

All ranges can be set up for Table V. This is the first requirement for every student. Table V is designed to test the gunner's ability to zero the M20 periscope and M97 telescope, using four or five rounds of shot ammunition. The students line up the gun barrel, periscope, range finder and telescope on one of the 6 x 6 foot targets positioned in groups of three at 1500 yds. They then strive to fire three rounds in a tight group of target hits. After correcting the reticles of the sights without moving the gun, a fourth round is fired for checking purposes. In order to provide against sighting difficulties caused by weather or a total miss with one of the first rounds, a fifth round may be fired when necessary.

Table VI tests the gunners' ability to utilize the burst-on-target adjustment on stationary targets. The men fire eight rounds of ammunition at four targets. These targets are staggered at unannounced distance intervals: between 800 to 1200 yards, 1200 to 1500 yards, 1500 to 1800 yards and 1800 to 2000 yards. The students are given a "battle sight" designating one of these intervals. They then have two rounds of HE ammunition for each of the first two targets, and two rounds of AP ammunition for each of the latter two. The near targets measure 3 x 5 feet; the farthest, 6 x 6 feet. Direct hits must be scored on the shot targets, while the HE ones are considered hits if the shellburst is one mil above or below the target, or five mils to either side.

Table VII consists of two parallel tracks on which tank silhouette targets move at distances of 1000 and 1400 yards from the firing position. It tests the gunners' ability to utilize burst-on-target adjustment on moving targets using shot ammunition. The targets move at eight miles per hour back and forth between two flags which mark the limits of the 200-yard tracking distance. The gunners are instructed to track the targets with a lead equivalent to the length of the target. Care is taken to see that the gunners learn to actually track the targets rather than trap them. Two rounds are fired at each target at the two ranges and an extra round is available for contingencies.

On Table VIII the gunners estimate target distances in a simulated night firing exercise. The gunners are tested on their ability to determine prearranged firing data for selected targets and engage area type targets with HE ammunition under conditions of restricted visibility utilizing range cards. The targets consist of crossroads, road houses and points comparable to enemy positions from whence an attack might be made. In the actual exercise, the gunner uses his range card to fire one round on any target selected by verbal command of the tank commander.

In previous years, the platoon battle run was always a feature of training at Belsen Hohne. It has been cut out of the current season for Seventh Army tankers as a better and more realistic course is nearing completion at Grafenwohr. The new tank-infantry platoon proficiency course, built



(U. S. Army)

An aerial view of one of the 20 tank ranges which are located at Belsen Hohne.



(U. S. Army)

A spotter-scope is used to check the number of hits by the two tanks in front.



(U. S. Army)
When the red flags are flying in the tank turrets the targets are being blasted.

under the personal direction of Lieutenant General Bruce C. Clarke, incorporates many of the features of the Belsen battle run but will be a vast improvement as it maintains tactical integrity, presents more realistic situations and permits employment of the tank-infantry team with supporting weapons. It is programmed to open in July of this year.

In addition to the ideal range, a rigorous one week schooling program is dedicated exclusively to work with the tank cannons. No passes are issued nor are details such as guard duty assigned. Hence the optimum atmosphere is created for concentration on the opportunities that Belsen Hohne provides. The schedule provides a six-day week for actual gunnery. One of these is reserved for make-up periods and graduation. Two additional days are allowed for travel. Each day the gunners fire on a different table, except that two days are reserved for the more difficult Table VII.

Five orders of students switch 13 work periods of 45 minutes each. With two actual firing periods, one for practice and one for qualification, each gunner actually fires for an hour and a half per table, and three hours on Table VII. Holidays never interfere with the standard number of hours that each student fires at Belsen Hohne.

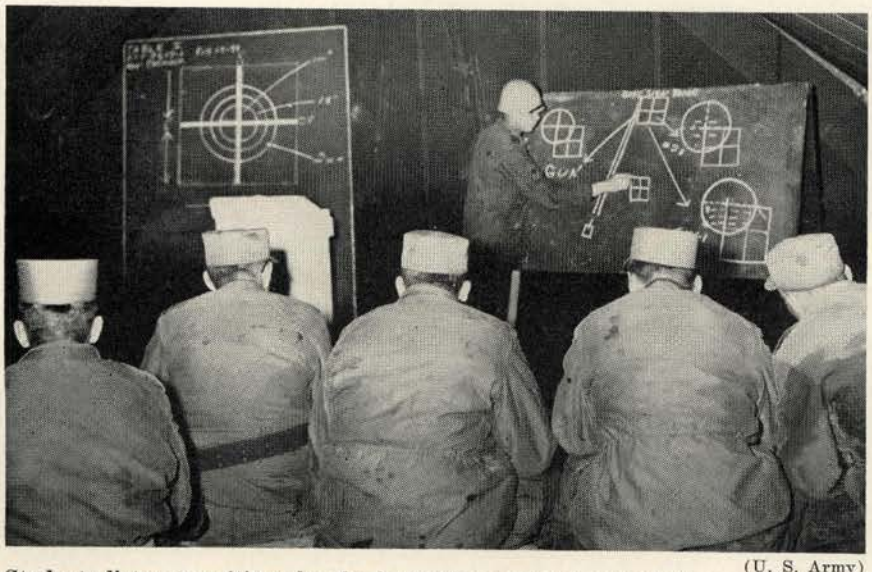
In the practice firing period the instructor makes criticisms and answers questions. In the qualifying period the instructor's sole purpose is to score and oversee the students' firing technique. Spotterscopes located behind every two tanks facilitate scoring, and telephone communication with the tanks serves to cross check the exact determination of hits.

Each firing period is followed by a thorough critique of the individual's performance. Two other instruction periods permit the optimum use of each student's skill in dry firing. Other periods consist of varying chores such as unloading and supplying ammunition. One period of physical training assures combat fitness.

A unique feature of each gunner's training is the standardization of both the shooting conditions and the critiques. The majority of gunners fire all tables on one range. They use the same tank, work with the same fellow students and receive the criticisms and training instructions from one instructor. This continuous association offers the instructors a chance to perceive and work with an individual's problems as they develop. The stabilized program also serves to improve the scores.

The aim is to qualify as tank gunners three men from every tank crew in Seventh Army. Crew integrity is maintained by having members from the same crew train together in so far as possible. Company integrity of the various units participating in the Belsen Hohne program is achieved by assigning each member of the company to the same order. This preserves and enhances the *esprit de corps* of the units involved, and obviates as well the adjustments that would be necessary between men who had not hitherto worked together.

The students graduate at the end of their Belsen Hohne week. They return to their units via the same trains on which the next week's group arrives. This synchronization typifies the organization achieved at Belsen Hohne. And with the ideal facilities available at this British base, these students thoroughly accomplish a vital portion of the integrated program that makes each tank battalion in Germany an effective fighting unit.



(U. S. Army)
Students listen to critique by the instructor who supervised them while firing.

The high cost of tank ammunition plus the unavailability of suitable firing ranges makes it imperative to explore other means to perfect the training of tank gunners.

TANK GUNNERY:

Economy Plus Quality

By CAPTAIN THEODORE S. RIGGS, JR.

EXCESSIVE danger space and the high ($40 or more per round) cost of present day tank ammunition severely limit its use in training. Only a few of our training areas permit realistic field firing exercises and many of them are not suitable even for qualification firing with the tank gun. In some cases, ammunition allocations would not permit enough field firing even if space were available.

I propose the development of a tank subcaliber weapon and special ammunition for use in training.

The weapon must fit (with simple adapters) into the breech of every tank gun issued to our Armor units and must be adaptable to likely future developments. Accurate installation must be quick, simple and within the capability of every tank crew.

Manual operation would be acceptable, but a weapon which extracts and ejects semi-automatically and leaves the action open for the manual feeding of the next round would be ideal. Firing should be electrical and mechanical, connected to the main armament firing system. The subcaliber gun must be cheap to produce and be rugged and reliable under training conditions.

I think these characteristics can easily be provided in a gun somewhat like the .50 caliber spotting rifle of the 106 recoilless. The characteristics I shall propose for the ammunition may require a larger caliber, such as .60 inch or 20mm, with which Ordnance already has much development experience.

For this weapon a shot round must be provided, with high velocity and a flat trajectory approximating that of tank gun AP ammunition to about 1500 yards. It is not necessary to duplicate the trajectory of any particular round, so long as the "c" is close to one mil. A tracer element, visible for as long as the trajectory approximates that of service AP, must be provided. The danger space and the penetration and destructive effect of the shot must be the minimum consistent with the above characteristics. If possible, the shot should be suitable for safe firing at normal tanks without special protection (but with lights, fender boxes, etc., removed).

These characteristics might be produced by making the projectile of light material. This would produce a high muzzle velocity and consequent flat trajectory, with the velocity decreasing rapidly at

CAPTAIN THEODORE S. RIGGS, JR., Armor, a 1952 OCS and Armor School graduate, served in Korea as a platoon leader with the 31st Infantry Regiment. Returning Stateside, he was assigned to the Tank Combat Training Center, at Camp Irwin. In 1954 he went to Germany to the 826th Tank Battalion. Temporarily on duty with the Tank Team, German Training Assistance Group, he Gyroscoped with the 826th to Fort Benning, where he is presently assigned.

longer ranges due to low sectional density. A shot made of sintered metal might be strong enough for accurate high velocity firing and still produce the necessary low sectional density and brittleness for minimum penetration and danger space.

The second type of ammunition should be a marker round visible at 2000 yards or more on impact and with enough velocity so that the "c" would not be over two mils at the same range. This range should be extended as far as possible without increasing the danger space beyond that of our present .50 caliber. Destructive effect should be as small as possible.

A bullet with a flash powder charge, like that of the three pound Air Force practice bomb, should give the required visible impact without undue incendiary or destructive effect. Sintered construction might decrease the possibility of damage without adversely affecting the other desired characteristics.

The weapon and both types of ammunition must have low dispersion within the specified ranges. The ammunition should produce a flash visible at the muzzle of the cannon and enough smoke to cause some obscuration, if this can be done without jeopardizing its primary characteristics.

Blank rounds designed for more flash and blast and less smoke (of a more realistic color) than our present cannon blanks might be developed for the subcaliber gun. They would have additional advantages in cost and bulk.

Admittedly, there are other solutions to the problem posed, some of them already in use.

First, there is the use of the coaxial machine gun. This is cheap and simple and requires no special equipment except an elementary single shot device. It should continue in use as a cheap preliminary to subcaliber and service firing. We have been unable, however, to devise a coaxial firing exercise requiring the crew to use a range finder to determine range and engage a target, which is the primary method with our 90mm gun tanks. This is one of the uses for which the proposed system is intended.

Although the new Table III is useful for teaching the principle of "burst on target" adjustment, adjusting neat black holes on a vertical surface is not the same thing as adjusting the burst of an HE round or the flight of a tracer onto a target located on horizontal terrain at a reasonable range. This could be taught better with the proposed gun and ammunition. The subcaliber gun would be capable of being zeroed with the same procedure as the tank gun, though at reduced range, something which is nearly impossible with most coaxial machine guns. Obscuration never bothers the gunner firing coaxial tables; the subcaliber gun would give him valuable practice in overcoming this normal difficulty of service firing.

For field firing exercises or tactical problems the subcaliber gun would have an advantage in effective accurate range and observable effect on the target over coaxial machine gun, in addition to leaving the machine gun free for its designed use. On the other hand, the subcaliber gun would permit a high degree of realism in the representation of firepower without the requirements for danger space which accompany the use of tank cannon.

A second solution to the original problem is the use of tank firing centers like Camp Irwin, California, Fort Stewart, Georgia and the NATO ranges at Hohne, Germany. Since they permit the use of service ammunition, these large areas offer more realistic training than could be conducted in any other manner. However, the cost of the service ammunition used and of transporting troops, together with the scarcity of such areas, limit both the frequency and length of training periods spent at them. For many units, all firing for a year or more is compressed into the short period at the training center.

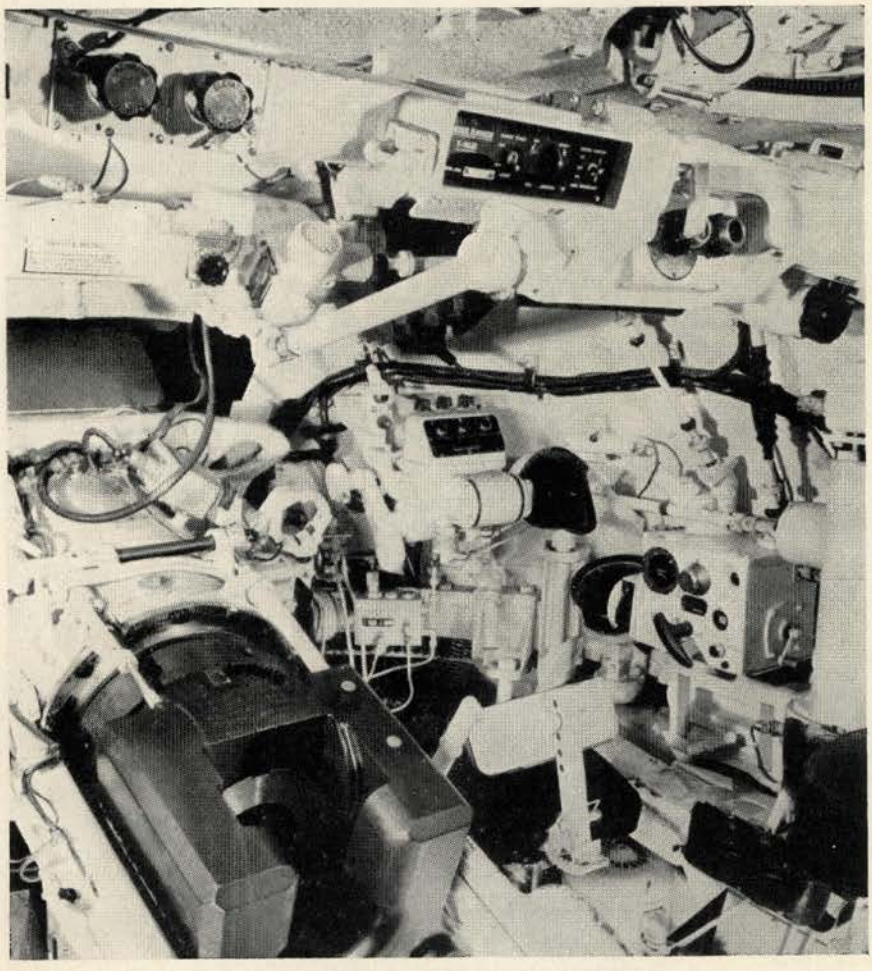
Units would be better trained if they fired for qualification during the individual training phase, on individual tank courses during crew training, on platoon combat firing ranges during platoon training, etc. I would not replace tank firing centers with subcaliber firing, but rather, use it to prepare more effectively for service firing and to enable units to conduct more realistic training in the gaps between their trips to firing areas.

Even to the fortunate unit located at an adequate training area, the proposed subcaliber weapon offers advantages. Lower cost would make more ammunition available for field firing and the decreased range would increase the proportion of available maneuver area to danger area.

As an answer to the training problems imposed by the great range and cost of present day tank ammunition, I have proposed the use of a specially designed subcaliber gun and training ammunition. The special characteristics designed into this system would be employed to improve the training of gunners by better simulation of the characteristics and effects of tank service ammunition and to improve the training of tank crews and units through more frequent and realistic field firing made possible by low cost and danger space.

These improvements will increase the combat capabilities of Armor units by increasing the firepower which is one of their distinguishing characteristics.

The Commander's DILEMMA*



ALTHOUGH at first glance this might appear to be the cockpit of a space ship, it is, of course, a gunner's view of an M48 tank turret. The picture provides us with a startling example of our "creeping inflation" in the development of equipment. In the beginning, we had a simple piece of equipment. Then came the incessant demands of modern warfare for more firepower, more speed, and greater mobility. So we added a knob here, and a dial there, then some hydro-electric components, and awoke one day to find ourselves with something resembling the B58 bomber, but without the flight pay!

This complexity poses a serious problem for the commander, particularly at higher levels. Can he be expected to keep abreast of technical developments in equipment, and find time for personal inspection, in the midst of his other pressing duties? Some say no—except in very general terms—that he has specialists for precisely this purpose. Others admit that he should, but has too little time. Still others go so far as to say that nothing would be as incongruous as a general officer climbing into a tank to inspect.

In suggesting an answer to the problem, we would be remiss if we failed to resurrect that creature of fond remembrance—the horse. Too often it has been implied that the commander of yesterday knew his horse better than the modern commander knows his tank because the horse was relatively simple. Not so! The horse was a very complex creature, consisting of a delicately balanced mass of bone, muscle, cells and nerves—all wrapped in a skin. Even the best veterinarian did not understand the animal completely—but the cavalry commander had grown up with horses. Consequently, he could inspect them in terms of external indications of health and physical condition without knowing the mysteries of protoplasm.

So it is with the tank—and other complex equipment. The commander cannot be expected to know the detailed inner workings and hidden mechanism, but he should—and can—inspect *personally*. Maintenance "indicators" to the cavalryman were eyes, teeth, hair, hooves, legs and fodder. To the modern Armor commander they are oil levels, exhaust, sound, lights, meter readings, track tension and the efficiency of turret operation.

Seldom will the busy modern commander have time to inspect large quantities of equipment—so he must resort to a random selection of items on the occasion of both formal and informal spot-check inspections. He should particularly emphasize the occasional inspection made without notice and without opportunity for preparation—on the road, during a field exercise, or on the occasion of an informal visit to the unit.

The commander's personal inspection of equipment pays off in compound, rather than simple, interest. The operator and specialist is impressed with his commander's interest and knowledge; subordinate commanders and staff officers are impressed—and sometimes disturbed, since they will have to know more than their commander; and finally, the commander himself has a much greater confidence in his ability to judge the unit maintenance status.

Moral: The sight of a senior commander climbing into a tank turret for an inspection may be incongruous, *but it will certainly produce results.*

*Prepared jointly by members of the U. S. Army Maintenance Board.



(U. S. Army)

Noncommissioned Officer Academies

By MAJOR ELAM W. WRIGHT, JR., INFANTRY

WITHIN Seventh United States Army, unit noncommissioned officer academies have been gaining in importance as a means of improving professional standards within the United States Army. In addition to the Seventh Army Noncommissioned Officer Academy in Munich, Germany, each division within the Seventh Army operates an academy of its own; personnel and equipment being provided on a provisional basis. Organization and methods of operation vary within these academies, but each institution operates within the framework established by Lieutenant General Bruce C. Clarke, Commanding General, Seventh United States Army.

The 2d Armored Division is particularly fortunate in having an outstanding academy with features which make it unique within its field. It is believed that a discussion of the organization and operational policies of this Academy will be of benefit to other units who may be confronted with the task of organizing similar institutions.

At present the 2d Armored Division Academy has a dual mission.

The first mission is to instruct and train the noncommissioned officers and noncommissioned officer candidates of the Division so that each graduate shall have the qualities and attributes essential to his progressive and continuing development throughout a lifetime profession as a noncommissioned officer of the Regular Army.

Inherent in this mission of the Academy are these objectives:

MAJOR ELAM W. WRIGHT, JR., Infantry, served as an enlisted man prior to World War II. During the War he served in Europe with the 30th Infantry Division. He was next assigned as a Battalion Commander and Regimental S3. He attended School at the US Infantry School and was instructor at the Ground General School prior to his present assignment as Commanding Officer of the 2d Armored Division Noncommissioned Officer Academy located in Germany.

1. To instill a high sense of honor.
2. To instill discipline.
3. To provide the general knowledge applicable to the noncommissioned officer corps and to develop the powers of analysis so that the mind may reason to a logical conclusion in the absence of instructions.

The second mission of the Academy is to train selected specialists in skills needed within the division.

In accomplishing this mission the Academy conducts the following courses:

1. An advanced Noncommissioned Officer Course of 4 weeks' duration for Master Sergeants and Sergeants First Class.
2. A Basic Noncommissioned Officer Course of 6 weeks' duration for Sergeants and Corporals.
3. A Noncommissioned Officer Candidate Course of 6 weeks' duration for Specialists and Privates First Class who have demonstrated the potential for assignment in positions of responsibility.
4. A CW Radio Operator Course of 10 weeks' duration for potential CW radio operators.
5. Several Maintenance Courses of 4 weeks' duration for motor officers, motor sergeants and mechanics.
6. A company Armorer Course of one week duration for men who are to be assigned as armorers.
7. From time to time, as the need arises, other specialist courses prescribed by the division AC of S, G3 are conducted. As an example the Academy recently conducted a course for counterfire specialists.

To conduct these courses, the Academy is organized along the lines shown in *Figure 1*, with the organizational philosophy being decentralization of both responsibility and authority. The total operating overhead required to conduct all courses is 12 officers and 44 enlisted men. One unique feature of the Academy is that all instructors are enlisted men, all of whom, except a few in the Communication and Vehicle Maintenance Departments, are senior noncommissioned officers. None of the instructors instructing before noncommissioned officer classes is below the grade of Sergeant First Class. The majority are Master Sergeants of outstanding ability and experience. It is believed that the 2d Armored Division Academy is the only academy in the United States Army possessing an all enlisted instructor staff. More will be said about this later.

In this discussion particular attention will be paid to the noncommissioned officer and the noncommissioned officer candidate courses. It should be noted at the outset that while there is a requirement for a noncommissioned officer candidate course in the school system, the major mission of the Academy in this field is the training of noncommissioned officers. It is for this reason that the quotas for noncommissioned officer courses have been established at 120 as opposed to 90 for the candidate course.

These courses are not designed to produce squad leaders or platoon sergeants or in any way create a tactician or a technician. It is felt that the noncommissioned officer is essentially a leader—he is not simply a soldier who because of his length of service receives more pay, but he is a leader who must have the same sense of responsibility as the commissioned officer. The transition from private soldier to noncommissioned officer must be a transition into an entirely different way of life, not merely like going from the seventh grade to the eighth grade in school. In substance then, the basic purpose of these courses is to increase the confidence of the student and to inspire him to assume and carry out his responsibility as a noncommissioned officer. A basic set of standards expected of a noncommissioned officer must be developed in him. He must be taught to look, act

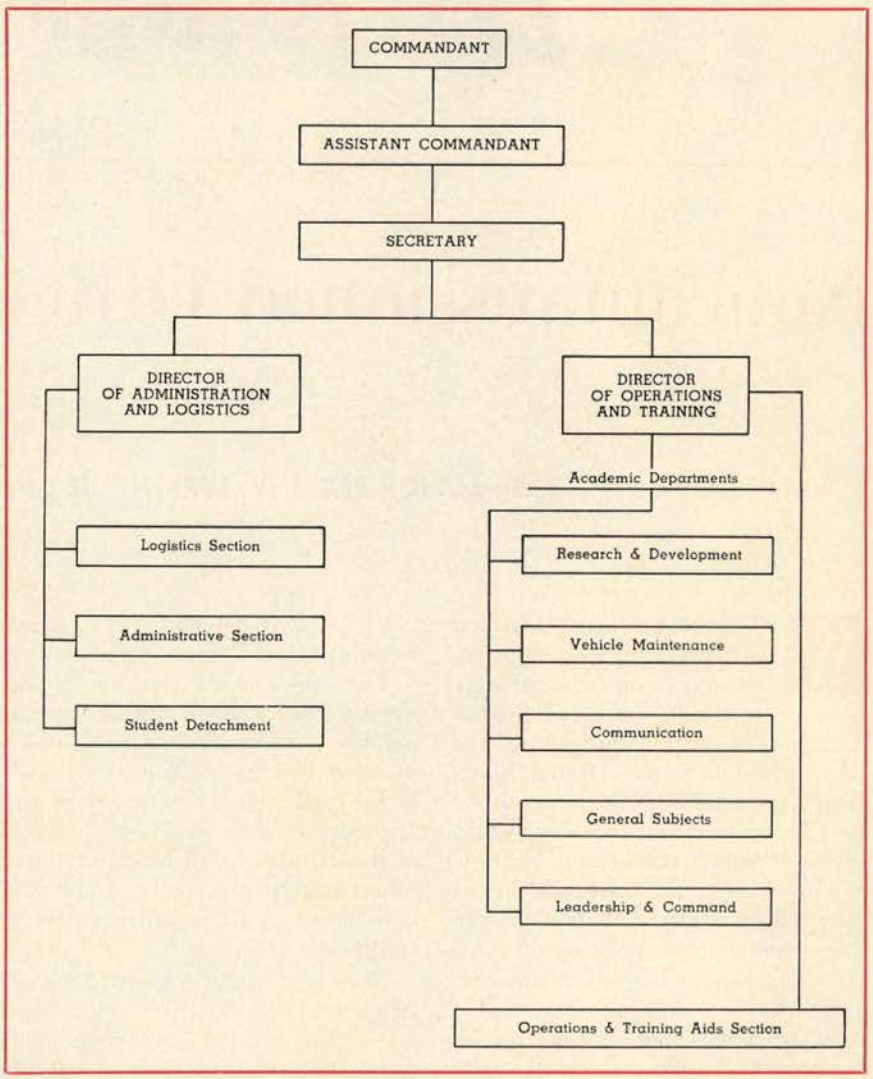


Figure 1

like, and do what is expected of a noncommissioned officer. Unless these purposes are accomplished, the course is a failure, regardless of the knowledge imparted.

Academically the Academy offers the student a program consisting of 190 hours in the Advanced Class and 278 hours in the Basic and Candidate Classes. In the case of the Advanced Class this is broken down into blocks of instruction as shown in *Figure* 2. There is nothing peculiar about the major subject headings—they are the same as would be found in any school of this type. There is one important factor, however: All subjects are considered to be principally vehicles by which leadership training is carried to the students. They are presented not so much with the thought of providing the individual with technical information as with the thought of acquainting the student with the problems of the noncommissioned officer that lie within these fields, and suggested solutions to these problems.

Much care has been taken to insure that the courses do not become warmed-over commissioned officer's courses borrowed from some officer's school, as are many noncommissioned officer academy courses. *Noncommissioned officer* instructors at the Academy teach subjects of immediate value to noncommissioned officers *on their level.* It is felt the student will be of greater immediate value to the unit when he returns from a course of this nature.

You will readily note that the small amount of Commandant's Time renders the Programs of Instruction quite inflexible. However, courses have been planned so that no holidays fall during any of the Advanced Noncommissioned Officer Classes and the Programs of Instruction can be followed with no trouble.

The subjects taught the Basic and Candidate Classes are identical with those taught the Advanced Classes. However, more time is spent on each subject since six weeks are allotted for those courses, and the practical exercises are conducted on a lower level where appropriate.

In the conduct of these courses the Academy has experienced that certain principles are indispensable to a successful program. First, it is believed that all noncommissioned officers should be eligible and *required* to attend. If attendance is limited to those who "*need* the course" the good noncommissioned officer will not want to attend since selection on such a basis implies that he is below average in efficiency.

Senior noncommissioned officers (Master Sergeants and Sergeants First Class), junior noncommissioned officers (Sergeants and Corporals), and noncommissioned officer candidates (Privates First Class and Specialists) should not be mixed together in the same course. Dividing them into Advanced, Basic and Candidate courses offers the following advantages:

1. Permits instructors to gauge their instruction at a level appropriate for all students in any one course. The student is thus better able to grasp the instruction, and the information obtained is of greater immediate value to the unit since the student will be able to employ it at his present grade level. The principles taught in a particular subject are the same for all classes. The difference comes in the application of these principles. For example, the candidate is taught to apply the principles at assistant squad leader and squad leader level whereas the advanced student is taught in addition to apply them at platoon, company and staff level.

2. Lends greater prestige to the Noncommissioned Officer Courses by separating them from the Noncommissioned Officer Candidate Courses.

3. Gives greater confidence to the noncommissioned officer candidate since he competes with equals rather than with men several months or years his senior.

4. Allows students to billet, study and associate with person-

PROGRAM OF INSTRUCTION

SUBJECT	Hours		Admin	Nightwork		Total
	LC[1]	GS[2]		LC	GS	
Leadership	54			8		62
Instructor Training	27					27
Map Reading		17			6	23
Drill and Ceremonies	17					17
Communication		11				11
Conduct of Inspections	5					5
Conduct of Physical Training	4					4
Military History		4				4
Organization		2				2
Examinations	17	5				22
Processing			4			4
Inspections			4			4
Graduation			4			4
Commandant's Time			1			1
	124	39	13	8	6	190

[1]Leadership and Command Department
[2]General Subjects Department

Figure 2

nel of the same grade, length of service and experience.

5. Provides greater and more equal competition among the students of each course since they compete with students of the same grade, length of service and experience.

Failure to divide the students into these recommended categories produces difficulty for the instructors in getting their lessons across to all the students; dissatisfaction on the part of noncommissioned officers, who resent being in the same class with apprentices; dissatisfaction on the part of Privates First Class and Specialists, who resent different treatment necessarily given fellow students who are noncommissioned officers; and an inequality of competition within each class. Furthermore, the opportunity to give the student the information he needs *immediately* in order to perform efficiently at his *present* grade level is lost.

Personnel attending the Noncommissioned Officer Candidate Class should be just what the name of the course implies: *Candidates* for promotion to noncommissioned officer status. It is manifestly inefficient to send a man to the academy who is not going to be in a position to employ, very soon after he graduates, the knowledge he has gained; furthermore the student resents not being assigned to the position for which his commander has thought him worthy to be trained. First priority in selection of candidates should be given to professional soldiers.

A requirement to have at least nine months remaining in the command after graduation is believed necessary in order to allow the unit maximum benefit from the graduate.

It is important that the student, as well as the Academy, be given a two week period to prepare for the course. Selection of students two weeks in advance gives the Academy a chance to prepare rosters; send letters of welcome and latest information, which helps the student in his preparations; and perform other administrative tasks which permit a smooth start. It allows the student to check all his equipment, make necessary arrangements in his personal affairs, and brush up a little on the subjects he will be studying at the Academy. If this two weeks' notice of selection is not given, great hardships are worked upon students and faculty alike.

Finally, the prospective student should be interviewed by both his company and battalion commander. Experience has shown that when this policy is followed, the student is properly oriented and impressed with the importance of the course. Conversely, experience has shown also that when this policy is not followed, poor results are often obtained.

It is believed that commanders should send their senior noncommissioned officers, particularly their Sergeants Major and First Sergeants, at the earliest opportunity. These are the men most able to establish standards in their units, and their early graduation from the course will greatly advance the date at which one can expect concrete results from the program. Sending the junior noncommissioned officers and other men not occupying key positions will have the exact opposite effect. They will not be in a position to influence others when they return to their units.

There will be commanders who hesitate to spare their senior Sergeants for the four weeks needed to complete the Advanced Course; but the Commanding General has found it profitable to direct that commanders do send these personnel and to establish mandatory quotas of at least one Sergeant Major from each senior command and one First Sergeant from each battalion for each Advanced Class until all such personnel have attended. It is also advisable that Operations Sergeants complete the course at the earliest possible opportunity.

Concerning the number of students to be sent to the Academy each year, it is the desire of the Commanding General, Seventh Army, that quotas be sufficiently large to permit each company to have assigned six or seven men who have graduated from either the Division or the Seventh Army Academy. In order to meet this requirement the Division has established the following quotas for the Division Academy:

Advanced Class	90
Basic Class	30
Candidate Class	90

These quotas, together with the quotas for the Army Academy are sufficient to meet the established requirements without constituting a hardship on the units.

Needless to say, the Academy must be capable of providing first class instruction *before* the first quotas are assigned. This can be insured only if high quality personnel are assigned as cadre, and each instructor is *thoroughly* rehearsed by departmental and academy rehearsal boards *before* the program is started. It is extremely important to maintain a highly qualified, well prepared group of instructors. They must not be merely acceptable. They must be so outstanding that all who see them are *greatly* impressed by their abilities to set the example and to teach others. If this principle is observed, the Academy will sell itself to the unit commanders and they will be not only willing but highly desirous of sending their best



(U. S. Army)

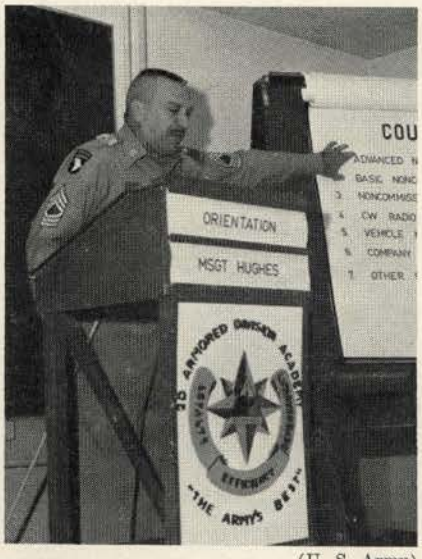
Students here are receiving practical work in instructing CBR warfare classes.

and most influential noncommissioned officers to attend the course. Personnel must be hand picked regardless of loss entailed by the losing unit. After the original cadre is thus established, it should be possible to maintain its strength through selection of highly qualified personnel received in the replacement stream; but when this cannot be done, there must be no hesitation to transfer outstanding men from the units. No noncommissioned officer in the division will have a greater impact upon the units than will one assigned to instruct at the Academy. His influence is division-wide. Whether this influence is good or bad depends upon the quality of the man in the job.

Instructor personnel of the 2d Armored Division Academy are assigned from the replacement stream and from units within the 2d Armored Division. They remain with the Academy for *at least* one year—longer in most cases. Mediocre instructor personnel cannot train others—and unless instructors are *thoroughly* prepared and rehearsed they will not be outstanding. Teaching at the Academy is based upon set standards and established doctrine, long proven to be sound. The aim is not to have the student debate them but to *grasp* them *through their employment*. Since time allotted in which to accomplish this is extremely short, this policy requires that the instructor know his subject.

It is believed that the instructor personnel at a noncommissioned officer academy should be noncommissioned officers. Much better results are obtained when senior, combat experienced, noncommissioned officers are utilized. Other ranks of enlisted men are satisfactory for instructing specialists in technical material but they do not have the background knowledge to answer questions and discuss problems applicable to noncommissioned officer students. A noncommissioned officer academy program of instruction should be gauged for the noncommissioned officer, and the best instructor under such a program is the noncommissioned officer.

Command support and publicity are extremely important to the success of the program. If desired results are to be obtained it is mandatory that all commanders, staff officers and noncommissioned officers understand the importance attached to the academy. This has been accomplished in the 2d Armored Division through the scheduling of "Visitors' Days" for combat command and battalion commanders, S3's, company commanders, Sergeants Major, First Sergeants and Operation Sergeants; by special radio programs and the showing of film produced at the Academy; by posters displayed on unit bulletin boards; and by visits to the units by members of the academy staff and faculty.



(U. S. Army)

Top noncommissioned officers are used as instructors at the Academy.

Such a policy will "sell" the Academy to most commanders, but there will be occasions where a unit will attempt to fill a quota with the man who can be most easily spared or with the man whom it wishes to reduce. When this happens prompt command action must be taken to prevent recurrence.

Finally it is believed that the system of teaching the noncommissioned officer courses and the specialist courses such as radio operators, vehicle mechanics, etc., in separate classes at one academy as is done here at the 2d Armored Division Academy is a sound system. It is economical in that it makes maximum utilization of overhead personnel and equipment. In addition the various departments are of mutual assistance in their operations.

If the staff and faculty assigned to supervise these activities are enthusiastic and thoroughly convinced that the product they are able to produce will have a profound impact upon the efficiency of the whole division, and if they dedicate their every act to the accomplishment of the school mission, most gratifying results can be obtained. The students will have such pride in their accomplishments that they will want to identify themselves as graduates of the Academy. While it may not be possible to carry that sort of thing as far as they might like, it is possible to take advantage of the *esprit* which motivated such desires and to guide that spirit in such manner that these men will continue to apply themselves in improving the standards of their units and the standards of the Army as a whole. If the staff and faculty do not have this necessary drive and enthusiasm, the academy will become just another orphan to be used as a dumping ground for undesirables. The valuable training that the noncommissioned officers deserve will have been lost.

The 2d Armored Division Academy is providing the noncommissioned officers of the Division an opportunity to improve their professional knowledge and ability immeasurably. The graduates have been extremely enthusiastic in their support of the Academy and have expressed their admiration in most glowing terms. Perhaps the most succinct of these praises was rendered by Master Sergeant John N. Lusk, Sergeant Major, 124th Armored Ordnance Battalion, who expressed himself thusly: "At the Bureau of Standards in Washington, D. C., will be found the standards for all known measurements. At West Point will be found the standards for our Army officers. Here at the 2d Armored Division Academy can well be found the standards for the Noncommissioned Officer Corps. This is the Army's best!" The Academy is particularly proud to receive such comment from Master Sergeant Lusk since he is also a graduate of the Noncommissioned Officer Course and the Military Instructor Course at Fort Knox.

Since the Department of the Army, through Army regulation 35-90, dated 25 June 1957, has recently announced the importance of division noncommissioned officer academies, it is felt the experiences of the officers and men of the 2d Armored Division Academy, here recorded, will prove beneficial to those who are involved in organizing and operating these valuable institutions.



(Embassy of Pakistan)

General Mohd Ayub Khan, Commander-in-Chief, Pakistan Army reviewing 6th Lancers during celebration of their centenary.

THE ARMORED CORPS OF THE PAKISTAN ARMY

By MAJOR HOWARD C. REESE

PAKISTAN, the sixth largest nation in the world, is a member of the Baghdad Pact, the northern tier alliance that includes Turkey, Iraq and Iran. It contributes a first class fighting force in which armor plays an important role. A small U. S. Military Armed Assistance Group, headed by Major General Louis W. Truman, advises on technical matters and vehicle maintenance. Much of its basic work is reduced because of the excellent soldier material in Pakistan, a legacy provided by the late British Indian Army.

Pakistan, a young country only ten years old, has military traditions, however, that go far into the past. Earlier this year, for example, the 6th Lancers, an armored regiment, celebrated its 100th anniversary, and is but one of several units of the Pakistan Army whose traditions are as old. Behind this century of continuous service lies a clue to the military profile of both India and Pakistan. In the course of their 90 years of rule, the British built a splendid fighting force, the British Indian Army, whose original duties consisted of guarding the warehouses of the East India Company. Later, with British troops, it was charged with the maintenance of law and order in the subcontinent. In the period between the wars it was a strategic reserve for British commitments in the Middle and Far East. Side by side with Allied forces it fought with distinction in two world wars. During the Second World War Americans noted its top caliber in North Africa, Italy, the Middle East and Burma.

The 6th Lancers, equipped with Sherman tanks, fought in Italy as the

MAJOR HOWARD C. REESE, USAR, is attached to the information Division of the Pakistan Embassy. During World War II he was assigned to the G2 and G3 Divisions, Supreme Headquarters Allied Forces Europe. Receiving an MA degree at New York University in 1954, he taught history prior to coming to Washington, D. C.

reconnaissance regiment of the 8th Indian Division, an Eighth Army unit that was subsequently under the command of General Mark Clark. Its armor now includes Shermans and some M24s.

Generations of the warrior spirit make the Pakistani soldier one of the most effective fighting men in Asia, and as such is an important auxiliary to the strength of the free world. It becomes a matter of some necessity for Americans to have more than a passing acquaintance with the military organization of a nation that, along with Turkey, bolsters the Baghdad Pact.

The Pakistan Army came into being when the subcontinent was partitioned in 1947. At that time there were eighteen cavalry regiments in the British Indian Army, of which Pakistan received one third. It is entirely a volunteer force, and its responsibilities are many owing to the unique geography of Pakistan.

Divided into two parts, the country comprises West Pakistan and East Pakistan, separated by 1,000 miles of Indian territory. The borders of West Pakistan touch the Soviet Union and China, while East Pakistan is surrounded by India on three sides. Such geography imposes military problems of considerable magnitude. The Army must be proficient in mountain warfare, in desert operations, in holding a river line and in jungle combat. Generally favorable terrain assures tanks a major role in overall planning; except for the Northwest Frontier the ground is good for track laying vehicles while a good road net facilitates communications.

The Pakistan Army follows British organization. While most American officers understand the differences in unit terminology, the matter is important enough to mention here. The basic unit of the infantry is the battalion which forms part of a regiment. This regiment, however, has no operational duties. Its mission is only the recruitment and training of personnel which means that it can concentrate on developing and fostering unit pride. The regiment has the additional task of looking after its battalions in the field. There is no limit to the number of battalions a regiment can have on its rolls, and some regiments have been known to have had as many as 16, a capability expansion that is useful in an emergency. Infantry battalions rarely operate independently and form part of a brigade which is equivalent to a U. S. regiment.

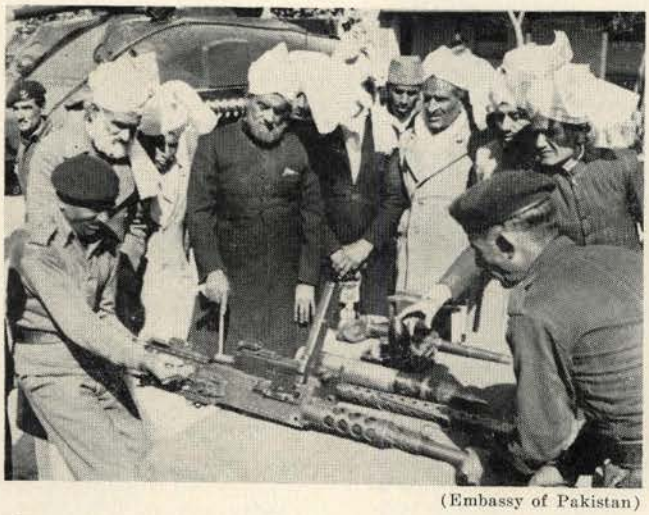
In Armor, the Pakistan regiment approximates a U. S. tank battalion. Made up of a headquarters squadron, it has three fighting squadrons of four troops each, or a total of 57 tanks. The tank platoon has four tanks, a number dictated primarily by economy although experiment has been made with the American five tank platoon.

Armor is the senior branch of the Army, and one of the most popular arms in which tradition plays a productive role. Men chosen for Armor have a family background of cavalry service; often the father of a recruit may have served in a certain regiment. But the necessary aptitudes for this select military career must be demonstrated, and a minimum educational standard of about six years schooling is required. Recruits agree to serve for a fifteen year period, seven years on active duty and eight in the reserve. Regular enlistment, however, can be extended if the Army finds the recruit acceptable. Recruit training varies from one to three years depending on the branch or service, and then he is assigned to a unit of his choice.

The Armored School, located at Nowshera, is commanded by Colonel R. G. Hyder and its mission is not unlike that of Fort Knox with courses for both officers and enlisted men. The School gives recruit and basic training, then goes on to trade (MOS) specialties, driver-mechanic, gunner and signals (radio operator), which take from 18 to 22 months.

Officer courses include Instructors, Tactical, Troop Commanders and Regimental Commanders programs which extend from six to ten weeks. Concurrently, the Tactical Wing of the School that administers this curriculum also sponsors brush up subjects, namely, gunnery, radio, and vehicle maintenance. Tactical doctrine blends U. S. and British procedures.

The time-honored cavalry traditions of the Pakistan Armored Corps provide the basis for great unit pride and help to make the Army as a whole a formidable unit among the forces of the free world.



(Embassy of Pakistan)



(Embassy of Pakistan)

Former members of the Regiment are examining the auxiliary weapons in the tank and measuring the thickness of armor.

NEWS NOTES

First Tactical Lacrosse Missile

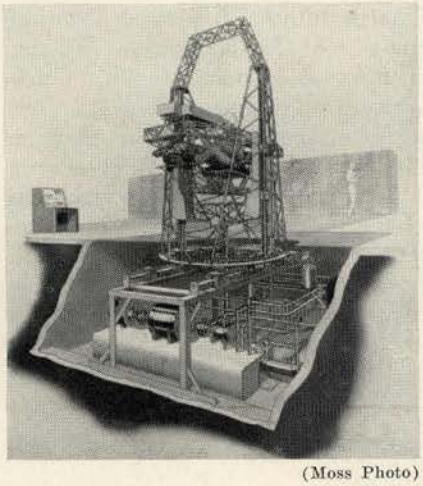
The first tactical Lacrosse missile has come off the production line at The Martin Company, Orlando, Florida, plant, the Department of the Army announced recently.

Tactical Lacrosse missiles now coming off Martin assembly lines are improved versions of earlier models which were test-fired successfully at White Sands Proving Ground, New Mexico. The Army will use these missiles for testing, training, and with operational units.

Lacrosse is an extremely versatile close and general support missile of high accuracy and mobility. The missile is controlled by a forward guidance station which acts in a capacity similar to a field artillery observation post, and can destroy a target with one shot. With artillery, several rounds must be fired to get on target. Additional rounds are needed to get the same destructive effect as one Lacrosse missile. Since all Lacrosse elements are mounted on mobile carriers, the missile can be fired and the launcher moved to a new location immediately.

Externally, Lacrosse resembles other missiles in the Army family. It has a warhead coupled with a body containing rocket and guidance units. About 20-feet long, it has four swept wings which are interchangeable and four tail fins.

Lacrosse is being produced at interim facilities of the Martin Company at Orlando, Florida. A new 7 million dollar plant is under construction on a 6,770 acre site south of Orlando and is scheduled for completion late in 1957. The plant is designed to accommodate the development and the manufacture of newer weapons in the guided missile, electronic and nucleonic and small weapons fields.



(Moss Photo)

An Automatic Engineer

An automatic engineer, shown above, that helps to design tanks is now under development by Lehigh Engineering Associates of Newark, New Jersey.

This unusual project—a tank fighting compartment simulator—is being developed for the United States Army.

Not a training instrument, the simulator is devised to reproduce the various forces which act upon a tank fighting compartment and on the gunner in it.

The simulator obtains immediate results, saving valuable design time and months of calculations.

Designed from just the basic idea at Lehigh's Development Laboratory in Orange, New Jersey, the simulator has been the object of intense concentration by the organization's key engineers and technical personnel during the past year.

An Aerial Jeep

Award of three contracts totalling $1,702,000 for the design, construction and testing of flying research vehicles to be used in the possible future development of an "aerial jeep" was announced recently by the Department of the Army.

The contracts were awarded to Aerophysics Development Corporation, Santa Barbara, California; Chrysler Corporation, Detroit, Michigan; and to the Piasecki Helicopter Corporation, Philadelphia, Pennsylvania.

Recent developments in direct lift devices utilizing the ducted propeller, improved power plant designs and advances in vertical take-off research, have prompted the Army to undertake the development of an "aerial jeep."

The "aerial jeep" concept seeks to provide the Army with a compact vehicle having the versatility of the conventional jeep but being capable as well, of hovering and propelling itself above the ground. This added capability would eliminate road or terrain restrictions associated with ground vehicles without an accompanying requirement for clearings or landing strips of the nature needed for airplanes.

Ultimately the Army hopes to have a general utility vehicle which can travel at speeds up to 50 miles per hour, stay in the air for several hours and carry up to 1,000 pounds of weapons or equipment. If successful, the concept could lead eventually to the development of an "aerial truck."

The small vehicle size is obtained through utilization of ducted propellers as lifting units. The ducts which enclose the propellers increase the efficiency of the propellers and also afford protection to the vehicle and ground personnel when maneuvering close to the ground in confined areas.

Under the contracts, flying research vehicles will be developed to explore the behavior of ducted propeller vehicles in forward flight and to determine the most promising control system. Different arrangements and configurations of ducted propellers and control systems will be investigated under the three contracts.

The contracts were awarded by the U. S. Army Transportation Research and Enginering Command, Fort Eustis, Virginia. The companies awarded contracts were selected through competitive negotiations from a total of 21 firms which participated in design competition.

Army to Test Consolidation of Eight Military Districts

The United States Continental Army Command recently was authorized by the Department of the Army to consolidate eight existing Military Districts within the Second US Army area into two new Corps Headquarters (Reserve).

To be activated are the XX and XXI US Army Corps Headquarters (Reserve), located at Fort Hayes, Ohio, and Indiantown Gap Military Reservation, Pennsylvania, respectively.

Responsibility for U. S. Army Reserve training, administration and support, in the states of Ohio, West Virginia and Kentucky is assigned to XX Corps (Reserve). The XXI Corps (Reserve) is delegated similar responsibility for the USAR in Pennsylvania, Maryland, Delaware, Virginia and the District of Columbia.

Consolidation of these Military Districts will serve as a field test for other Army areas. Success of the program in Second Army will determine whether or not it is extended nationwide.

Primary goal of the consolidation, long under study by the Department of Army and US Continental Army Command, is further improvement of USAR training by assigning responsibility to an Active Army organization created specifically for that purpose. Non-Reserve operations ordinarily will not be delegated to the new Corps Headquarters (Reserve), or its elements.

Each Corps Headquarters (Reserve) will be commanded by a major general, responsible for the supervision of training, administration and support of USAR units within the Corps' area. Additional supervisory duties for the Reserve Officers Training Corps also may be assigned by the Army commander.

Major advantages of the consolidation plan are:

1. Reduction in the number of major headquarters, providing greater simplicity of operation and control. Two Corps Headquarters (Reserve) will replace eight Military Districts in the Second Army area, for example. There are 49 Military Districts in all six Army areas.
2. Reduction in the number of per-

sonnel required, due to consolidation of headquarters and assignment of supply and logistics functions to Army Headquarters and Active Army installations wherever possible. Civilian employees whose jobs are affected will be accorded full rights for reassignment under current Civilian Personnel Regulations.

In announcing the plan, the Army said facilities and locations for Corps Headquarters (Reserve) will be established at existing military installations to the greatest possible extent.

Both Fort Hayes and Indiantown Gap Military Reservation are inactive Class I installations, occupied by Military District Headquarters. In addition to Headquarters, US Army Military District, Ohio, Fort Hayes also houses USAR units for inactive duty training and supports smaller elements of Army, Navy and Air Force.

Indiantown Gap Military Reservation is used by Headquarters US Army Military District, Pennsylvania; the Pennsylvania National Guard, the Pennsylvania State Police, the Pennsylvania Civilian Defense Organization, a USAR unit for inactive duty training, and National Guard and USAR units for summer active duty training.

Exercise All-American

EXERCISE ALL-AMERICAN, first of a series of field training exercises scheduled to be held by the Army during fiscal 1958, will take place at Fort Bragg, North Carolina, during 15 days in November, the Department of the Army announced recently.

Approximately 19,000 troops will take part in the exercise, one of several tests to be conducted by the Army to achieve the degree of armed readiness necessary to meet its national defense demands.

Participating troops will include the 82d Airborne Division, an Operations Company of the 313th U. S. Army Security Agency Battalion, both at Fort Bragg, a helicopter company, and other units designated by the maneuver director.

Primary purpose of the exercise will be to train elements of the 82d Airborne Division in offensive and defensive operations under assumed tactical conditions. The exercise will assume extensive tactical atomic weapons capability for both offensive and defensive units.

Two troops tests will be included. One will test helicopter transport patrols from Infantry regiments to their objective. The second will determine the feasibility of utilizing air-dropped observers in enemy territory to acquire information.

The exercise will be under overall supervision of the US Continental Army Command.

Dates of the exercise will be announced later.

Army to Withdraw Division

The Army announced recently the withdrawal of the 1st Cavalry Division from Japan and the redesignation of the 24th Division in Korea as the 1st Cavalry Division.

Personnel and equipment of the 24th Division will be absorbed in the newly-designated 1st Cavalry Division. Army personnel of the 1st Cavalry Division in Japan will be assigned elsewhere in the near future, in keeping with the joint statement issued on June 21, 1957, by President Eisenhower and Prime Minister Kishi that the number of U. S. forces in Japan will be substantially reduced within the next year, including the agreed withdrawal of all U. S. ground combat forces.

For the time being, the 24th Division will be removed from the active list. However, all of its famous regiments will be represented in other divisions of the Army.



(Texas National Guard)

A Mobile Control Tower

The weird-looking apparatus shown above is a mobile control tower, the only one of its kind in use by a National Guard division.

It was put together from a miscellany of spare parts picked up here and there —including an old Army surplus truck and a heavy dose of ingenuity—by the maintenance men of the 49th Armored Division's aviation section.

The plexiglas-enclosed tower, rear-mounted on a bright yellow Ford truck, was on duty 24 hours a day while the Texas Guard division underwent summer field training at North Fort Hood.

When the division returned to home stations June 16, the tower went along, back to its stand at the aviation section's base at Grand Prairie, Texas.

But the hand-built tower isn't standing idle. It will be used year-round by the division's air section and the Civil Air Patrol in the Fort Worth-Dallas area. It is also available for coordination of Guard vehicles during disasters like the recent North Texas floods. The tower is equipped with three radio transmitting and receiving sets, one of which may be used for coordination of vehicle movements.

The tower serves much the same purpose as the standard tower at any fair-sized commercial airport. It is designed, of course, to put more safety in aircraft landings, takeoffs and operations. It also increases the efficiency of an aviation group.

A three-man crew—headed by Specialist 2/c Edward Paul Jones, a citizen of Dallas who in civilian life is an electronics technician for Chance Vought Aircraft, Inc.—operates the tower.

The idea of a mobile tower for a Guard division was born last year when Jones and other members of the aviation section battled blowing dust and heat at Summer encampment while keeping the light planes in the air. After returning to home base, the sections mechanics rounded up an old surplus truck which was little more than an engine and a frame.

Then they picked up some angle iron, used to put together the frame of the tower. Plywood overlapped with sheet metal wasn't too hard to come by to enclose the lower half of the tower. An old Navion plane furnished the rubber insulation surrounding the plexiglas of the top half of the tower.

M103's to Seventh Army

The Army M103 heavy gun tanks were issued to the 4th Armored Division, Fort Hood, Texas, early this year and have undergone troop tests. The tanks are currently scheduled for shipment overseas early this Fall for use by US Seventh Army troops in Europe. Currently the Army M103 tanks are being prepared at Fort Hood, Texas for shipment overseas.

FROM THESE PAGES

65 Years Ago

It is impossible to pass over in silence the views expressed by Count Hebert in his "Essai de Tactique," which appeared in 1773:

"In the less civilized nations, cavalry has always been the first arm of the service; in the more enlightened ones, although it has passed to second place it yet forms an indispensable part of the army and often has decisive importance in battles. Improvements in the art of war give a greater scope to infantry than to cavalry; infantry, being capable of all kinds of fighting, in all seasons, day and night, and upon all kinds of ground, can act independently; but cavalry is adapted to but one kind of fighting and to ground which is known to be favorable, and therefore it cannot be used without infantry. I consider cavalry the second arm of the service," says Hebert; "I acknowledge, also, that it must form an indispensable part of every army.

"In fact, the cavalry often decides the fortune of battle, makes it possible to more fully reap the fruits of victory, and protects the defeated infantry; it exclusively performs the scouting service, and upon it are imposed all operations in which celerity of movement is essential.

"Infantry, it is true, could operate without cavalry, but all its movements would be extremely sluggish; it would risk being often stopped unnecessarily, and would meet with accidents."

LIEUTENANT COLONEL PREJENTSOFF

Cavalry Upon the Field of Battle

50 Years Ago

In meeting the increased demands of modern war, cavalry, even though numerous, and efficiently trained and armed for dismounted action, is dependent for its success upon two factors. In the first place, the army commander must appreciate its limitations, understand its use, and avoid its abuse. He must have digested the lessons of history; he can expect no real benefit from his cavalry unless he knows enough to put every horseman where he will do the most good; not scattered through the country on outpost, convoy, or orderly duty, but in the ranks of a strong, self-sustaining cavalry mass, his keenest instrument in strategy and his readiest reserve in battle. And when these masses are formed he must realize that their leaders should be trusted and given free hands; their tasks must be clear cut, but orders from army headquarters few.

In the second place, the leaders who are to solve these problems must be officers of experience in the arm, and of high military attainments; their independence and the consequent demands upon their ability are greater than ever before.

FIRST LIEUTENANT S. R. GLEAVES

The Strategic Use of Cavalry

25 Years Ago

We take account of relative strengths; the amount of artillery the writer of the problem has assigned to us as against the amount he has given the enemy. We can count noses and we can count tanks. We can measure the miles we have to go and compare it with the distance the enemy has to march,

"Then take the result, as you readily see,
Add seven and ninety and two,
Subtract seventeen and the answer must be
Exactly and perfectly true."

But it isn't always exactly and perfectly true. Inferior and poorly equipped armies have repeatedly defeated superior, well equipped forces. The favorite horse has often been the last in the field. There is evidently something else we must take into account; something besides guns and tanks and a count of noses. Obviously, we must weigh carefully the balance of material forces, but unless we understand the human equation, our superiority of force may prove an illusion.

The Imponderables—the things of the mind and spirit and soul that cannot be weighed or measured or touched, yet have in them the power to move mountains and conquer the world. Stronger than bands of steel, more powerful than T.N.T., yet insubstantial, they exist as latent forces, waiting to be tapped by those who know of their existence and understand their use.

COLONEL WESTON JENKINS

The Imponderables in an Estimate of the Situation

10 Years Ago

Tanks were used successfully in night attacks, moving with the leading elements of the infantry. The tank fire was not too accurate and all adjustment was made with tracer. It was found that it was best to fire only when necessary at night as the fire was inaccurate and disclosed the tanks' positions. The tanks gave the attacking infantry a defense against machine guns, built up his morale and unnerved the defender. The enemy or anybody, hearing tanks at night becomes very much alarmed and especially so if he cannot locate them or determine their number. It was found that better results were obtained when a detailed daylight reconnaissance was made prior to the attack and when plans further provided that the forces arrive on the objective while there was sufficient light to reorganize the ground in preparation for possible counterattacks. This denied the enemy the opportunity for launching a night counterattack against an unprepared position. The tanks should always remain on a newly taken objective until it is fully organized and ground mount antitank guns have been brought forward to cover the possible tank routes of approach.

MAJOR WILLIAM R. CAMPBELL

Tanks With Infantry

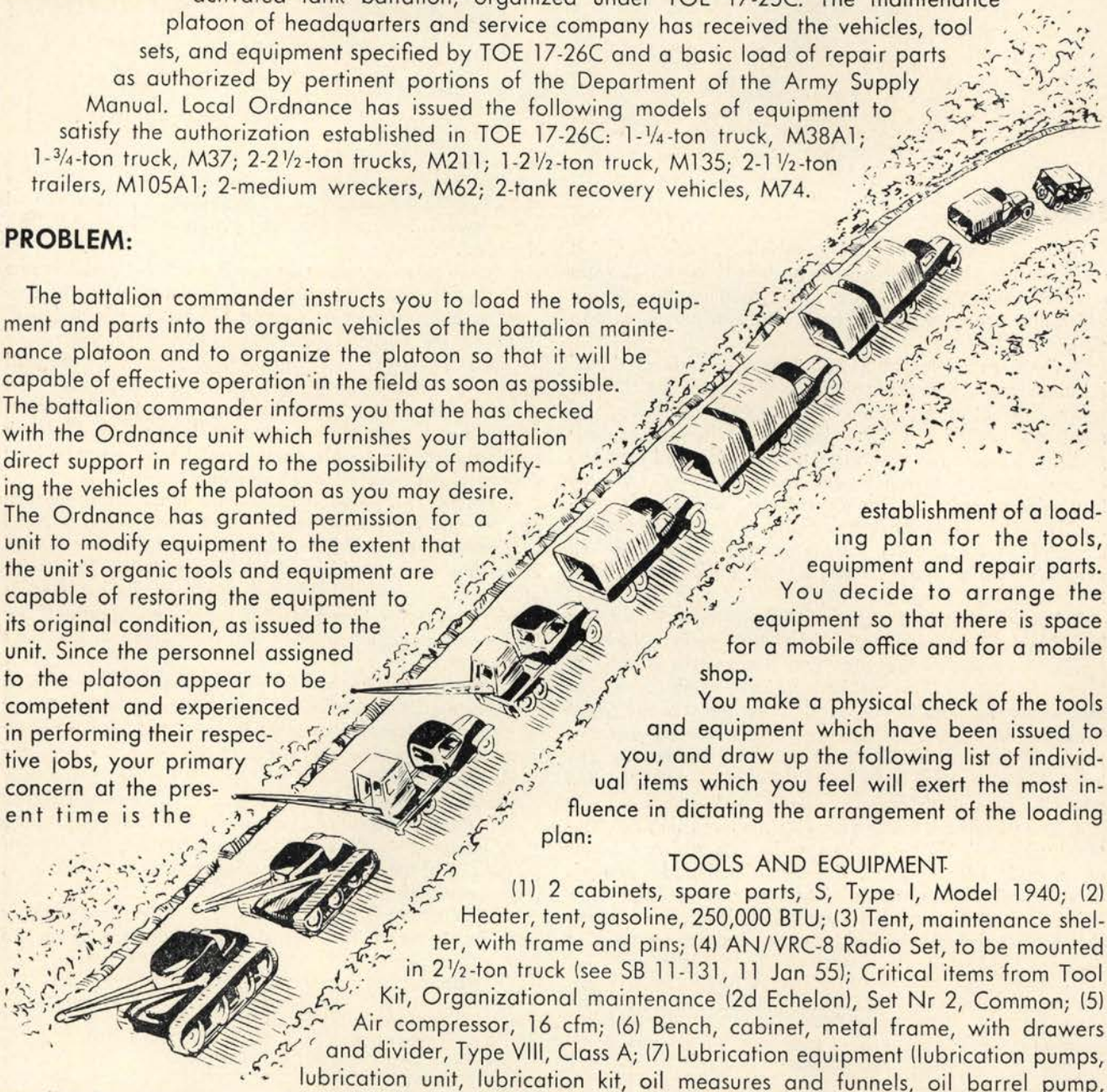
How Would You Do It?

US ARMY ARMOR SCHOOL PRESENTATION

SITUATION You have just been assigned as the battalion motor officer of a newly activated tank battalion, organized under TOE 17-25C. The maintenance platoon of headquarters and service company has received the vehicles, tool sets, and equipment specified by TOE 17-26C and a basic load of repair parts as authorized by pertinent portions of the Department of the Army Supply Manual. Local Ordnance has issued the following models of equipment to satisfy the authorization established in TOE 17-26C: 1-¼-ton truck, M38A1; 1-¾-ton truck, M37; 2-2½-ton trucks, M211; 1-2½-ton truck, M135; 2-1½-ton trailers, M105A1; 2-medium wreckers, M62; 2-tank recovery vehicles, M74.

PROBLEM:

The battalion commander instructs you to load the tools, equipment and parts into the organic vehicles of the battalion maintenance platoon and to organize the platoon so that it will be capable of effective operation in the field as soon as possible. The battalion commander informs you that he has checked with the Ordnance unit which furnishes your battalion direct support in regard to the possibility of modifying the vehicles of the platoon as you may desire. The Ordnance has granted permission for a unit to modify equipment to the extent that the unit's organic tools and equipment are capable of restoring the equipment to its original condition, as issued to the unit. Since the personnel assigned to the platoon appear to be competent and experienced in performing their respective jobs, your primary concern at the present time is the establishment of a loading plan for the tools, equipment and repair parts. You decide to arrange the equipment so that there is space for a mobile office and for a mobile shop.

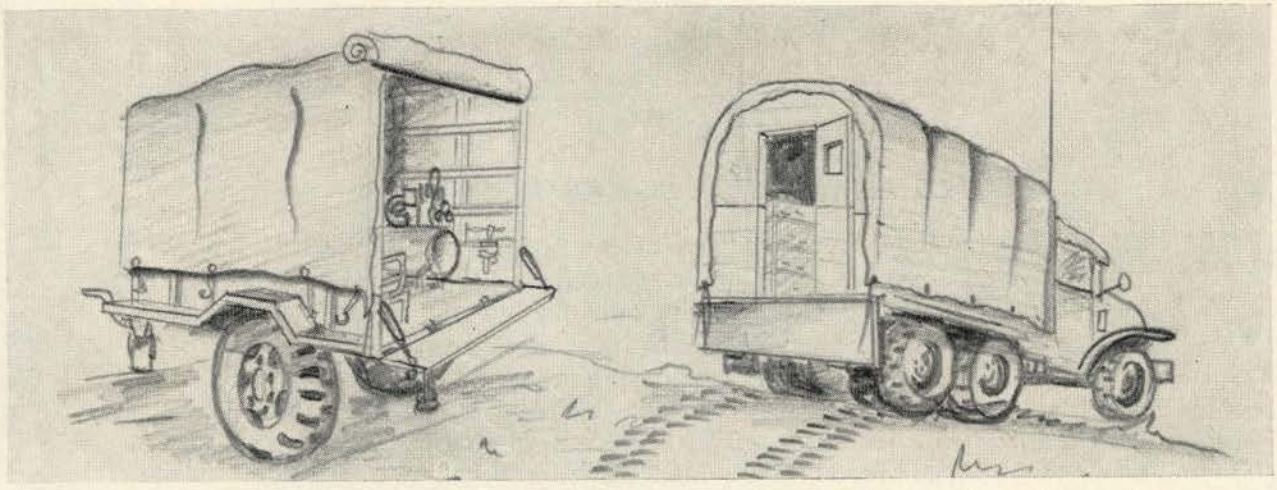


You make a physical check of the tools and equipment which have been issued to you, and draw up the following list of individual items which you feel will exert the most influence in dictating the arrangement of the loading plan:

TOOLS AND EQUIPMENT

(1) 2 cabinets, spare parts, S, Type I, Model 1940; (2) Heater, tent, gasoline, 250,000 BTU; (3) Tent, maintenance shelter, with frame and pins; (4) AN/VRC-8 Radio Set, to be mounted in 2½-ton truck (see SB 11-131, 11 Jan 55); Critical items from Tool Kit, Organizational maintenance (2d Echelon), Set Nr 2, Common; (5) Air compressor, 16 cfm; (6) Bench, cabinet, metal frame, with drawers and divider, Type VIII, Class A; (7) Lubrication equipment (lubrication pumps, lubrication unit, lubrication kit, oil measures and funnels, oil barrel pump, gasoline barrel pump); (8) Battery charger, battery filler, syringe, hydrometer, etc.; (9) Generator set, gasoline engine; (10) 2 cabinets, spare parts: S, Type V, with drawers; (11) 2 cylinders (oxygen and acetylene), with frame; (12) Electric sander and portable electric drill; (13) Tire repair equipment (tire spreader, tire tools, hydraulic jacks, vulcanizer, etc.); (14) Anvil, blacksmith's; (15) Bench grinding machine; (16) Vise, machinist's; (17) Cleaner and tester, spark plug. Critical items from Tool Kit, Organizational Maintenance (2d Echelon), Set Nr 2, Supplemental: (18) Welder, electric arc; (19) Drill, electric, heavy-duty, with vertical stand (drill press); (20) Welder's set (helmet, gloves, welding rod, etc.); (21) Portable electric grinder.

What is your plan for loading the tools, equipment, and repair parts of the maintenance platoon in its organic vehicles?



SOLUTION:

1. You exclude the recovery vehicles, wreckers, 3/4-ton and 1/4-ton trucks from the loading plan. These vehicles are often absent from the platoon area, and the missions for which they are used require that they be as mobile as possible.

2. The three 2 1/2-ton trucks and two 1 1/2-ton trailers should be used for stowing the majority of the repair parts, tools and equipment of the platoon. You realize that stowage of repair parts will be a continuing and constantly changing problem, because the stock of repair parts required for operation of the platoon will be constantly changing. You plan to provide as much shelf space in these vehicles as is practical, and to parcel out repair parts to those vehicles excluded from the loading plan only as necessary after all available storage space in the 2 1/2-ton trucks and 1 1/2-ton trailers has been fully utilized.

3. You allocate one 2 1/2-ton truck, without trailer, for handling heavy equipment, such as tank power plants or tracks. You select an M211 truck for this purpose in order to take advantage of its flat bed, without wheel wells. No shelves will be built in this truck. When platoon equipment is loaded on organic vehicles preparatory to movement, this truck will haul the maintenance tent, the tent heater, and large, bulky stockage items which may be quickly unloaded when the platoon prepares to operate in bivouac.

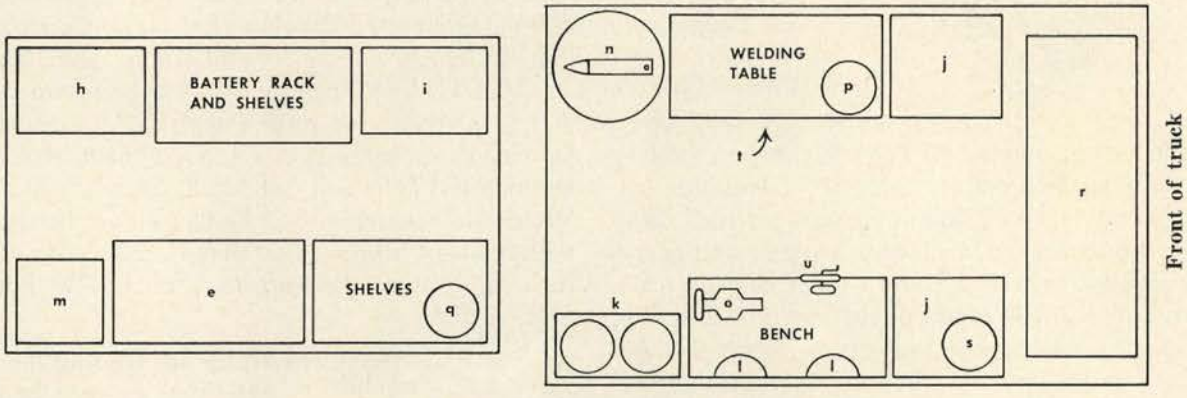
4. You discuss the loading plan for the remaining two 2 1/2-ton trucks and 1 1/2-ton trailers with your assistant motor officer and motor sergeant. The discussion includes analysis of weight distribution, accessibility, safety, and convenience. Using the best features of various suggestions proposed, you sketch a suggested layout to be used as a guide for storing and mounting the tools and equipment which you have listed as the items critical to the loading plan *(see Figures at bottom of pages)*.

5. As many repair parts as possible will be stored in one truck and the trailer which it tows. This truck will also contain manuals, references, platoon supply records and desk space for the Ordnance Parts Specialist. Since floor space for parts cabinets will be critical, the second of the assigned M211's will be used for this parts truck and shop office. The AN/VRC-8 radio *(item 4)* will be mounted on top of the parts cabinet bench *(item 6)*, and you plan to use a handset with sufficient extension cord to permit operation of the radio from the cab of the truck while the vehicle is moving.

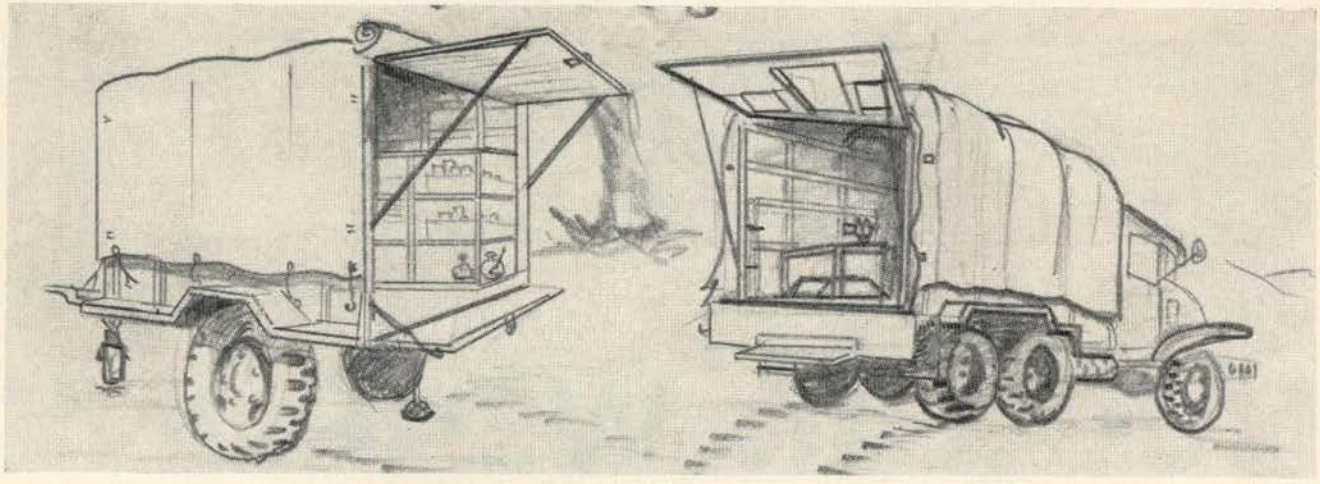
6. The M135 2 1/2-ton truck will be fitted for convenient operation of the welder and power tools, and will be used as a mobile shop truck. Power equipment which is not needed in the shop truck, or which would create ventilation and noise problems if operated inside the truck, will be mounted in the 1 1/2-ton trailer towed by this truck. The majority of the tools assigned to the platoon will be located in this truck and trailer.

a. The electric arc welder will be mounted transversely at the end of the bed of the shop truck. (CAUTION: Proper cooling and ventilation must be provided for the welder as well as a means of leading the exhaust out of the cargo body.) Removable shelves will be constructed over the top of the welder for additional storage space. You discard the possibility of mounting this 2000-pound piece of equipment in the trailer, because effective utilization of the rest of the space is almost impossible without creating an overload.

b. Small items from the Number 2, Common, and Number 2, Supplemental, Tool Kits will be stored in one of the two



M135 shop truck with trailer



spare parts cabinets *(item 10)*. Small items from the Special Sets "B" for the vehicles assigned to the battalion will be stored in the other cabinet in this truck.

c. A removable welding table, with part of its top lined with fire brick, and a work bench will be constructed in the shop truck. The drill press and the two grinders *(items 15, 19 and 21)* will be mounted on the tops of this table and work bench, or the bench tops of the spare parts cabinets. Brackets for the electric sander and portable electric drill will be mounted on a board behind the work bench *(item 12)*. Optional placement of the vise *(item 16)* would be on the front bumper of the truck or on the work bench.

d. The anvil *(item 14)* will be clamped to a salvage 2½-ton truck wheel with locally fabricated clamps to provide it with a stable but portable base.

7. Alterations will be accomplished by use of scrap material. The bows of the two trucks and trailers should be raised to about 6½ feet above the bed floor to provide comfortable working space within the cargo bodies. A strip of salvage canvas about five feet wide may be sewed in at the center of each of the tarps to compensate for this added height. Strips of scrap lumber, running the length of the cargo body, will be attached to the bows with bolts or thumb screws. These strips will be spaced to prevent entry into the cargo body if the tarpaulin is raised and to ensure security of the tools and equipment inside the vehicle. You decide to take the following steps to permit effective loading and use of the tools and equipment in the two trucks and trailers:

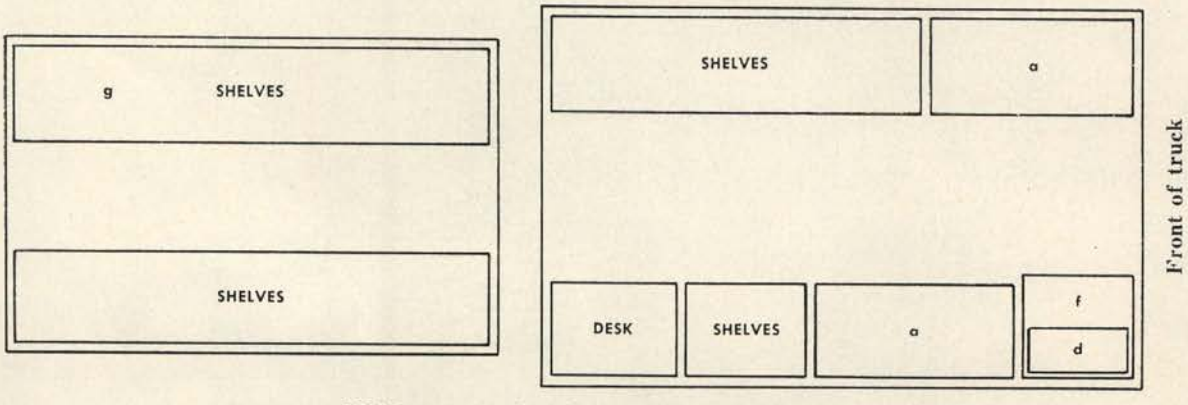
a. Mount personnel seats on the outside of the beds of the trucks to provide more space inside the cargo bodies, and to be available as additional working space on the outside of the trucks, as needed. Construct shelves for storage of tools and repair parts in all the space along the sides of the two trucks and trailers which is not otherwise committed.

b. Provide removable end panels of scrap plywood for the cargo bodies of the trucks and trailers, which can be locked in position from inside the cargo bodies. Hinge these panels at the center so that they may be removed, folded and stored in the cargo body if it becomes necessary to reduce the vehicles to their minimum dimensions. Provide a small access door for personnel in the rear end panel of each truck, and fit it with a hasp and lock.

c. Arrange the rear end panels and the side flaps of the tarpaulins so that they may be supported at an angle to the vehicle to provide better light and ventilation inside the vehicles and to provide working areas next to the vehicle protected from the weather. To accomplish this, hinge the rear end panels at the top, insert a pipe through the bottom seam of tarpaulin side flaps, and provide suitable supports for the end panels and tarpaulins.

d. Install lighting cable along the bows of the trucks and trailers, and provide fixtures so that the lighting system can be plugged in to the generator, the welder, standard 110-volt alternating current, or the 24-volt battery of the trucks. Provide receptacle plugs for power tools on the bows of the shop truck and trailer. Assemble extension cords for field use.

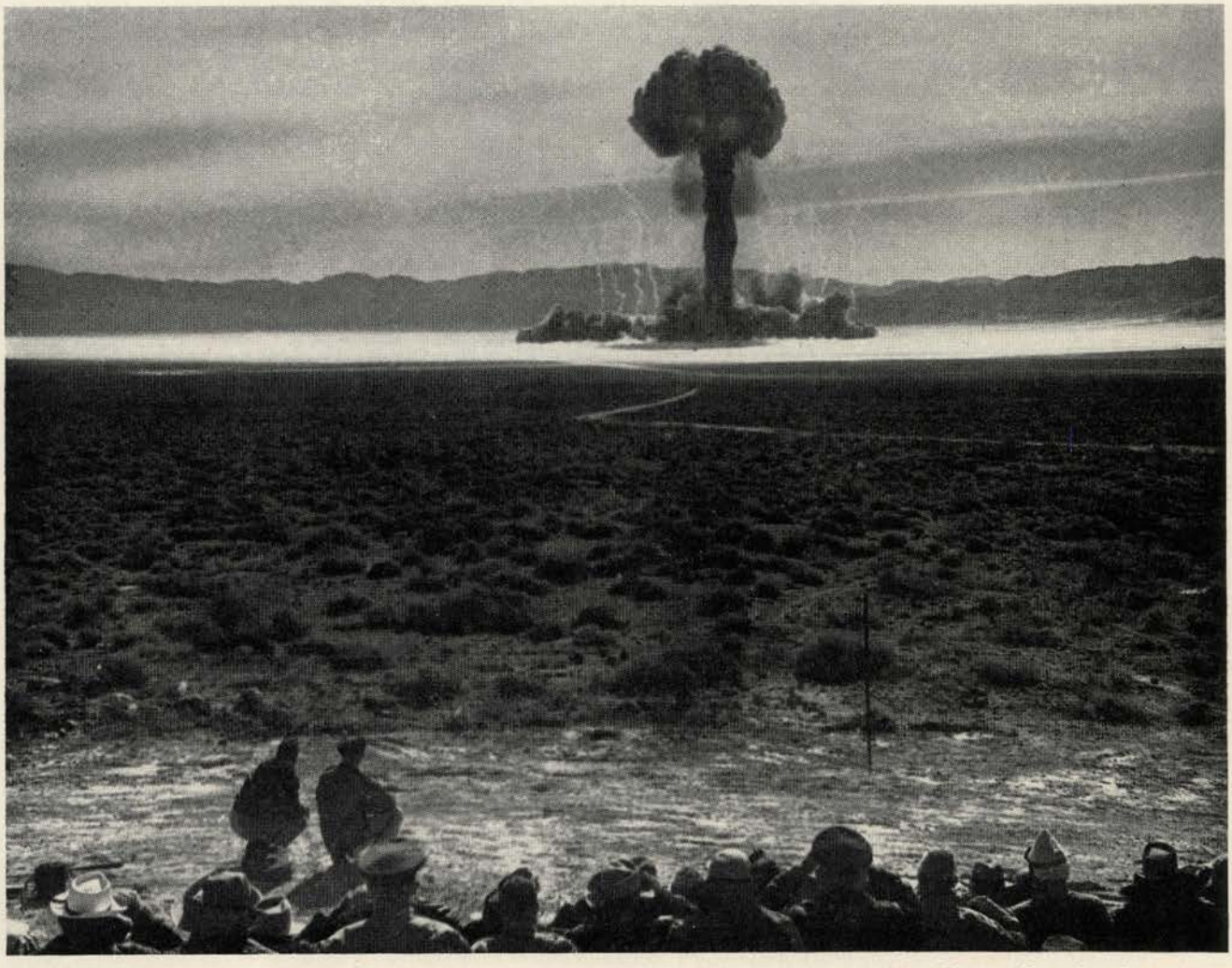
e. Utilize space in the most expeditious manner possible. You impress upon your motor sergeant and assistant motor officer the importance of flexibility in the loading plan. You remind them that this is a solution to the problem, but future activities may make it desirable to relocate certain items as experience with the work load and the need for more frequent use of certain tools, equipment, or spare parts may dictate.



M211 parts truck and shop office, with trailer

The Book Section

NUCLEAR WEAPONS and FOREIGN POLICY



NUCLEAR WEAPONS AND FOREIGN POLICY. By Henry A. Kissinger. 455 pp. Harper and Brothers, New York City, New York. $5.00.

Reviewed by

JOHN G. NORRIS

IN the decade since the military lessons of World War II were codified in the National Security Act and Key West functions paper, there have been vast changes in weapons and the world picture. The United States atomic monopoly has been broken. Russia has developed a strategic air force, opening American cities to direct attack. Both East and West have built up big stockpiles of hydrogen bombs capable of destroying whole cities. Development of missiles and small precision atomic weapons are revolutionizing tactics. Long range ballistic missiles—for which there is no defense yet in sight—soon will join the arsenals of both sides.

At the same time, spiraling defense costs have run head on into a new public demand for cutting Government spending. This has brought cutbacks in the armed forces, sharpened inter-service rivalry, and renewed Congressional demands for "greater unification" of the forces. Representatives of the major powers debate plans to avert the horrors of nuclear war and ease the arms burden, with little promise, however, of reaching any meaningful agreement.

Into this muddled situation has come a new element—a catalyctic agent in the form of a book. "Nuclear Weapons and Foreign Policy," by Dr. Henry A. Kissinger of Harvard, takes up the greatest problem of the age: how to revamp American foreign and military policy to meet the revolutionary changes in arms.

In a brilliant, penetrating discussion of all aspects of the problem, Dr. Kissinger proposes some radical but logically expounded solutions. Because Russia and United States could knock each other out in an all-out nuclear war, this is the least likely though most dangerous threat. Therefore, the United States must maintain sufficient strategic retaliatory forces to deter such an attack. But, we must go further and develop both the "capability" and "military doctrine" to counter "more ambiguous" Soviet threats short of all-out war. We must abandon our traditional attitude that we will go to war only to meet direct, unambiguous threats to our most vital interests. Unless we "create a spectrum of capabilities to resist likely Soviet challenges," we will meet each crisis with uncertainty and suffer repeated minor defeats.

To counter and, if necessary, forcibly oppose such indirect threats, the United States must revamp its military doctrine and present the aggressor with "graduated deterrents."

To this end, therefore, we must develop the forces, tactics and willingness to fight limited nuclear wars.

These ideas are not new, and many Pentagon officials will argue that the United States today has the weapons, forces and war plans for fighting such limited conflicts. This is true to a degree. What the author stresses, however, is the need for a *national* military doctrine—a "pattern of response, a routine."

Feature Reviews

Exclusive with
ARMOR

There is a military doctrine expressed in the law, Key West agreement and the decisions of the National Security Council and the Joint Chiefs of Staff. But, as many of these were compromises, they are stated in general terms, and existing military doctrine exists largely in conflicting Army, Navy and Air Force concepts.

Moreover, the concentration on all-out nuclear war has resulted in the neglect of some essentials for waging limited nuclear war, such as adequate airlift.

To make possible the development of a new American political-military doctrine to meet the threat, Kissinger proposes sweeping changes in the defense organization.

The book has received highly favorable reviews in the daily press. *The Washington Post's* Chalmers Roberts called it "undoubtedly the most important book of 1957." He urged that President Eisenhower, Secretary of State Dulles and top military and civilian officials hole up and read it. The book *is* important, not so much because of the solutions it offers—which are radical and controversial—or for its prospect of influencing military leaders, but for other reasons.

Prior expositions and criticisms of American political-military problems either have been made by partisans or set forth on the basis of incomplete knowledge. Those with access to all the facts and the pro and con arguments—military men and top civilians in Government—have spoken or written largely in defense of a point of view. Newsmen and other outsiders attempting to weigh current problems are denied, on security grounds, the full facts and largely get only "sales pitches" from contesting groups rather than logical reasoning.

Dr. Kissinger is more fortunate. As study director of a panel of the Council on Foreign Relations, which for 18 months considered what to do about nuclear war, he heard the arguments of the Nation's leading military men, scientists and international experts at round table discussions. The group asked him to write this book making his own conclusions. He approached this assignment with a background of having been a consultant to the Government's Weapons System Evaluation Group, Psychological Strategy Board, Operations Coordinating Board and Operations Research Organization. A World War II veteran and winner of the Bronze Star, the 34 year old educator and writer is now a captain in the military intelligence reserve.

It is as a scholar rather than a military expert, then, a reporter, and contemporary historian with a "secret clearance," but no predeliction to any service viewpoint, that Kissinger writes.

The book has faults. The author gets his missiles mixed up once or twice. He sometimes treats weapons still in the early development stage as being operational. The geographical disadvantages of the Soviet strategic air force in making an attack on the United States are stressed, in playing



(U. S. Air Force)

THE AUTHOR

Henry A. Kissinger received his degrees, up to and including his Doctorate, from Harvard University. He served in Europe during World War II with the 84th Infantry Division and later the Counter-Intelligence Corps. He presently holds a Reserve Captaincy in CIC. In addition to being a consultant to many government groups, he is the Director of the Special Studies Project, Rockefeller Brothers Fund, Associate Director, Center for International Affairs, and Editor of *Confluence*. He is the author of *A World Restored: 1812-1822*, soon to be released.

down such dangers, while similar disadvantages of the Soviet submarine fleet in getting out of the Baltic and Black Seas and approaching the Western Hemisphere undetected are ignored. His conclusion that the location of future ICBM sites will be either underground or mobile, so that there will be little chance of strategic missile forces being neutralized, seems questionable.

But such open-to-criticism statements are no reason for discounting the Kissinger book, as some in the Pentagon are attempting to do. Its influence largely stems from its impact on editors, Congressmen and others interested in the vital problem with which it deals. The author, it seems clear, has fully grasped the essentials of the nuclear war dilemma. It is his full, probing and informed discussion of the current poblems and his searching analysis of existing policy and the pros and cons of proposed changes that are so valuable.

"The key problem of present-day strategy," Kissinger declares, "is to devise a spectrum of capabilities with which to resist Soviet challenges. These capabilities should enable us to confront the opponent with contingencies from which he can extricate himself *only* by all-out war, while deterring him from this step by a superior retaliatory capacity. Since the most difficult decision for a statesman is whether to risk the national substance by unleashing an all-out war, the psychological advantage will always be on the side of the power which can shift to its opponent the decision to initiate all-out war. All Soviet moves in the postwar period have had this character. They have faced us with problems which by themselves did not seem worth an all-out war, but with which we could not deal by an alternative capability. We refused to defeat the Chinese in Korea because we were unwilling to risk an all-out conflict. We saw no military solution to the Indo-chinese crisis without accepting risks which we were reluctant to confront. We recoiled before the suggestion on intervening in Hungary lest it unleash a thermonuclear holocaust. A strategy of limited war might reverse or at least arrest this trend. Limited war is thus not an alternative to massive retaliation, but its complement. It is the capability for massive retaliation which provides the sanction against expanding the war."

Arguing for a more flexible policy, the author declares: "We added the atomic bomb to our arsenal without integrating its implications into our thinking, because we saw it merely as another tool in a concept of warfare which knew no goal save total victory, and no mode of war except all-out war.

"It is clear that the nature of war has altered. Our traditional insistence on reserving our military effort for an unambiguous threat and then going all-out to defeat the enemy may lead to paralysis when total war augurs social disintegration even for the winner.

"An all-or-nothing military policy will, therefore, play into the hands of the Soviet strategy of ambiguity which seeks to upset the strategic balance by small degrees and which combines political, psychological and military pressures to induce the greatest degree of uncertainty and hesitation into the minds of the opponent. Moreover, to the extent that we become dependent on the most absolute applications of our power, even the secondary states may be able to blackmail us."

Taking up the most common argument against a policy of limited nuclear war—that any employment of atomic weapons will most inevitably bring on an all-out thermonuclear war, the author declares this idea has been a major tenet of Soviet propaganda. He argues plausibly that horrors of all-out war will make the contending powers in a limited atomic war lean over backward to prevent such a development.

THE REVIEWER

John G. Norris served in the Navy during World War II. He served aboard aircraft carriers, amphibious landing craft and with shore based naval aviation. He took part in the Normandy, Southern France and Iwo Jima invasions. He is presently a Commander in the Naval Reserve. He has been the Military reporter for *The Washington Post* for the past 20 years. Prior to this assignment he was on the staff of the *Army-Navy Journal*. Writing news and comment on current affairs he travels extensively around the world following various military events.



(Washington Post)

Limited nuclear war, moreover, is a field of conflict in which the West has the advantage over the Russian and Chinese hordes, Kissinger goes on. Massed manpower—the tactics employed against Germany and the UN in Korea—cannot be used in atomic war. In mobile warfare, Western individual initiative and technological superiority should win out over the Communist doctrine of centralized command and almost blind following of orders. Furthermore, he reports, all evidence indicates that while the Soviets have made great strides in building their nuclear stockpile and delivery systems their efforts have been largely confined to employment of higher yield rather than precision, tactical weapons.

With thoroughness and willingness to repeat himself to make his point, Kissinger takes up each phase of his many-sided problem and discusses its pros and cons. He reviews various proposals for limitation of armament now under discussion in London, seeing little hope for their adoption or worth if agreed to. Instead of seeking illusionary plans for "open skies" inspection, he argues, the United States rather should seek an agreement to lessening the horrors of nuclear conflict, *i.e.*, steps to keep it limited.

Another chapter is devoted to an analysis of the United States world-wide system of alliances. Particular attention is paid to NATO, which he calls "an alliance in search of a purpose."

There is a valuable discussion of Communist military policy and doctrine—the "strategy of ambiguity." Another chapter analyzes in detail the way the Soviet High Command met and countered the terrific threat of the American atomic monopoly in the immediate postwar years.

Arguing for a new and well-thought out military doctrine, Kissinger calls for changes in defense organization. He feels that the separation of the Army and Air Force probably came two decades too late, and that it would be wise to remerge them. Naval problems are sufficiently different, it is said, to leave the Navy separate. A "single service" probably is out of the question because of traditional resistance and the unwieldiness of such a huge organization.

To meet the two major problems of the age—deterring all-out war and countering other Communist challenges by a readiness for limited nuclear war—Kissinger proposes revamping existing forces into operational commands.

The Army, Navy and Air Force would continue as administrative and training units, in supporting a "Strategic Force" and a "Tactical Force." The former would include SAC, Continental Air Defense Command, Army units protecting overseas bases and Navy units earmarked for all-out war. The Tactical Force would consist of the Army, Air Force and Navy units required for limited war. Each force should be self-contained.

Kissinger also would alter the Joint Chiefs of Staff. It would be made up of a chairman, the commanders of the Strategic Force and the Tactical Force, and the Chief of Naval Operations "to represent operations such as antisubmarine warfare." Other changes which the author advocates include adoption of a two year budget cycle to encourage long range planning and creation of a "Strategic Advisory Council" of civilians to aid the Secretary of Defense.

Specific proposals like these are subject to challenge on many points. The author does not defend them in detail as he does his well-thought-out advocacy of a military doctrine for limited nuclear war. Regardless, however, whether you agree with his conclusions or not, the exposition of the complex problem is very helpful in understanding its many aspects.

A careful reading of the book is commended to all serious students of the key issue of the age, whether a layman or professional military man.

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by

Colonel Charles R. Codman

This book is compiled from letters written by the author to his wife over a period of 33 months of service in the European theater of operations during World War II. It is an account of his day-to-day personal experiences in wartime Africa and Europe. At the end of the North African campaign, the author was appointed as senior aide-de-camp to General George S. Patton, Jr., serving in this capacity until after V-E Day and his return to the United States. While General Patton is naturally the central and dominating figure of this journal, the latter is in no sense an attempt at either biography or military analysis.

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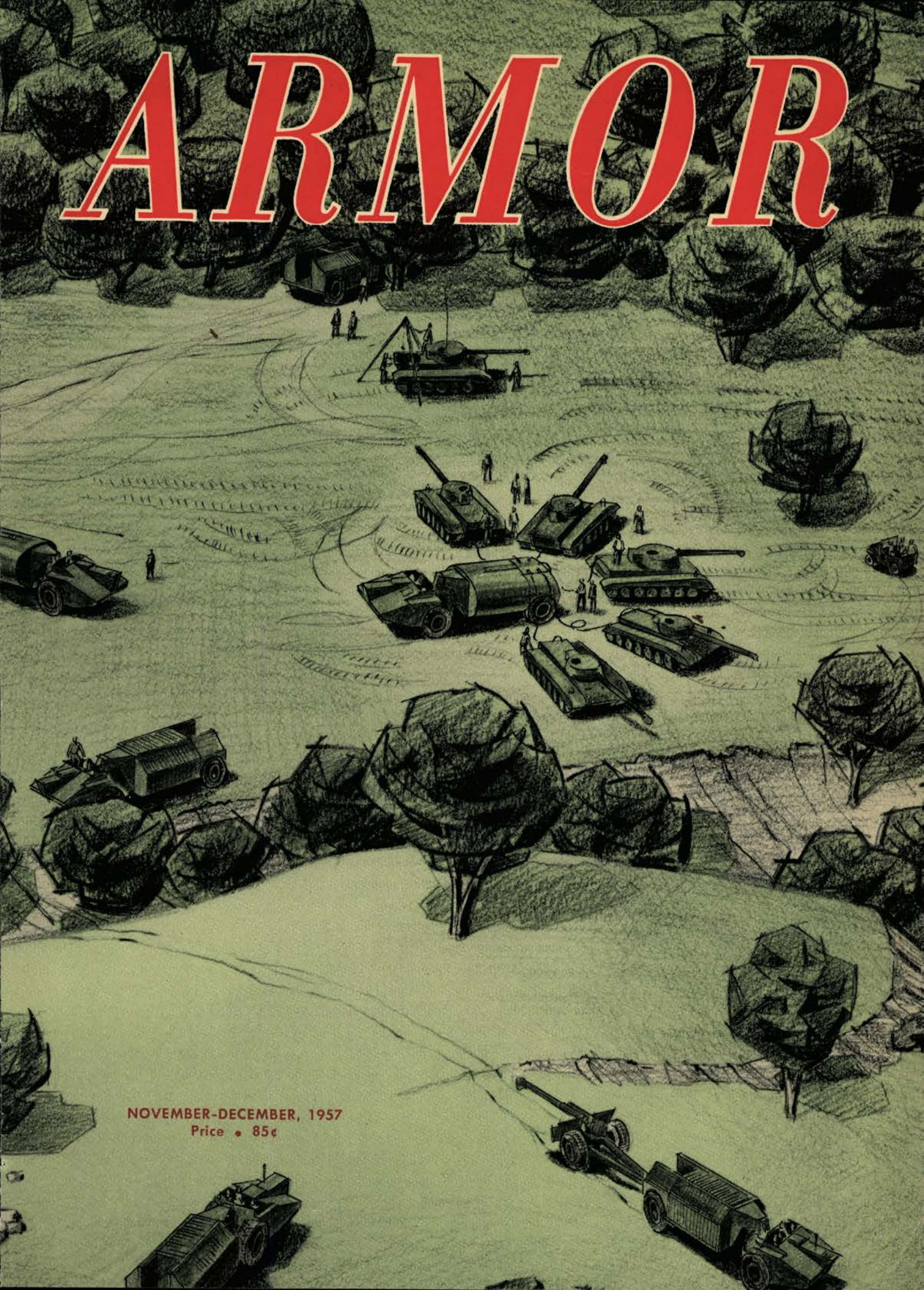
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ARMOR



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MEDITERRANEAN THEATER OF OPERATIONS

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Seizing the Initiative in the West

By George F. Howe

Northwest Africa: Seizing the Initiative in the West tells why and how the Allies invaded French North Africa on November 8, 1942. It explains the elaborate methods by which brave men attempted to forestall all fighting between French forces and American invaders. By accepting the Allies as friends, the French would be able to rearm a new liberating force and, ultimately, to recover the land then occupied by German and Italian troops. From the most authentic and ample evidence, the author explains why these plans failed, how Vichy France floundered, how Hitler arrived at strategic decisions and how the Axis powers put them into effect.

The race for Tunisia was lost by a whisker; the book shows why. Then both sides extended their lines southward toward the salt marshes and the Sahara until the front was about 375 miles long. Westward across Libya came Rommel's decimated army and Montgomery's triumphant command, while both sides accumulated larger and larger forces in Tunisia. The French returned to the war as active belligerents. Over these complex coalitions were a unified headquarters and effective chain of command under General Eisenhower and a far less unified and effective Axis command whose principal officer was Field Marshal Kesselring of the German Air Force.

The U. S. Army had one large corps in Tunisia. Its experience is shown in context, with the other military services of the United States and those of the British and French (and of the enemy) each given its place in the narrative. Tunisia was the scene of that process which changes troops and commanders from a condition of partial readiness for what they had to do to win into fully seasoned and competent officers and enlisted men.

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Continuation of THE CAVALRY JOURNAL

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LETTERS TO THE EDITOR

On Armor in the Guard

Dear Sir:

The very fine special presentation on Armor in the National Guard in the September-October issue of *ARMOR* magazine was read by me with a great deal of interest and I expect this will be true of all your readers.

By acquainting your professional readership with such a detailed discussion, you have rendered a service not only to the readers but to the Army National Guard.

My heartiest congratulations and my appreciation.

MAJ. GEN. EDGAR C. ERICKSON
Chief, National Guard Bureau
Washington 25, D. C.

Utilization of Combat Commands

Dear Sir:

Your editorial on page seven of the September-October issue of *ARMOR* indicates that some commanders are concerned about the training of their combat command staffs in Armor type operations.

This problem should be no different in Armor than it is in Infantry as long as the commander will give his combat commands some troops and a mission, whether it be a training mission or a movement mission or both.

Habitually our training is under major command supervision and our organization during the armory and field training periods is by major command.

The 50th Armored Division has always moved all impedimenta and as many of its personnel as possible by organic transportation. This year one combat command was completely motorized with borrowed non-divisional vehicles and one battalion was airlifted by the New Jersey Air National Guard.

The use of mission type division orders has been habitual, thereby requiring detailed planning and execution by combat command commanders and staffs. An example of such in a movement order follows:

A typical task organization:

CCA

Hq & Hq Co CCA
114th Armored Infantry Battalion
216th Armored Infantry Battalion
114th Tank Battalion
228th Armored Field Artillery Battalion
Company A 50th Ordnance Battalion
Detachment 50th Military Police Company

A typical division order:

CCA—Issue necessary instructions for convoy assembly at MT HOLLY, NJ PM 15 Aug; Movement via West route to NEDROW, NY 16 Aug; Movement to CAMP DRUM, NY 17 Aug.

Issue necessary instructions for rail movement on trains Nr NJ-9 and NJ-10.

The above contents of paragraph 3

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Manuscripts: All content of Armor is contributed without pay by those interested in furthering the professional qualification of members of the Armed Services. All manuscripts should be addressed to the Editorial Office, 1757 K Street, N.W., Washington 6, D. C.

Change of Address: All changes of address should be sent to the Editorial Office in time to arrive at least weeks in advance of publication date of each issue, which is the 25th day of the even month of the year: *i.e.*, Dec. 25 for Jan-Feb issue, Feb 25 for the Mar-Apr issue, etc.

Rates: See bottom of contents page.

of the division operations order together with the essential logistical instructions contained in paragraph 4 of the same order, constituted the only formal orders issued by my headquarters to the commanding officer of CCA for this movement of over 400 miles through three States.

The details of planning and execution were by the commander and staff of CCA and without hesitation I would venture to say that due to the invaluable training such moves have provided, I could issue such simple orders orally or otherwise to CCA or any command of this division and expect the move to be executed properly.

Commanders who do not take advantage of the availability of combat command headquarters are missing a bet.

MAJOR GENERAL EDW. O. WOLF
Commanding General
50th Armored Division, NJNG
East Orange, New Jersey

In Search of a Handbook on the Italian Forces

Dear Sir:

I am presently doing research on the Italian Military Forces and their various military operations during World War II. I desire to include operations in Ethiopia and Spain.

Would you please assist me in locating authoritative information on this subject? If any member or *ARMOR* reader has information on this subject I would be glad to hear from him. It is one of my aims to present a complete authoritative account of this too little known subject concerning the Italian participation during the War. It is my desire to clear up some of the misunderstanding and controversy currently existing among civilians as well as military men. The controversy is particularly prevalent in the area of Italy's participation by both ground and air forces while they were fighting alongside of the Axis powers.

At one time there existed a handbook entitled "Handbook on the Italian Military Forces, TM 30-240." Its highest classification was restricted but I understand it has been since downgraded. If any member or reader has a copy of this particular text I would be willing to purchase it or make a swap, whichever is most desirable. By the title alone it is easy to see what tremendous value it would be to me in my research. It undoubtedly would be worth more to me than anybody else who is not studying this little known facet of the War. I assure you I would be most appreciative if I could possibly locate a copy.

JAMES W. GRAHAM, JR.
5700 Chillum Heights Drive
Hyattsville, Maryland

● *If anybody is willing to help Mr. Graham in his worthy project please contact him at the address shown above or write this office.* ED.

An Important Member of the Baghdad Pact

Dear Sir:

In my article, "The Armored Corps of the Pakistan Army," which appeared in the September-October issue of *ARMOR*, Great Britain was unintentionally omitted as a member of the Baghdad Pact. May I take this opportunity to state that Britain is a most valuable component of that organization and that the only reason for presenting the countries as given was geographical.

MAJOR HOWARD C. REESE
Embassy of Pakistan
Washington, D. C.



THE COVER

We are grateful to the LeTourneau-Westinghouse Company for supplying the artwork for the cover showing its concept of GOERs. The cover is a portion of the center spread on pages 32 and 33. The 13 GOERSs in the center spread portray their concept of different operational situations. The 13 GOERs have an aggregate payload of almost 200 tons which constitute a significant portion of the daily logistical requirements of an Armored Division.

On NCO Academies

Dear Sir:

I am writing to ask for the correct address of Major Elam W. Wright, Jr., Infantry, Author of "Noncommissioned Officer Academies" which appeared in your September-October 19. 7 issue.

The Delaware National Guard intends to start a Noncommissioned Officer Academy during the month of February 1958 and I, as Commandant, feel sure Major Wright could give me some valuable suggestions.

I will appreciate any information you can give me to facilitate my contacting Major Wright.

CAPTAIN FRANK L. MATHEWSON, JR.
The Adjutant General's Office
Wilmington, Delaware

● *Due to the fact that the 2d Armored Division is Gyroscoping it might be difficult to contact Major Wright at this time. However, I suggest that you write to him at this address: 2d Armored Division NCO Academy, APO 34, N. Y., N. Y. If your letter does not reach him come back at us and we will try again. Any time any member or reader desires to contact one of our contributors, please contact us and we will help wherever possible. For it is one of our aims and purposes to exchange information.* ED.

Any Donations in the Preservation of History?

Dear Sir:

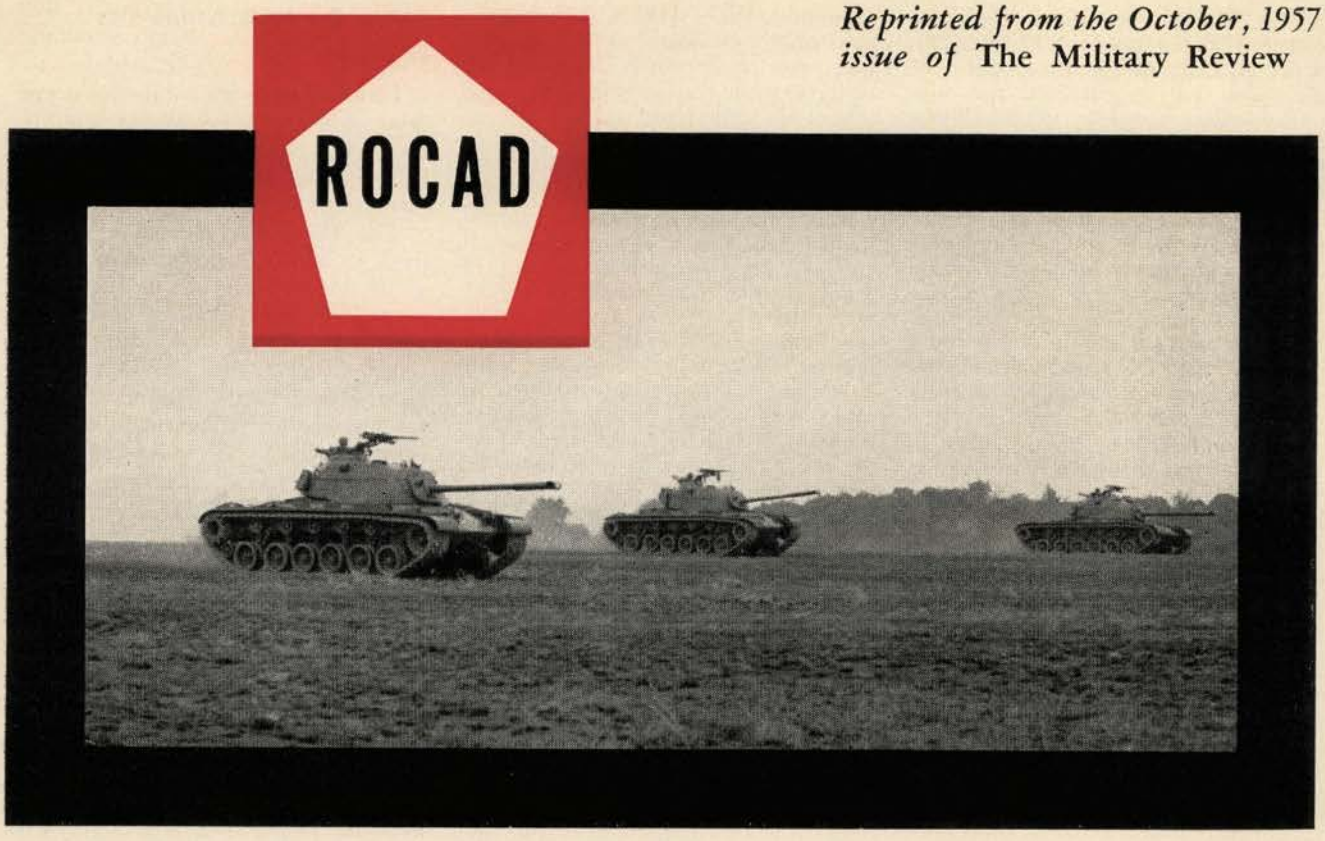
Plans have been in order since the latter part of July for an historical Post Museum here at Fort Sheridan, under the direction of Colonel John W. Hammond, Post Commander. Many items relating to the picturesque past of the post have been collected and renovated through donations with the express purpose of obtaining showpieces for the museum.

With the hope of opening the museum in the near future, this is a plea for anyone with relics representing the 1880 period of history, or relating to General Sheridan's military career to contact Mr. Richard E. Puckett, Special Services Museum Director at Fort Sheridan. Such objects as: Uniforms, books, pictures, weapons, maps or anything depicting the past history of the post are being sought.

As soon as the museum is complete it will be open to the public for tours. The museum will be located in the Indian Room of the Fort Sheridan Tower.

RICHARD E. PUCKETT
Fort Sheridan, Illinois

Reprinted from the October, 1957 issue of The Military Review



INTRODUCTION TO THE NEW ARMORED DIVISION

By LIEUTENANT COLONEL DUANE S. CASON

Introduction

THE significance of the U. S. Army as a vital instrument of national security and a decisive element of the total military power of the Nation is reemphasized by the continuing matériel and political developments of the current era. Discerning recognition is again being given to the roles that can be performed only by land military forces. Understanding of the fundamental nature of these developments by the officers and men of the Army is essential. With this understanding there must be a constant alertness to the impact of these developments on the application of the unique combat power of the Army. To meet the foreseeable requirements of future ground combat that stem from these developments, the U. S. Army has reexamined its major battle formations to ensure that its organizations are modern and effective.

The rapid evolution of the tools of war has caused revolutionary changes in the concepts of ground warfare, Atomic weapons in quantity, potential improvement in target acquisition, and missiles of vastly increased range present new dimensions of firepower. Greatly improved means of battlefield and strategic mobility and communications contribute to these dynamic changes and permit new considerations of time and space. From this revolution of ideas and weapons there has emerged a new conception of mobile ground combat to be conducted at a tempo and on a scale never before obtainable. Within this concept, a modernized and improved armored division provides the most powerful mobile force of combined arms yet devised to dominate a dispersed and fluid battle area. By its tremendous volume of firepower, crushing shock action, wide-ranging armor protected mobility, extensive and flexible signal communication, and responsiveness to the exigencies of battle, this new armored division presents a decisive ground weapon of opportunity and exploitation.

The concept of mobile armored operations and divisional organization discussed herein represents the current thought of U. S. Continental

Army Command and the U. S. Army Command and General Staff College on the conduct of an atomic war of movement, with due consideration to the evaluated experience of history and field tests. The organization and concepts stated, taken in conjunction with the Army's overall organization and strategic concepts for its employment, will provide the Nation with appropriate type ground forces which can effectively support its national security objectives and commitments.

As explained in the Army's view of a sound national military program, existing threats to the security of the United States may erupt into conflict taking a wide variety of forms. The U. S. Army must be so composed, trained and deployed as not only to deter aggression in all its forms, but also to cope with the entire range of possible military actions required in support of the national policy.

The armored division described in this article is the major specialized combat force of self-contained, completely mobile combined arms and services which can be stationed worldwide, or readily deployed to those theaters of operations where its exceptional capabilities can be realized. While this division can be readily adapted to a wide spectrum of operational environments, it attains its peak effectiveness when employed in those operations requiring either the threat or direct application of great destructive violence and disruptive power.

Combat, Fire Support and Combat Support Organizations

To those familiar with the 17R division organization, a superficial examination of the ROCAD organizational chart in *Figure 1* may lead to the erroneous conclusion that little change has occurred in the new division. Such a conclusion is valid only with respect to the number of major control headquarters and combat battalions. In most instances, greatly improved capabilities are afforded by changes and new equipment within battalion or company size units. The sum of these changes has provided a more efficacious division command and control system, greater flexibility, combat power and range of operations than heretofore available.

As indicated in *Figure 1*, certain completely new units have been provided in the ROCAD division, in addition to those existing units which have undergone significant reorganization.

The Signal Battalion organization provided replaces the former Armored Signal Company. Composed of a Headquarters, Headquarters and Service Company, a Combat Operations Company and a Command Operations Company, this battalion provides a more flexible and functional organization, capable of installing and maintaining a division area communications system. This system, to be discussed in more detail subsequently, furnishes the ROCAD division commander with improved means of exercising command and control of the far-flung operations of the armored division on the atomic battlefield.

The Aviation Company consolidates all divisional aircraft and aviation personnel into one unit. Within this company, personnel and aircraft are grouped functionally to furnish division staff aviation representation and service, aviation direct support to major control headquarters, as well as general support and tactical transportation for the division as a whole. This organization provides greater flexibility of Army aviation employment within the division, improved maintenance with better availability of aircraft resulting, together with centralized training and utilization of critical MOS skills. The total number of aircraft in the ROCAD division has been almost doubled.

The Administrative Services Company serves as a carrier unit for those elements of the division administrative special staff which provide personnel and administrative support and normally operate from the division headquarters rear echelon. The company also furnishes replacement support for the division, supplanting the former Replacement Company.

The Field Artillery General Support (Composite) Battalion is a most important addition to the armored division's combat power, since it is here that the division's atomic punch is located. This battalion replaces the Armored Field Artillery Battalion, 155mm Howitzer SP. In addition to its Headquarters and Headquarters Battery and its Service Battery, this battalion consists of two batteries of 155mm howitzers, and a battery each of 8-inch howitzers and 762mm (Honest John) rocket launchers, with all elements being self-propelled. The latter weapon is provided with the dual capability of atomic or nonatomic delivery systems.

In addition to the units replaced by the new organizations outlined, it is apparent that the AAA Automatic Weapons Battalion has been eliminated from the ROCAD armored division. This is in keeping with the principle of pooling at higher echelons those means not habitually required. Thus it is contemplated that AAA battalions of appropriate type will be available at corps level and attached to the armored division as required by the situation. This will be in addition to the air defense afforded the division by the new area air defense systems to be phased into the corps and field army organizations.

Turning next to the reorganization which has been effected in existing units of the division, it is found that new internal organization and up-to-date equipment have been provided which will result in overall improvements in operating efficiency and responsiveness.

As noted in considering the Administrative Services Company, division administrative special staff sections are now part of that unit, rather than Division Headquarters and Headquarters Company. This streamlining of the latter unit thus simplifies the echelonment of the division headquarters in combat and provides for a more manageable organization.

The Headquarters and Headquarters Company, Combat Command, has been strengthened by the provision of a Communication Platoon to handle the increased communication requirement of the combat command and provide additional means. A Scout Section is also provided which can furnish valuable assistance in reconnoitering routes and new locations for the displacement of the command post, as well as providing improved local security for the headquarters.

Internal changes in both tank and armored infantry battalions follow a

LIEUTENANT COLONEL DUANE S. CASON, Armor, was an enlisted man prior to the War. Commissioned in the Regular Army in 1942, he served in the China Theater during the War. Subsequently he attended the Armor and Navy General Line Schools. Next he had tour in Europe with Logistics Division, EUCOM. Returning Stateside, he was assigned to Camp Irwin and later attended C&GSC, Fort Leavenworth, remaining there as an instructor. He is now attending the Air War College, Maxwell Air Force Base, Alabama.

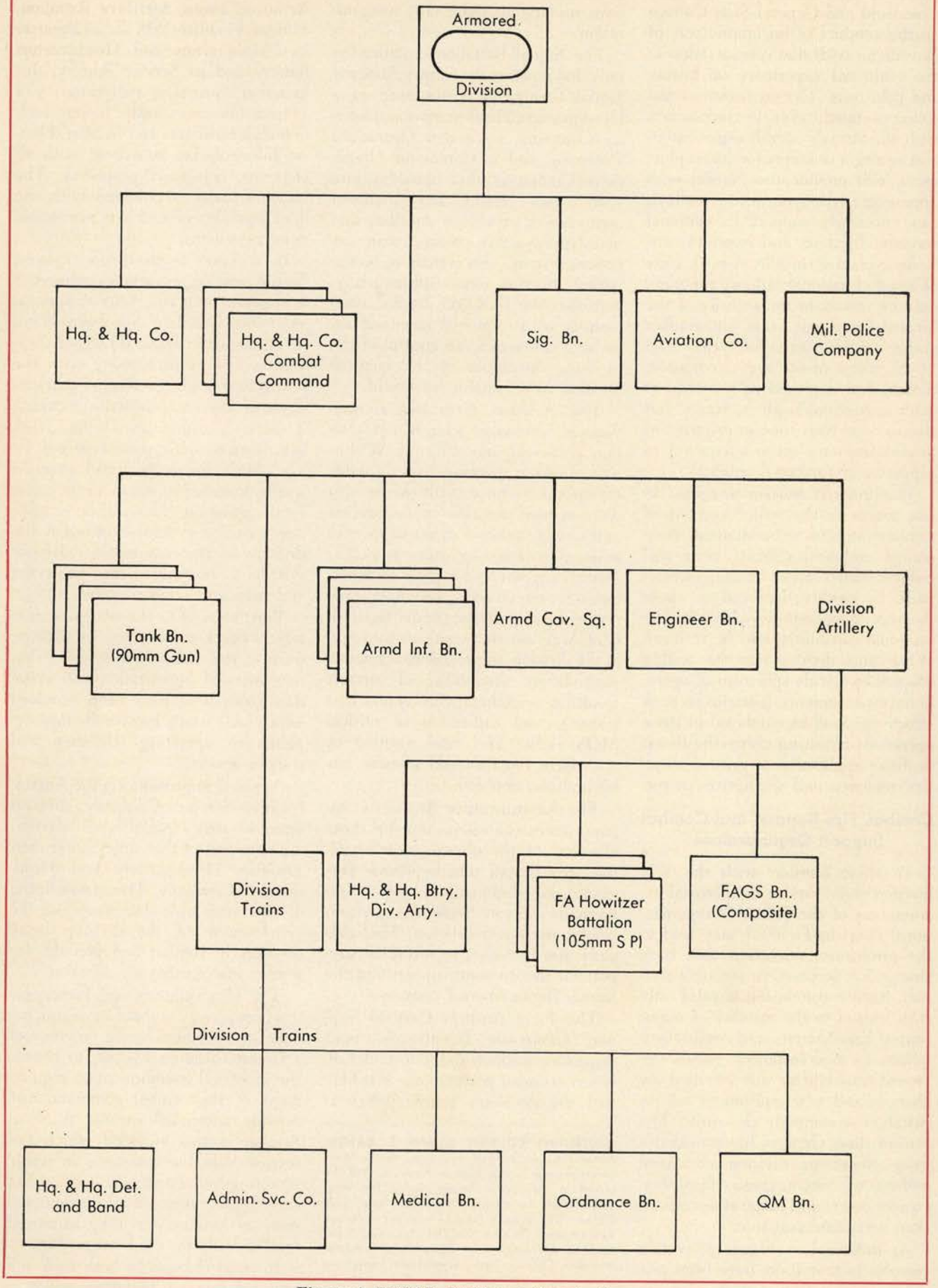


Figure 1. ROCAD Divisional Organization.

similar pattern with respect to those type units. The former Battalion Reconnaissance Platoon has been replaced by a Battalion Scout Platoon, mounted entirely in ¼-ton trucks, equipped with vehicle-mounted machine guns and radios. The elimination of the light tank in the former reconnaissance unit will simplify the overall maintenance requirements of the battalion, while the Scout Platoon will provide a highly mobile element to assist the battalion commander in the movement of the battalion by reconnoitering and locating suitable routes, obstacles and bypasses. Facilities for command and control of both type battalions have been enhanced by the provision of a Battalion Communication Platoon, with improved signal communication means. An improved logistical support capability is provided each type battalion by the substitution of 5-ton cargo trucks for the bulk of the 2½-ton trucks formerly in the Battalion Support Platoon. The rapid handling of bulk fuel and refueling of tracked vehicles is facilitated by the inclusion of 1,200-gallon gasoline tank trucks in each type battalion. A resultant reduction in the quantity of 5-gallon cans formerly required is thus achieved.

Within the tank battalion specifically, the tank strength of the Battalion Headquarters, Headquarters and Service Company has been increased from two to four. This provides additional means of suitable battlefield mobility for the battalion commander, staff, artillery liaison officer and forward air controller operating with the battalion. These headquarters tanks are equipped with appropriate radios for air-ground communications with tactical air force elements and for operation of necessary command and fire request nets. The four tank companies of the battalion continue to be organized on the basis of three tank platoons of 5 tanks each, but four-man crews, rather than five-man, are provided for the latest 90mm gun tanks. A security section is provided in company headquarters, which may be a source of tank crew replacements.

The four rifle companies of the armored infantry battalion have undergone no major changes of equipment or organization. They continue to be composed of three rifle platoons, each consisting of three 12-man squads and a machine gun squad and a three-squad 81mm mortar platoon.

Internal reorganization of the former Reconnaissance Battalion has been extensive. In addition, this unit has regained its traditional designation as a *Squadron*, with subordinate elements redesignated as *Troops*. Within the Headquarters, Headquarters and Service Troop, Armored Cavalry Squadron, a Reconnaissance and Surveillance Platoon provides new and valuable means for the distant detection of enemy troop movements, locations and dispositions under conditions of poor visibility. These include airborne television, infrared and radar surveillance equipment, as well as ground photographic and radar capabilities. The reconnaissance and surveillance element of the squadron is normally supported by aircraft from appropriate elements of the Division Aviation Company. The aerial photographic capability of this latter unit can also augment the reconnaissance and surveillance operations of the Armored Cavalry Squadron as necessary.

Significant changes have been effected in the four armored cavalry troops within the squadron. Integration of light tanks, armored riflemen, scouts and close fire support is now accomplished at the troop, rather than platoon level as before. Each troop is composed of two light tank platoons, an armored infantry platoon, and a scout platoon, to which has been added a section of two heavy mortars, self-propelled. The troop has 12 tanks 76mm gun, for an increase of 20 light tanks in the squadron, or a total of 52. This organization affords the troop commander considerable flexibility in the organization of small combined arms teams for specific missions. The additional light tanks and inclusion of heavy mortars considerably increase the combat capability of the squadron for the execution of its roles of reconnaissance, counterreconnaissance and security operations for the division, as well as enhancing its capabilities for extensive battle area surveillance.

New capabilities have been given the Engineer Battalion. These include a total of 12 tanks 90mm gun with bulldozer attachments, allocated three per engineer company, and an increase in the Bridge Company from two to three bridge platoons. The Bridge Company is now equipped with three units of M4T6 bridge consisting of aluminum superstructure and pneumatic floats. This bridging provides approximately 450 feet of class 50 floating bridge or six 50-ton rafts. Components of this bridge may also be used for short-gap spanning. The battalion also has the added capability for field maintenance of all engineer equipment organic to the armored division. This capability is of particular importance in view of the increased quantities of power generating sets and other engineer matériel now afforded the division.

The major organizational changes in Division Artillery have been previously dealt with in discussion of the Field Artillery Composite Battalion and the deleted AAA AW Battalion. The Howitzer Battalions, 105mm SP, are essentially unchanged except for the availability of 5-ton cargo trucks and gasoline tanker trucks within their service batteries. Headquarters and Headquarters Battery, Division Artillery, has been augmented in signal communication means, and in staff personnel for division fire support coordination operations, necessitated by the increased responsibilities of the Division Artillery Officer in this area. Although the total number of air control teams remains at four, these teams have been redistributed, with only one now remaining in Division Artillery Headquarters, while the other three have been allocated on the basis of one per light artillery battalion. These teams are complete with all radios, vehicles and personnel necessary for tactical air direction operations within the division, except for the forward air controller who must be furnished by the supporting tactical air force.

Armored Division Trains and Service Support Organizations

The armored division trains concept has been carried forward to the ROCAD Division. The division trains commander continues to exercise *tactical* command and control of all units attached to division trains, while their *technical* operations are supervised by the appropriate division special staff officer.

The Division Trains Headquarters and Band have been combined in a single unit to reduce overhead. The

Band has an additional function as a security section. When not engaged in its primary mission of furnishing music, it may be used for providing local security, prisoner of war escorts, supply handlers, litter bearers and messengers. It may also perform route reconnaissance and furnish road guides to new trains areas.

Although frequently located in the division trains area for overall security and movement control, the Administrative Services Company performs its functions directly under division headquarters control, since it not only forms the Division Headquarters Rear Echelon, but also establishes the Division Administrative Center when the division is organized for combat. This latter activity is composed of all unit personnel sections of divisional units, under the supervision of the Adjutant General.

The Medical Battalion has been subjected to major reorganization, and is now composed of a Headquarters and Headquarters Detachment, an Ambulance Company and a Clearing Company. This organization provides four ambulance platoons and four clearing platoons, each of the latter capable of operating a division clearing station with a capacity of 80 patients. Augmentation of the evacuation capability of this battalion can be provided either by use of helicopters from the Division Aviation Company or by field army helicopter ambulance units.

The redesigned Ordnance Battalion provides a more flexible unit for support of all elements of the division. It has a Headquarters and Rear Support Company and three Forward Support Companies. Each Forward Support Company is capable of furnishing ordnance field maintenance support to all units which might be attached to a combat command and approximately one-third of the ordnance equipment of division troops normally operating forward in the division formation. The Headquarters and Rear Support Company, in addition to furnishing command, tactical and administrative supervision and support for the battalion, provides ordnance service support to all elements of the division as required. It also serves as a supply source for the remainder of the battalion and supplements the capabilities of the forward support units. This is accomplished by a cellular augmentation platoon of seven mechanical maintenance sections and four artillery maintenance sections which may be attached to forward support companies in varying combinations, dependent upon the equipment density to be supported.

The basic organization of the Quartermaster Battalion remains essentially unchanged. Increased capabilities have been provided this unit for the critical areas of Class III supply and cargo lift. The Class III Section, Supply Company, is equipped with 18 tractor/trailer gasoline tankers of 5,000 gallon capacity each, as well as five trucks, 1,200 gallon each, of the same type found in the combat units of the division. The number of 5-gallon cans now carried by this section has been reduced to approximately 3,000. With its tanker trucks and cans, this unit can now transport over 111,000 gallons of gasoline. The three truck platoons of the Supply Company continue to be equipped with the 2½-ton cargo truck. However, the truck platoons of the Field Service Company now have a total of 48 5-ton cargo trucks. Both type truck platoons have been provided additional driver personnel. These changes in equipment and personnel have greatly increased the ability of the Quartermaster Battalion to operate on an around-the-clock basis and provide needed increased cargo capacity.

As indicated in the previous discussion, however, mere numbers alone do not tell the entire story, although certain advantages accruing from increased means are self-evident. Equally important is the redistribution of such items as the light tank to provide for better utilization, and the introduction of the latest in weapons systems and target acquisition means, providing capabilities never before available at the division level.

Armored Division Communication System

It has long been axiomatic that the successful employment of the armored division is determined by its ability to *move, shoot* and *communicate.* With this in mind, and in consideration of the extensive frontages and great depth of formations in which the armored division will fight in atomic warfare, an area communication system has been designed for the new division. This system is established and operated by the Signal Battalion. *Figure* 2 depicts schematically how the area communication system might be established in a hypothetical situation.

The forward signal centers shown are established and operated by the Combat Operations Company, generally in the vicinity of combat command headquarters. These signal centers have radio relay and telephone carrier terminal stations tied into the area communication system as well as operating an FM radio/wire integration station to connect mobile FM radios into the system. Similar facilities are established by the Command Operations Company for the division command post, division trains headquarters and the division headquarters rear echelon. This company also installs and operates the necessary facilities to connect the division artillery headquarters into the area communication system. To illustrate the flexibility of this system, assume the Commanding Officer, CCA, had occasion to speak directly with the Commanding Officer, Division Trains. The CO, CCA, would call the FM radio station at the signal center in the vicinity of his command post. At this station his transmission would be routed over the radio relay system to the appropriate signal center in the division trains area, thence to the division trains command post by either telephone or radio.

It is emphasized that the division area communication system is an *additional* system designed to ensure control of operations on the highly dispersed atomic battlefield. All units of the division continue to utilize radios within the unit and other communication means for command and control of their subordinate elements.

Since radio remains the primary means of communication within the armored division, it should be stated that the division normally will establish and operate the following seven radio nets:

1. Division Command Net (Radio-teletype)
2. Division Command Net (FM Voice)
3. Division Intelligence Net (Radio-teletype)
4. Division Logistical Net (Radio-teletype)
5. Division Headquarters Rear

Echelon Net (Radio-teletype)
6. Air Request Net (AM)
7. Division Warning Net (AM)

The radio nets of major subordinate control headquarters are designed to tie into all appropriate division nets and appropriate equipment is provided.

Thus, the division area communication system, the numerous division radio nets and the high density of radio communication equipment afford an overall division communication capability of extensive coverage and great flexibility. As a result, all elements of the armored division are able to rapidly respond to the will of the commander and the rapid developments of the future battlefield.

Roles of the Armored Division

As earlier stated, the Army as a whole must be prepared to cope with the entire range of possible military actions required in support of national policy. With an insight into the organization, equipment and communication aspects of the new armored division, it is appropriate to next consider the nature of the military actions in which the Army might participate, and the roles of the armored division pertinent thereto.

In general, military actions of the future may be categorized as general war, local war and situations short of war.

A general war will involve U. S. and enemy forces in an all-out effort including total mobilization of resources. The military objective of general war is the destruction of the enemy's will to resist. The ultimate national objective of the United States in a general war is victory and a viable peace. A general war may be initiated with an atomic onslaught by the enemy with little or no warning. In a general atomic war, nuclear weapons may be used on an unlimited scale between nations. This condition would be accompanied by immediate ground action in those areas where opposing forces are in proximity. The results of such an exchange may be the ascendancy or dominance by one side, or it may develop into a lesser role of atomic employment or a temporary stalemate. The role of the armored division in a general war will be the conduct of mobile, decisive ground operations aimed at the destruction of the enemy's armed forces

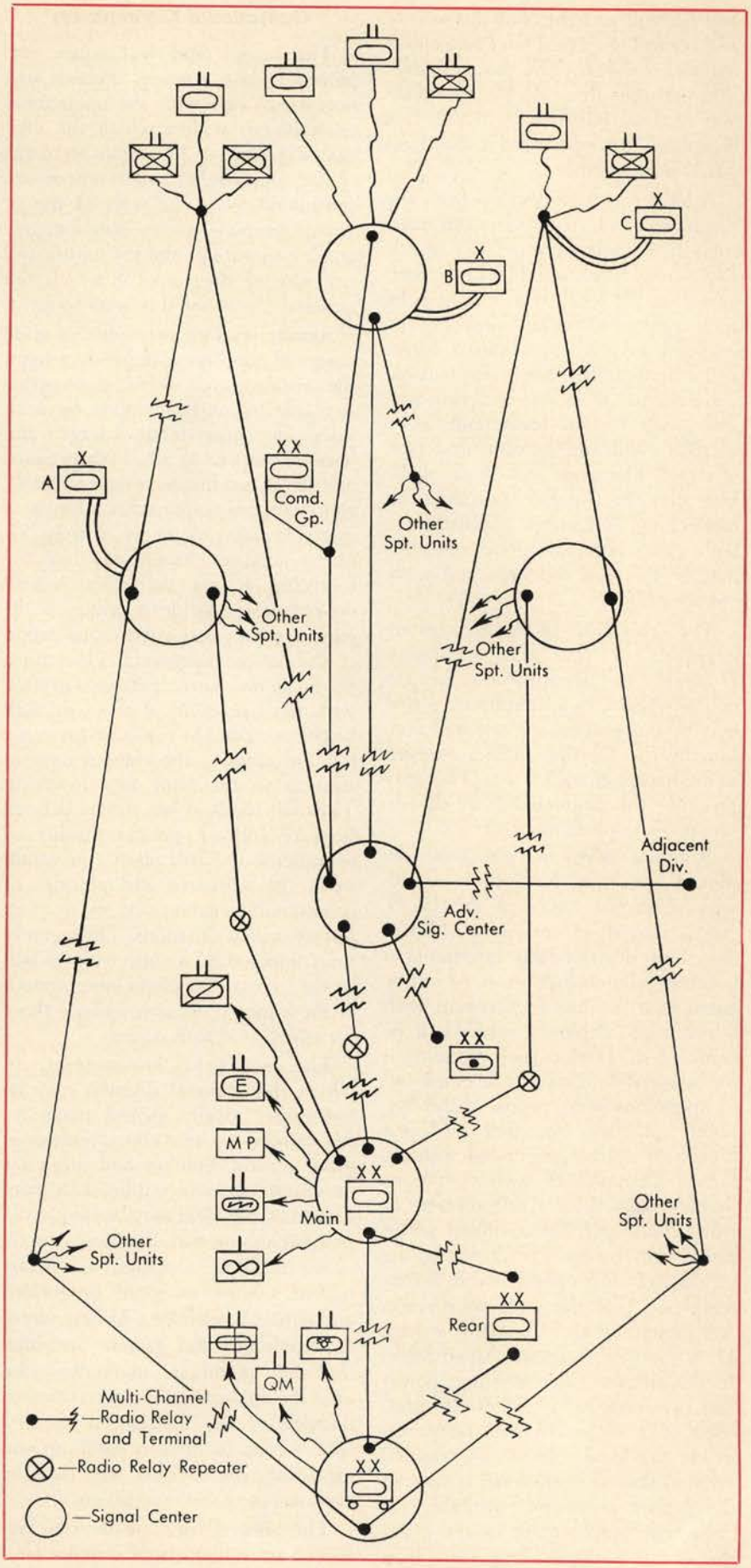


Figure 2. Typical Communication System ROCAD Division.

and his will to fight, and the seizure and control of critical land areas leading to his defeat. The armored division performs this role by the execution of those missions for which it is organized, equipped and trained, as stated subsequently.

A local war may develop from the employment of Army forces to assist friendly nations in repelling aggression as may be required by U. S. commitments. A local war initiated by such aggression might probably be confined to relatively limited forces and a limited area. Such war may involve the use of atomic weapons, possibly with certain restrictions as to weapon yield and location and type of target. The scope and extent of the war may be further restricted by moderating influences applicable to both sides, although these restraints may be removed suddenly and without warning.

The capabilities of the division are adaptable to local war operations. However, they are subject to the particular restrictions and limitations that may be imposed on the armored division by the limiting factors relevant to the nature of such a war. This may preclude the employment of the division with optimum effect.

Armored divisions are now deployed abroad as part of the worldwide deterrent forces of the U. S. Army. Periods of serious world tension and deteriorating international political relationships must be anticipated as a continuing situation with which these deployed forces will be confronted. Under such conditions the armored division may be employed in operations in extension of the National interests, but short of open hostilities against organized military forces. Examples of such operations include show of force, enforcement of truce conditions, international police action and occupation duty. In the conduct of such operations, it is contemplated that the armored division will operate as an element of a large U. S. joint or combined Allied force. In this instance, the mobility, power and psychological effect of the presence of a large armored formation makes the ideal role of the armored division that of operational reserve of the higher command, available for immediate employment in the event the situation degenerates into open hostilities.

Operational Environment

The tactics and techniques employed by the armored division will necessarily vary with the operational environment within which the division is employed. The major elements of the operational environment are considered to be the scale of use of atomic weapons, enemy situation, geographic conditions and the nature and structure of the force of which the armored division will be a component.

Atomic warfare may involve wide ranges of conditions, dependent upon the number and yields of weapons available to, and employed by both sides. The employment of large numbers of weapons of all yields presents one set of conditions; whereas, small-yield weapons employed at infrequent intervals may present an entirely different picture. Accepting that the foregoing is not definitive, it can nevertheless provide a point of departure for a generalized visualization of the atomic battlefield. Operations on the atomic battlefield, as contrasted with the battlefield of the past, will be characterized by fewer troops in the forward areas of the combat zone in relation to the land area involved. This will result in less clearly defined lines of contact, greater fluidity of operations, and will place a premium upon the initiative and abilities of subordinate commanders to react to unforeseeable situations. These conditions imposed by atomic warfare will be the normal battlefield environment of the armored division and are those for which it is well suited.

The geographic environment in which the armored division may be committed ideally should maximize the division's salient characteristics of great ground mobility and minimize its sensitivity to very difficult terrain. However, the ideal may be frequently unattainable in war; therefore, the division must be prepared to operate within a wide range of geographic and climatic conditions. Where physical environmental factors are such that they modify or markedly influence the application of normal tactical doctrine of the division, or require special consideration in planning and execution, the division will then be involved in special operations.

The armored division may be employed as an element of a major land force composed of army groups, armies and corps with fully developed lines of communications. Also probable may be its employment on independent or joint operations of no larger than corps size, or on small combined operations with Allied forces, in which lines of communications are hastily established or incompletely developed. In either case, it may operate in conjunction with infantry, airborne or other armored divisions, either U. S. or Allied, or independently for a period of time dependent upon the degree of logistical and other support provided.

Missions and Employment

The missions assigned to the armored division are those which capitalize upon its outstanding characteristics of ground mobility, great firepower, armor protection and capabilities for violently destructive and disruptive action. It is particularly well suited to execute missions of the following types:

1. Offensive operations designed to achieve deep penetration or wide envelopment to seize decisive objectives, destroy hostile forces and disrupt the enemy rear areas.
2. Exploitation of the successes of other units and of the effects of atomic fires, as a decisive element of a larger force.
3. Pursuit of enemy forces.
4. Covering force for a higher command conducting offensive, defensive, or retrograde operations.
5. Striking force of a higher command on the defense, or in the conduct of a mobile defense.
6. In conjunction with any of the foregoing, the destruction of enemy armored formations.
7. Special operations, such as offensive action against enemy airborne or guerrilla forces, and operations in conjunction with airborne or amphibious operations, raids and seizure of special intelligence targets.
8. Operational reserve of the field army or higher command.

Successful execution of the missions of the armored division is characterized by thorough rapid estimates and detailed planning, followed by violent execution. Once plans are put into effect the violence and impetus

with which the division's operations are prosecuted generally determine the degree of success achieved. The unique shock effect of armored action cannot be achieved without violent execution. Planning requires careful consideration of road nets, terrain trafficability, timing and supply and maintenance requirements. It involves careful coordination and intimate teamwork with all arms and services both within and in support of the division. Carefully developed signal communication plans and effective liaison are essential.

When committed to action, the armored division thrusts rapidly and decisively for its assigned objectives. This is accomplished by a combination of fast-moving maneuver and the rapid concentration of the division's firepower and physical mass against those areas of the enemy's greatest vulnerability with such relative speed and momentum as to deny the enemy time to effectively react. When necessary to overcome enemy resistance or meet unforeseeable developments, the division exploits its capability to concentrate its combat power in *time* rather than in *space* to deal with the situation.

The combination of speed, firepower and mass of matériel generates great momentum in armored offensive action, usually resulting in the overrunning of enemy forces or positions before forward movement can be slowed or halted. Unnecessary restriction of this momentum by restraining control lines, limited objectives or other measures that require high level decisions in order to continue the advance, will dissipate momentum—often faster than does the enemy. Loss of momentum may provide the enemy time to react and reorganize his defenses. It may further result in the inadvertent concentration of the division or major elements into identifiable atomic targets.

Concept of Organization for Combat

The salient armored characteristic of crushing shock action—resulting from the combination of mobility, maneuverability and concentrated armored and atomic firepower—is brought to its highest state of effectiveness by the habitual employment of the combat command task force concept of organization for combat within the division. The three combat command headquarters are the nuclei around which the major task groupings are organized for the execution of the armored division's combat operations. Each combat command is formed on a task force basis for a particular mission by the attachment of tank and armored infantry battalions and the provision of artillery, engineer, aviation, signal and service support. Each element of the combat command, whether attached or in support, contributes its specific characteristics and capabilities to complement the combined effort of the whole. Additional means for reconnaissance and security may be provided a combat command by attachment of elements of the armored cavalry squadron. Normally, however, the bulk of this unit will be retained under division control, as well as the atomic delivery units, due to the added flexibility and influence these means provide the division commander for the overall operation.

Within each combat command, the task force concept is further employed by the formation of battalion task forces. This is done by the cross-attachment of tank and armored infantry companies between attached battalions, or the utilization of "pure" tank or armored infantry battalions. The basis for determination of the proper ratio of tanks and infantry in the battalion task forces is based on the combat command commander's analysis of his mission, terrain, and enemy situation confronting him, and the troops made available to him. Other combat, combat support and service support units which may be attached to the combat command, can be further attached to battalion task forces where necessary for specific missions. Usually, it will be desirable to retain attached supporting elements under combat command control in support of battalion task forces in order to obtain maximum flexibility and support of the mission as a whole.

The attributes of organizational flexibility afforded the armored division by its tables of organization are meaningless, unless exploited with imagination and daring by the commander. Because of terrain, weather, trafficability and the enemy, situations continually change and cannot be predicted far into the future. A fixed organization for combat for all situations is a dangerous approach to the conduct of armored division operations. Its inherent flexibility, coupled with mobility and extensive signal communication, enables the armored division and its subordinate commands to react to enemy action with the violent application of combat power. This can be done by the rapid maneuver of combat units and fires; by swiftly changing the direction of attack to bypass or outflank and surprise the enemy force; and by the ready responsiveness of the division to the will of the commander in the fluid situations normal to the atomic battlefield.

Conclusions

Concurrent with the modernization and reorganization of the battle-proven armored division to its new and powerful state, there has been an intensive program for the development of revised and new doctrine for its employment. Thus, the commanders of major combined arms forces are provided with a sound basis upon which to initiate the solution of the problems of mobile atomic ground warfare.

As new analyses of developments continue, the actual battlefield conditions of the atomic era are becoming more apparent. From these analyses comes reaffirmation of the underlying truth that man himself remains the fundamental instrument of war, regardless of the weapons of war, or the nature of the battlefield upon which he may apply them. More than ever, the reward of "mission accomplished" will fall to the resourceful, steadfast American soldier with a sound knowledge of the tools of his trade and the will, determination, courage, skill and offensive spirit to use them well. To weld these human qualities into an integrated force of spirit and modern weapons systems under the conditions of today and tomorrow is the great challenge confronting the leadership of the Army. Within the armored division, the utmost of inspired, intelligent leadership from tank commander to division commander will be the vital force which forges and binds together the traditional qualities of the mounted American soldier and the inherent characteristics of armored units. From this integration will develop the foundation of successful armored combat.

Megatons, Missiles and Men

The headlines in the papers during the past several weeks have been frightening to the American public, to say the least. We read and hear of many incidents which have impaired our missile program: First, we hear of budget limitations; next, that inter-service rivalries have impeded the arrival to the production stage of certain type missiles, and the culminating piece of information which has startled the American public; namely, that Russia has launched a satellite. This information, if allowed to run rampant, could be the proverbial "straw that broke the camel's back."

In accomplishing this feat, the Russians have let the world know that they have the technical "know-how" to harness the required energy and force to thrust an object into outer space. To accomplish this feat the USSR has undoubtedly made a scientific "first-down" among the other nations of the world. The effect of being the first nation to launch a satellite gives them a decided edge in the missile race, if we are truly in a race for supremacy. It is also true that we have lost some stature internationally by allowing Russia to beat us to the punch.

According to reports in various news sources, the launching of a satellite is only a short step away from the Intercontinental Ballistic Missile. And perhaps the American public has a right to become panicked if the ICBM would become solely a possession of the Russians.

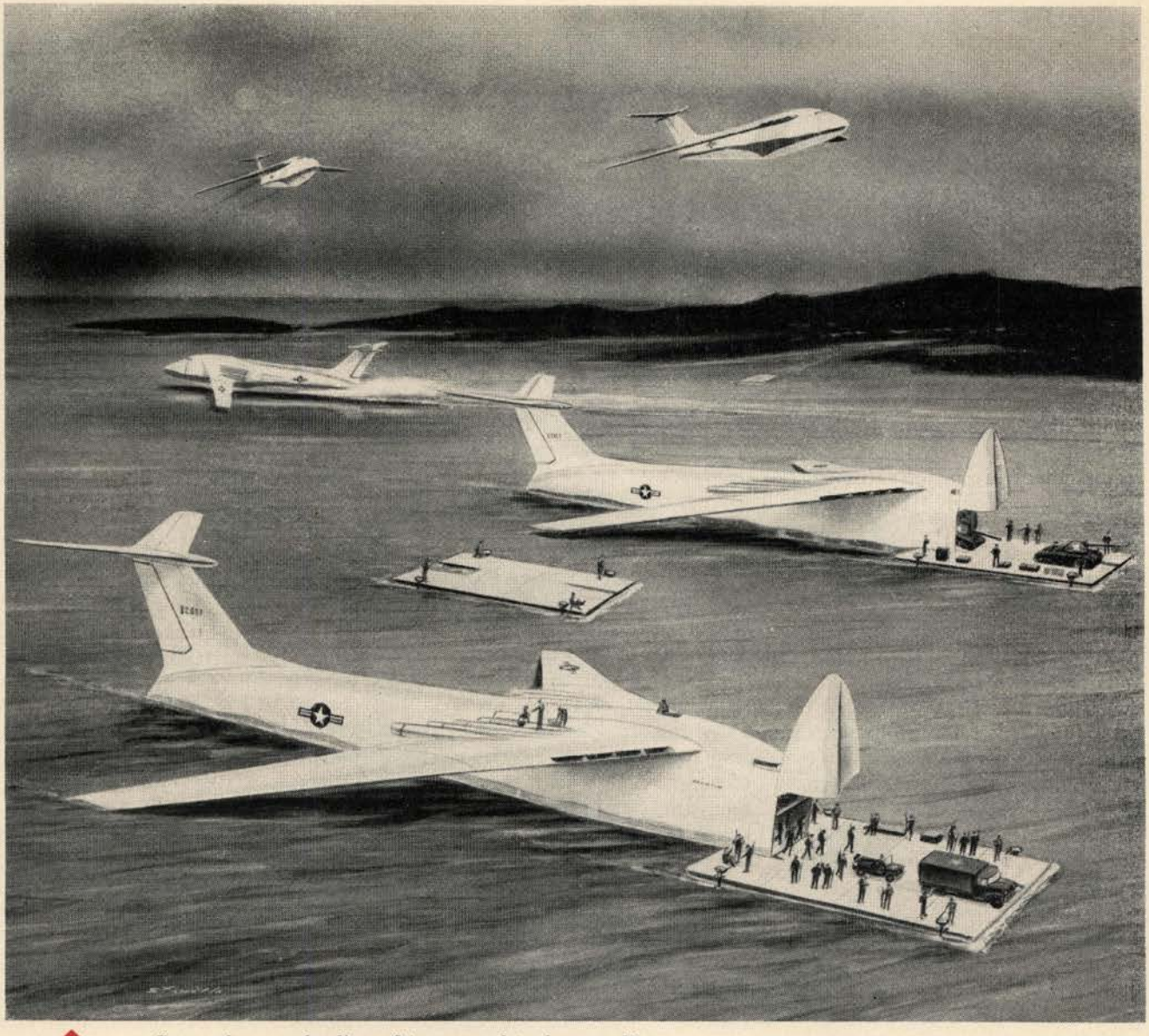
Yes, the immediate results seem startling and it will take a long time to recoup our stature on the international front.

But this is only a first-down. The game isn't over yet. We should not push the panic button. Nor can we afford complacency. Either of these extremes can spell disaster. It is time, however, for a reappraisal of our capabilities compared to those of our potential enemy. We should take complete stock, reset our aims and approach the task confronting us with increased vigor.

One thing overlooked during critical periods is what effect such weapons have on the whole defense picture. It is true that such weapons are devastating. But they are only a part of the picture. It takes a combination of strategic and tactical weapons properly employed to assist the ground forces in their mission. These devastating weapons undoubtedly can cause greater destruction per square mile than ever before dreamed of. However, although these weapons can destroy people and property, they cannot move in and take advantage of the situation. It takes men to fight for the ground and hold it after it has been conquered. It also takes men to man and control these weapons. Regardless of the potency, this idea will prevail for some time to come. Possession is still nine-tenths of the law and it takes human muscle to claim the real estate and people.

We have explored new realms of science and have come up with new weapons and new and terrifying explosives. The extent of the damage that can be done with the latest discoveries is not even appreciated at this time. Instead of running scared or being too complacent, we should now accelerate our weapon program so that we remain superior or regain what yardage we have recently lost. This grotesque weapon, the ICBM, does not frighten the Army. In fact the Army has anticipated the weapon and is already at work on the anti-ballistic missile, the Nike Zeus. This program has reached the hardware stage of development. We, in the Army, must also train to combat these weapons and devise our own methods of exploitation when employing these weapons ourselves in the accomplishment of our missions.

Summing up: An article appearing in the October issue of *Infantry,* the quarterly publication of The U. S. Army Infantry School, is entitled "We Still May Walk." Let us carry that one step further and say: We must still train men to fight on the ground.



Scene shows unloading of troops and tanks on self-propelled lightering rafts, foreground, and the arrival and departure of seaplanes in the background.

ARMOR AND THE AIR AGE

By CAPTAIN JOHN C. BURNEY, JR.

When we think of using aircraft to support Armor, we should not think of today's matériel, but of tomorrow's.

Photograph
The Martin Company

HOW often have you read that Armor, as organized and equipped today, is ideally suited for atomic warfare? To me, such statements smack of smugness and complacency. Can it really be possible that, in view of the emergence of radical new tools of warfare such as atomic weapons, helicopters, and huge cargo aircraft, Armor's past organization and techniques are still suitable for the battlefield of tomorrow? To answer this question, let us first examine three widely recognized requirements of future atomic warfare to determine whether Armor fulfills these requirements.

Strategic mobility is an obvious requirement when facing a numerically superior enemy. In the words of Lieutenant General C. D. Eddleman, Deputy Chief of Staff for Military Operations, at the Second Annual Meeting of the Association of the U. S. Army: "If we are to be prepared to engage in varied forms of warfare anywhere in the world, reduce our vulnerability to enemy action, and exploit the effects of our improved firepower, we must attain vastly improved strategic and tactical mobility. . . . We require strategic air and surface lift from the Air Force and Navy, respectively, which is geared to the requirements and tempo of future war."

The need for superior *tactical mobility* to permit forces to concentrate quickly for an attack and disperse rapidly thereafter is apparent. In this day of atomic weapons and electronic, photographic and infrared detection devices, we will never again be permitted the luxury of congregating at such bottlenecks as bridges and defiles. We will have to be able to cross rivers and ridge lines on broad fronts.

The quickened pace and increased dispersion of an atomic war demand simplified, faster and more flexible logistical support. Lengthy, vulnerable land lines of communications would shackle exploiting Armor. Accordingly, combat forces must be capable of being supported largely by *air lines of communications.*

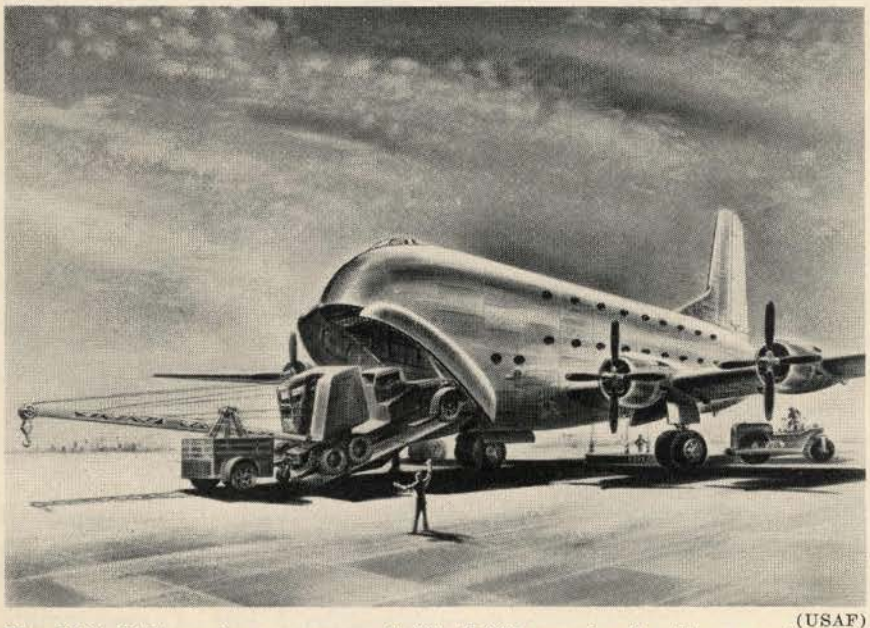
How well does Armor meet these requirements of future warfare? In some respects Armor is very well suited. Tanks, with their good cross-country mobility and armor protection, are "hard" atomic targets. But suppose that we had to move our Armor rapidly between theaters of operations. With our present heavy equipment and troop carrier aircraft we would have to rely on slow-moving surface transport. Our strategic mobility is inadequate for modern requirements. As for tactical movements, the tank's inability to cross rivers and steep ridge lines will continue to channelize the movement of armored units at bridges and defiles. Armor's freedom of maneuver is dangerously restricted by the heavy tonnages of fuel and ammunition required to support Armor and by the surface transport now used to move these supplies. Thus, it appears that armored units possess several deficiencies that would restrict their effectiveness in a major atomic war.

These deficiencies can be erased by effective use of transport aircraft. As will be shown in following paragraphs, aircraft of the future will be able to provide Armor with strategic movement, tactical mobility, and air resupply. And by "Armor" I mean capable armored units designed for sustained combat, not light, special purpose units. Large troop carriers will be able to quickly move complete armored organizations to overseas theaters. It will even be possible to provide *tactical* mobility by air. Armor could be placed into operational areas by air transport and could be lifted over obstacles by huge "flying crane" helicopters. Armor need not be burdened by cumbersome land lines of communications, for aerial resupply of armored units will be feasible. The airplane will increase Armor's effectiveness immeasurably.

When one suggests the air movement of tanks, many immediately reject the idea unconditionally. This reaction is a result of the *past* incompatibility between Armor's equipment and the capabilities of transport aircraft. Those who oppose Armor's use of the transport airplane are living in the past and are failing to anticipate what *will* be possible in the future. Words such as "air-transportable" and "airborne" are offensive to them because they fear that the growing requirement for air-transportable units will result in tanks incapable of sustained combat.

These skeptics would be of more help to Armor if, instead of opposing airborne enthusiasts, they made an unbiased effort to make the best possible use of the airplane. If they examine trends in transport aircraft and tank development, they will find that the weight of armored equipment and the capabilities of cargo aircraft are at last becoming compatible.

CAPTAIN JOHN C. BURNEY, JR., Armor, graduated from USMA in 1946. He served in US CONARC Board No. 1 at Fort Bragg, North Carolina working on airlift problems. He went to the Far East and worked with the G3 Section, Fifth Air Force. Returning Stateside he was assigned as an instructor at the U. S. Army Armor School. He is now a student at C&GSC, Fort Leavenworth.



(USAF)

The C124 Globemaster can carry 40,000-48,000 pounds of military equipment.

This compatibility is clearly shown in *Figure 1*. The solid lines represent the weights of our standard medium gun tanks, light gun tanks and armored infantry vehicles at the time that each vehicle was standardized; the dotted line the maximum load capable of being carried by our largest troop carrier airplane. With equipment weights dropping and aircraft capabilities soaring, the lines have already crossed. Their rapid divergence illustrates the increasing feasibility of transporting Armor capable of sustained combat by air.

The trend towards lighter armored equipment is already clearly established. As General Eddleman indicated at the last annual meeting of the Army Association, our future goal is the development of a medium gun tank weighing approximately 30 tons. Also, a new light tank under development (the T92) weighs only 18 tons. As for armored personnel carriers, the 38,000-pound M59 may soon be replaced by the 16,000-pound T113. With such advancements imminent as the economical processing of titanium, the development of even lighter combat vehicles with greatly reduced fuel requirements is inevitable.

Now let us examine the increasing capabilities of troop carrier airplanes and airborne equipment—capabilities that will permit the air movement and air supply of future armored units.

First, let us consider airplanes suitable for the strategic or long range movement of army units. We're all familiar with the Douglas C124 "Globemaster," so it will serve as a yardstick to measure other heavy transports now under development. The C124 will carry 40,000-48,000 pounds (depending on the model) for 1,500 nautical miles on a typical combat support mission. The C124 is out of production and will be replaced by Douglas's C133. The C133 will carry 50,000 pounds across the Atlantic nonstop. As with the other developmental aircraft which we will mention, further details of this airplane's characteristics and capabilities are still classified. Two prototypes of the C133 are now undergoing Air Force tests, and a contract has already been awarded for 29 of these huge four-engine aircraft. In the more distant future is the C132, also being developed by the Douglas Aircraft Company. The C132 is even larger than the C133. It will carry a 100,000-pound load across the Atlantic or much heavier loads for shorter distances. Two C132s are under construction. (Unfortunately, the Air Force recently cancelled the C132 contract, and the future of this promising airplane is in doubt.) Certainly long range movement of Armor by air will soon be practical and will provide Armor the strategic mobility it now lacks.

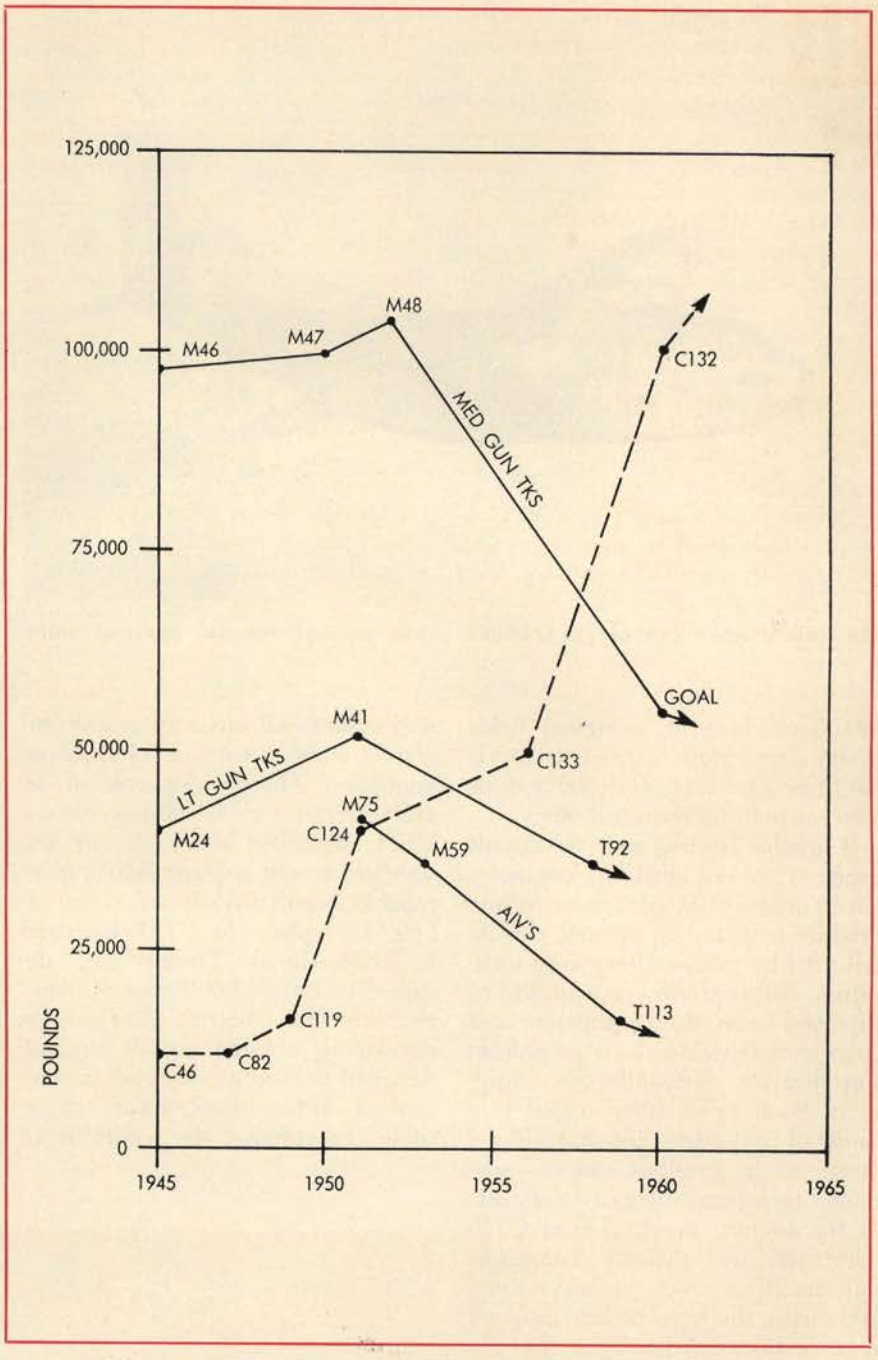


Figure 1. The increasing capabilities of troop carrier aircraft.

But what of tactical mobility? How will future armor units be able to use the airplane to move directly into an operational area where no airfields exist? One of the most promising techniques is to use airborne engineers to hastily clear landing areas for large airplanes carrying armored units. Light engineer equipment, that is available now, could be delivered into the airhead by assault airplanes —airplanes that can land and take off using rough, unprepared fields. One such airplane is already in use by troop carrier units. The Fairchild C123 "Packet" can land with a 16,-



(Fairchild Aircraft)
The C123 Packet can carry a 16,000 pound payload for 680 nautical miles.

000-pound load in ploughed fields which even jeeps cannot cross. It can carry a payload of 16,000 pounds for a range of 680 nautical miles.

If suitable landing areas for assault airplanes are not available, engineers can be delivered by parachute. While airborne engineer equipment can be delivered by today's heavy drop techniques, the impending availability of improved heavy drop equipment and cargo aircraft will make it possible to drop heavier, more effective equipment. Soon to be standardized is a family of heavy drop kits that will decrease weight penalties, shorten preparation times, and increase reliability. As for aircraft, the Lockheed C130 "Hercules" will increase immeasurably the effectiveness of heavy drop. In the past, the heaviest load dropped by airborne units has been the 12,000-pound 2½-ton truck. A 27,000-pound load has already been dropped from the C130. The "Hercules" is now in production and is replacing the C119 "Flying Boxcar."

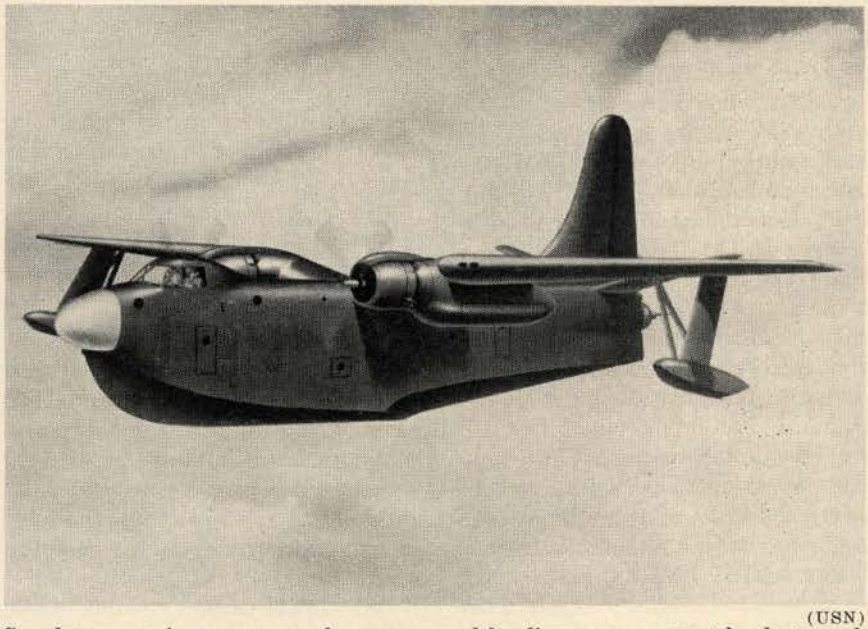
The C130 could be used to land with armored units on the hasty strips prepared by the engineers. This aircraft will carry a maximum payload of 37,800 pounds for 1,500 nautical miles, and thus it could deliver units equipped with T92 tanks or lightly armored special purpose armored equipment. Much heavier loads could be delivered by the C133.

In the more distant future, it should be possible to place Armor directly into operational areas by assault airplanes without the use of airborne engineers. The development of assault aircraft is in its infancy, for the C123 (described above) is our first standard assault airplane. Much more capable assault aircraft are in the offing. To replace the C123, Fairchild is developing its "Turboboxcar," designed to carry 32,000 pounds. Also, the Stroukoff Aircraft Company is developing a C134 assault airplane designed to land and take off on any type of surface—land, water, ice or snow. To enhance the feasibility of moving Armor by assault aircraft, technological achievements will certainly permit lighter and lighter vehicles as the years go by.

There is another air landing technique that warrants consideration for the transport of Armor—the use of water based aircraft. Amphibious airplanes require no prepared runways and their landing areas cannot be destroyed by enemy atomics. Even a hasty geographical survey shows that adequate landing areas abound throughout all parts of the globe. Armored units, with their speed and mobility, could quickly reach their objectives from these areas. Furthermore, amphibians are especially well suited for the delivery of heavy payloads. Martin's SEA MASTER can carry 15 tons, and studies indicate that much larger amphibious aircraft are feasible and more economical than large ground based transports.

Still another type of aircraft appears appropriate for Armor's use—the "Flying Crane"-type helicopter. These helicopters are designed to carry very heavy loads for short distances, and would be invaluable in lifting armored equipment over terrain barriers and in moving and emplacing bridging. Hughes' XH17, a developmental aircraft designed only to test the flying crane principle, has carried loads weighing as much as 10 tons.

Not only will aircraft be able to provide Armor with tactical mobility, but they are particularly well suited



(USN)
Seaplanes require no prepared runways and landing areas cannot be destroyed.

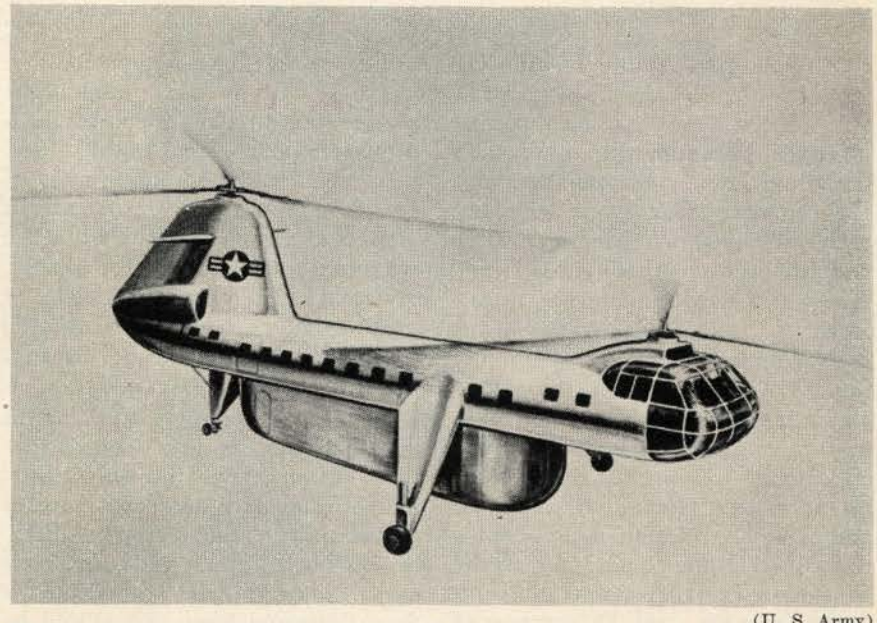
for resupply. Both the fixed wing and rotary wing cargo aircraft, with their speed and flexibility, can adequately support fast moving armor columns. Armor in the exploitation must be free to move without the responsibility of maintaining ground lines of communications.

While we now are ill prepared to supply by air the large quantities of fuel and ammunition required by armored forces, this situation should improve rapidly. More effective parachute and free fall resupply equipment is under development. Of particular note is a saucer-shaped container for the free drop of gasoline. Assault airplanes such as the C123 and the Army's larger helicopters will be able to deliver supplies close to combat units. As for the more distant future, there are under consideration army cargo aircraft with payloads of 2½ and 4 tons. These airplanes would be able to land on rough fields and would require very short landing and take-off distances.

There are many indications that we will have to rely more and more on the airplane to support future operations. It is obvious that we must make every effort to depopulate the battle area to avoid presenting suitable atomic targets. Studies indicate that personnel in the communication zone can be reduced by as much as 80 per cent by using large jet transports as logistical carriers.

The eventual logistic achievements of the airplane are limited only by one's imagination, for we are on the threshold of a new era in air transport. For longer range aircraft, atomic power promises more economical transportation. Even atomic power may be made obsolete by the "super" fuels—compounds of boron, lithium and other metals. Rapid progress is being made to perfect boundary layer control, ducted fans, and tilt wing aircraft, and to utilize deflected slip streams and jets. Both the Bell and McDonnell developmental convertiplanes show progress in these fields. To complement the rapidly increasing capabilities of aircraft, is the certainty of our having lighter vehicles and weapons. When we think of using aircraft to support Armor, we should not think of today's matériel, but of tomorrow's.

The use of transport airplanes to fill Armor's vital needs—strategic mobility, improved tactical mobility and resupply—requires a thorough understanding of the airplane's characteristics, capabilities and limitations. Those who plan operations must understand payload to range relationships and must know how to prepare loading tables. Those who execute air movements must know how to use tie-down devices, roller conveyors and heavy drop kits if parachute delivery is used. The Infantry has thousands of personnel well trained in the use of aircraft. The Infantry is aware of the airplane's advantages and is prepared to use cargo aircraft.



(U. S. Army)

Flying crane type helicopter designed to carry heavy loads short distances.

But how well is Armor prepared for this air age? Are we looking ahead and planning for the day when we too will be able to effectively use transport airplanes? Some of our officers show little interest in transport aircraft and "fight the problem" when air movement and resupply are suggested. We have pitifully few personnel trained in airborne techniques. We have allowed a temporary incompatibility between the weight of our equipment and aircraft capabilities to blind us to the true worth of a valuable tool. We who will need the airplane most—to support rapid, deep penetrations—have shown the least interest in its use.

With Armor ignoring the airplane, the Infantry seized the initiative and has made the airborne field almost its exclusive domain. The Army's school for airborne and air movement training is a department of the Infantry School. Our research and development activities in the airborne field are controlled by Infantry officers. "Airborne" is almost synonymous with "infantry."

We in Armor must change our attitude if we ever hope to obtain effective support from transport aircraft. We should plan ahead to make full use of the airplane. Every effort should be exerted to make our equipment as light and as small as possible *without sacrificing combat effectiveness.* We must teach our personnel what the airplane can do to support Armor and train them in the use of air transport. We must take a more active role in aircraft development to insure that future aircraft will be able to support Armor. Instead of saying "We'll never have sufficient aircraft," we must determine our requirements and fight to get them.

If we recognize the true value of future aircraft and tailor our armored forces for this modern air age, we will be able to provide Armor with the strategic mobility, tactical mobility and logistical support needed for atomic warfare. If we combine Armor's battlefield mobility with the airplane's strategic mobility we will secure Armor's place as the *decisive combat arm.*

THE COMBAT ARMS REGIMENTAL SYSTEM

By MAJOR OLIN C. HARRISON

This system has as its primary purpose the perpetuation of the regiment, which is the traditional "home outfit" of the line soldier in the United States Army.

PROBABLY no action ever taken by the Department of the Army has had a greater impact, at least administratively, than the introduction of the Combat Arms Regimental System. Every unit and each individual in Armor, Artillery and Infantry, whether Active Army, National Guard or Reserve, is affected.

Department of the Army Pamphlet No. 220-1, dated 20 June 1957, gives an outline plan of the System, including the reasons for its establishment. This article will present briefly some of the material from that pamphlet, and will then give in more detail a discussion of the application of the System in everyday usage.

For some time, the Department of the Army has been concerned about the fact that frequent organizational changes have made it impossible to maintain continuity of units. These organizational changes have been necessary because of the changing conditions of warfare. However, because of them, units with long and glorious histories have ceased to exist, while at the same time new units have been formed that obviously had no history. This has denied smaller units and individuals the *esprit de corps* that comes with membership in, and identification with, an historic organization.

MAJOR OLIN C. HARRISON, Armor, served in Europe during World War II with the 3d Infantry Division. He was then assigned to Fort Knox, followed by another overseas tour of duty with the 14th Armored Cavalry Regiment. Returning Stateside, he was again assigned to The U. S. Army Armor School where he recently completed a tour. He is presently en route to the Far East for a new assignment with the MAAG in Vietnam.

The Combat Arms Regimental System has as its primary purpose the perpetuation of the regiment, which is the traditional "home outfit" of the line soldier in the United States Army. It does this by establishing a number of regiments which will serve as parent organizations for smaller units and for individuals. Initially, 164 such regiments have been selected: 55 Infantry, 27 Armor and Cavalry, 81 Artillery and 1 Special Forces.

The key to grasping the concept of the System is to recognize that *these regiments will not be "active" in the commonly accepted sense of the word.* The exact method of establishing them has not yet been determined. However, the general idea is that regimental headquarters will be established in permanent locations in the United States. These headquarters will maintain the regimental history and traditions; in addition, they may maintain records of members, perform certain personnel services, conduct regimental recruiting and perform other support functions.

To these regiments will be assigned a number of smaller units. For example, an armor regiment might include one or more armor (tank) battalions of active divisions, one or more armor battalions of reserve divisions, and a training unit of an Army training center. Each of these battalions will thus have two assignments. For duty purposes, it will be a member of its division; for historical and *esprit de corps* purposes, it will be a member of its regiment.

Thus far, the System has been applied only to active divisions reorganized under the ROCAD and ROCID concepts. As these divisions reorganize, their battalions, battle groups, and squadrons are assigned to parent regiments, and designations are changed accordingly. Complete plans have not yet been announced for extending the System to other units and to individuals who are not members of units that can be assigned to regiments—such as personnel of a division headquarters and headquarters company.

A major administrative result of the System is that it completely changes unit terminology. Furthermore, the nature of these changes is such that their implementation amounts to considerably more than simply substituting Term A1 for Term A.

Time and usage will undoubtedly determine just how the new terms will be employed and what "short titles" will be developed. However, The United States Army Armor School is faced with the problem of using the new terminology immediately, in its instruction and in manuals now being written; therefore, its method is presented as "a School solution."

A recent directive from United States Continental Army Command included the approved terminology for divisional TOE units. An extract of this directive, listing the armor units in the armored, airborne, and infantry divisions, is shown in *Figure 1.*

In order to discuss the terminology for these units, it is necessary to define *title* and *designation.*

1. A unit's title is the term used to describe it in general terms. Frequently, the TOE title is not used in its entirety in what

TOE NUMBER	TITLE	DESIGNATION*
	Infantry Division	
17-65T	INF DIV ARMOR BN, 90MM	___Med Tk Bn (Patton), ___Armor
17-67T	MED TK CO, INF DIV, ARMOR BN, 90MM	Co___, ___Med Tk Bn (Patton), ___Armor
17-85T	INF DIV CAV SQ	___Recon Sq, ___Cav
17-87T	RECON TRP, INF DIV CAV SQ	Trp___, ___Recon Sq, ___Cav
	Airborne Division	
57-57T	ABN DIV CAV TRP	Trp___ (Recon) (Abn), ___Cav
	Armored Division	
7-25T	ARMD INF BN	___Armd Rifle Bn, ___Inf
7-27T	RIFLE CO, ARMD INF BN	Co___, ___Armd Rifle Bn, ___Inf
17-25T	ARMD DIV ARMOR BN, 90MM	___Med Tk Bn (Patton), ___Armor
17-27T	MED TK CO, ARMD DIV, ARMOR BN, 90MM	Co___, ___Med Tk Bn (Patton), ___Armor
17-45T	ARMD CAV SQ	___Recon Sq, ___Cav
17-57T	RECON TRP, ARMD CAV SQ	Trp___, ___Recon Sq, ___Cav

*The final element of the designation is the regiment of the Combat Arms Regimental System to which the unit belongs. Since this regiment has no connection with the division to which the unit is assigned, inclusion of the regimental element of the designation will almost always be necessary for complete identification.

Figure 1.

might be called informal writing or discussion; for example, "medium tank company, armored division armor battalion, 90mm" would normally become "medium tank company" or simply "tank company" in everyday usage. However, to ensure clarity it is essential that the formal title be used as the basis for more commonly used names; it can be shortened, but should never be changed radically.

2. A designation is the term used to denote a specific unit. Again, the entire designation is not always used; if the higher elements are clearly understood, they may be omitted in informal references. For example, "Company A" is an adequate designation if everyone concerned knows what battalion (or other higher unit) this particular Company A is a part of. Again, while the formal designation can be shortened, it should not be changed.

Employment of unit terminology is made easier when titles and designations are as similar as possible. However, the new terminology system requires that the regimental name (armor, artillery, cavalry or infantry) be shown in the *title;* this requirement results in dissimilarities between title and designation. Note TOE 17-45T in *Figure 1,* for example; we say "an armored cavalry squadron" when talking generally about the type unit, but when we become specific we say "1st Reconnaissance Squadron, 100th Cavalry."

Another dissimilarity is noted between battalion-size and lower units. The basic element of the title in TOE 17-25T is "armor battalion," whereas the basic element in TOE 17-27T is "tank company."

These dissimilarities create a special problem in Armor, because of the

fact that so much of our doctrine is based on combined-arms teams. In discussing tactics, we have frequently made use of general terms: armor units, tank units, armored infantry units, etc. This brings us to the problem of what general terms we will use under the new terminology system. The decision was made to employ general terms based on the battalion-level title, *except* in the case of the armor battalion. The exception is necessary because we must have a term that will apply equally to units of tanks, armored cavalry and armored infantry. Here are the terms the School will use.

Armor unit. The general term applied to a unit of tanks, armored cavalry or armored infantry. Also frequently applied to a combined-arms team of armor units.

Tank unit. The general term applied to all such units, including the armor battalion, in both the armored and infantry divisions.

Armored cavalry unit. The general term applied to all such units in all types of divisions (recognizing the fact that the word "armored" does not appear in the title of such units in the airborne and infantry divisions).

Armored infantry unit. The general term applied to all such units. In speaking of specific type units, the School will use, of course, the title terminology. The completeness of the terminology used will depend on the situation. Here are some examples of terms that would be appropriate in various situations, depending on how complete an identification of the unit was necessary.

Armor battalion; 90mm armor battalion; infantry division armor battalion.

Armored cavalry squadron; cavalry squadron; infantry division cavalry squadron.

Reconnaissance troop; armored cavalry reconnaissance troop; infantry division reconnaissance troop.

Rifle company; armored rifle company.

Reconnaissance platoon (infantry division only); armored cavalry platoon team (armored division only).

Tank company; 90mm tank company; infantry division tank company.

The main thing that instructors and writers must constantly watch out for is to ensure that their students and readers know exactly what unit they are talking about. Clarity must be emphasized without regard for brevity.

Here are some examples of the use of unit title terminology in a hypothetical discussion.

"Armor units are better suited for atomic warfare than other types of combat units, primarily because of the protection afforded their personnel. Tank units provide their personnel with better protection than do armored infantry units; the protection afforded personnel of armored cavalry units varies with the type vehicle in which the personnel ride. Personnel of the tank platoons of the reconnaissance troop, armored cavalry squadron, and of the tank section of the reconnaissance platoon, infantry division, are the best-protected armored cavalry personnel. Next best protection is afforded the armored rifle platoon and the mortar section of the armored cavalry reconnaissance troop, and the rifle squad and support squad of the infantry division reconnaissance platoon. The scout personnel, of course, have little protection.

"The armor battalions of the armored and infantry divisions may have tank companies detached for many types of missions. Frequently a tank company of the infantry division armor battalion is attached to a battle group. In the armored division, an armor battalion may be the nucleus of a battalion task force formed of organic tank companies and attached armored rifle companies (in which case it is called an armor battalion task force, 90mm); or an armored infantry battalion may be the nucleus, with one or more tank companies attached to it (in which case it is called an armored infantry battalion task force). Company teams may be formed around tank and armored rifle companies, with tank and armored rifle platoons being attached and/or detached; they are called tank company teams and armored rifle company teams. Tank sections and rifle squads are seldom detached from the tank and armored rifle platoons.

"Within the armored cavalry reconnaissance troop, armored division, which is integrated at troop level, armored cavalry platoon teams may be formed from elements of the tank, armored rifle and scout platoons. Sometimes the platoon team so formed will be identical to the infantry division reconnaissance platoon."

In the designation terminology, the problem is how to shorten the designation for efficient use on maps and overlays, and for brevity in talking.

On maps and overlays, virgules ("slashes") will be used to separate the various elements of the designation: 1/66 would mean the 1st Battalion, 66th Armor (or Cavalry, or Infantry) (the type of regiment would be indicated, if necessary, by the unit symbol); A/1/66 might be used on a boundary line, or for some similar purpose, to mean Company A, 1st Battalion, 66th Armor (Cavalry, Infantry).

In writing the numerical designations of battalion task forces (in operation orders or in showing unit boundaries, for example), both the battalion and regimental numerical designations will be included. For example, the designation for a battalion task force based on the 2d Medium Tank Battalion (Patton), 32d Armor, will be Task Force (TF) 2/32; the designation of a battalion task force using the 1st Armored Rifle Battalion, 15th Infantry, as a nucleus will be Task Force (TF) 1/15.

Where it is necessary to shorten the designation in written material (usually combat orders), only the number of the battalion will be shown, separated from the regimental number by a virgule. Thus, 1/21 Armor is the 1st Medium Tank Battalion (Patton), 21st Armor; 1/61 Cav is the 1st Reconnaissance Squadron, 61st Cavalry; and 1/101 Inf is the 1st Armored Rifle Battalion, 101st Infantry. In the last example, 1/101 Inf might also be used to designate the 1st Battle Group, 101st Infantry; therefore, when further clarification is necessary, 1 (Armd)/101 Inf can be used to emphasize the fact that the 1st Armored Rifle Battalion is the unit referred to.

What the units will be called in everyday conversation is hard to anticipate. It is understood that not more than one unit of any one regiment will be assigned to a particular division, although there may be several units with the same numerical designation, though of different regiments, in the same division (for example, the 301st Armored Division might include the 1st Medium Tank Battalion (Patton), 11th Armor, and the 1st Medi-

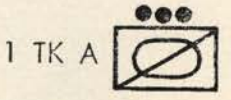
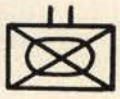
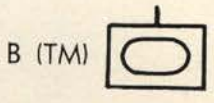
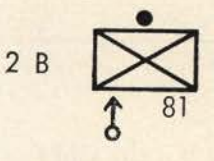
UNIT	
Trp A, 1st Recon Sq, 31 Cav	
1st Tk Plat, Trp A, 1st Recon Sq, 31 Cav	
Task Force 1/101 (battalion task force formed around 1st Armd Rifle Bn, 101st Inf)	
1st Med Tk Bn (Patton), 1st Armor	
Team B [company team formed around Co B, 1st Med Tk Bn (Patton), 11th Armor]	
Btry A, 1st How Bn (105-mm) (SP), 61st Arty	
1st Plat, Btry C (8-in How) (SP), 1st FA Bn (Rkt/How), 91st Arty	
1st Bat Gp, 21st Inf	
2d 81-mm Mortar Squad, Wpn Plat, Co B, 1st Bat Gp, 21st Inf	

Figure 2.

um Tank Battalion (Patton), (21st Armor). This being true, it is probable that a battalion will be popularly referred to as the "11th Armor" (or "11th Armor battalion"), especially within its division. Again, caution must be exercised to ensure clarity without regard to brevity.

The general principles of forming map symbols are unchanged. The only change of importance is that the regimental number must be included on symbols. The battalion, battle group, or squadron number must still be shown as well; therefore the Armor School solution is to place both numbers to the right of the symbol, separated by a virgule. (The reason the battalion, battle group or squadron number must be shown is that each such unit letters its companies independently; formerly, companies were lettered on a regimental basis. A regiment under the System will probably have, for example, a "Company A" in each of its immediately subordinate elements.) *Figure* 2 shows a number of representative symbols as they are now being used in the School.



Armor—Where Are We Going?

EARLY in 1957, the Chief of Staff directed that the Army Staff make a comprehensive review of our plans for the future development of Armor. Monitorship of the review was assigned to the Chief of Research and Development, who formed an *ad hoc* group to examine our developmental plans and to make recommendations concerning the modernization of current armored vehicles and the adoption and utilization of developmental armored vehicles. The *ad hoc* group consisted of representatives from Department of the Army Staff agencies, and made use of the resources of USCONARC and the U. S. Army Armor Center. Chairman of the group was Colonel Walter B. Richardson, representing the Office of the Chief of Research and Development. Colonel Richardson, who came to Washington from his post as Chief of Staff, U. S. Army Armor Center, at Fort Knox, Kentucky to head the group, is presently assigned to the Third Armored Division in Germany. Other members of the group were Lieutenant Colonel James C. Fry, GS (Armor), representing the Office of the Deputy Chief of Staff for Logistics, and Major Stanley Y. Kennedy, GS (Armor), representing the Office of the Deputy Chief of Staff for Military Operations. Although not a formal member of the group, Major H. C. Brill from the Office of the Chief Chemical Office, now assigned to CONARC, assisted materially in the preparation of this material. The group commenced its study in mid-April and concluded with a presentation of its findings and recommendations to the Chief of Staff of the Army on 1 August 1957. The findings and recommendations were approved by the Chief of Staff as policy for the development of Armor. The *ad hoc* group's presentation is printed here for the information of *ARMOR'S* readers.

The recommendations of the special ad hoc *group to the Army Chief of Staff are now*

Armor's Capabilities

In making the review it was deemed essential to consider the capabilities of Armor on the atomic battlefield, as well as the Armor potential of the Soviets, if we are to correlate properly our development program with requirements for the future.

On the battlefield of the future, offensive operations will be characterized by deep penetrations conducted by mobile forces moved over the ground in armored vehicles and through the air under cover of long-range atomic fires when appropriate. Combined action of mobile forces and air-transported forces promises more decisive success in deep penetrations than has ever been possible before. The advent of effective surface-to-air missiles may limit penetration of Phase I type-airborne assault to undefended areas or to smaller objectives. Defense operations will be characterized by counter-offensives conducted by mobile forces. Army operations, under these conditions, emphasize the battlefield requirements for mobility, quick reaction time, protection, firepower, reconnaissance and control, as characteristics of ground force units.

On the battlefield—firepower alone will not suffice to attain the decisive objective. Armor, with its mobility and shock action, is needed to move in rapidly after an atomic blast to exploit the atomic firepower by preventing the enemy's reorganization, reassessment and counter-stroke against us.

To cope with a large scale enemy attack in conjunction with atomic weapons our forces need three principal characteristics: mobility, quick reaction and protection against blast and radiation.

These points should be elaborated: *FIRST*—The need for mobility. This is primarily the basic requirement for establishing and maintaining a favorable mobility differential over the enemy's forces. *SECOND*—Quick reaction is the ability to seize and sustain the tactical initiative. *THIRD*—The need for protection against atomic effects. This is a requirement for protection of the individual and of the unit's combat integrity, thus preserving the unit's ability to conduct mobile combat operations.

In the following examples, the M48 series tank is used as a standard of comparison in view of its role as the main striking weapon of the armored division which can be logically expected to lead the attack in the exploitation of atomic firepower. Other armor protected units, to include Infantry, Artillery and Engineers, will receive protection benefits commensurate with the armor of the vehicles in which they are mounted.

Tanks furnish complete protection against thermal effects of atomic weapons. Of all the effects, radiation has the greatest radius of potency against tanks. This limiting effect against tanks must be compared to the thermal effect which is approximately three times as great in effectiveness against exposed personnel. These two governing effects measure an inherent advantage of tanks on the atomic battlefield.

The effect of this protection on combat integrity is further illustrated by considering a 10-mile fallout area in which the fallout at H+2 hours is 100 roentgens per hour. Given a 12-hour stay time, certain important points can be shown. Dismounted troops must remain immobile in the ground or be rendered ineffective; those inside tanks for this period receive only six roentgens and remain fully combat effective. Dismounted personnel crossing this area would require four hours and absorb a 50% sick dosage; while personnel mounted in tanks can cross in 35 minutes, receiving about one roentgen. The point is that the armor-protected unit retains its combat integrity and its battlefield mobility. To illustrate the effect of this protection on reaction time, let us consider a tank unit and a dismounted unit adjacent to each other in an assembly area. After an attack by an atomic weapon, the dismounted troops require two and one-half hours to assemble and march to a point five miles away and the unit arrives at half strength. A tank company, on the other hand, arrives in 50 minutes at 92% strength.

The net gain of the protection against atomic effects offered by Armor is to maintain the ability to react quickly under atomic attack. Thus, unit mobility is not restricted by radiological effects, stabilized battlelines are avoided, and fighting flexibility is maintained.

Exploitation of this fighting flexibility is a question of firepower. The battlefield requirements for mobility, protection and quick reaction time all point up the need for armor-protected firepower, so that the enemy can be engaged under conditions of our choosing to gain the necessary decisive objectives.

Future combat action will necessitate better knowledge of enemy dispositions, capabilities and intentions. The increased dimensions of the battlefield and accompanying demands for intensified intelligence effort, target acquisition and surveillance of the enemy—emphasize reconnaissance. To meet this demand we must have reconnaissance which is improved in penetrating ability, protection, and possesses the facility in fighting for information in all conditions of terrain and weather. This means armored reconnaissance ground elements in close coordination with air-transported reconnaissance and battle area surveillance units.

Combat distances, complications arising from problems of quick massing and quick dispersal, and the suddenness with which atomic weapons can wipe out major fighting elements of a force, will develop critical control problems. Successful command control in the future is more than a matter of improved communications and

approved policy in the development of Armor in the near future. How this group arrived

battle discipline. It is a matter of organization, tactics and logistics responsive to the extreme fluidity of the modern battlefield.

Although these characteristics inherent in Armor have been discussed in relation to the atomic battlefield it must be emphasized that Armor can exploit these characteristics equally as well on the non-atomic battlefield. The tank, more than any other weapon in our arsenal, possesses the versatility required to survive and achieve decisive results on either the atomic or the non-atomic battlefield.

Roles for Armor

These foregoing considerations, then, generate certain roles for Armor on the modern battlefield. *FIRST*—As the main striking weapon of the integrated armored fighting team. Tanks, in their primary role, move the armored formation through the battlefield deep into the enemy rear against decisive objectives. *NEXT*—As an infantry support weapon, the tank is utilized to provide offensive support in an infantry attack or counterattack and to add antitank firepower, depth, resiliency and mobility in the defense. *LAST*—To attack successfully, we must destroy opposing enemy Armor. To date, we can best do so with tanks. Measures such as mines, antitank guns, antitank missiles, may assist, but to be successful on the offense—we must not only counter enemy Armor, but defeat and destroy it. The tank must be able to live in the element in which it fights—it must gain armor supremacy.

Proper evaluation of these characteristics, however, must include consideration of Soviet concepts and attitudes with respect to modern war.

Soviet Concepts

Current Soviet concepts emphasize that tanks are essential to achieve decisive results in ground combat under modern conditions. Increased mobility, maneuverability, depth, dispersion and deeper objectives, with quickened tempo of operations, are features of current Soviet tactical doctrine. These points are reflected in Soviet Army reorganization.

On the offensive, Soviet forces will use Armor to exploit atomic firepower. Armor will make the breakthrough; a change from the old Soviet concept of the infantry breakthrough supported by tanks. On the defensive, the Soviets hold enemy Armor to be the primary target because this is the gravest threat.

Introduction into Soviet units of a light-gun amphibious reconnaissance tank and amphibious troop-carriers, along with doctrinal stress on intensified reconnaissance, illustrate Soviet interest in prompt action and reaction against their enemy's atomic capabilities.

It follows, then, that the Army's plans for the development of Armor must be responsive to the missions required of Armor in modern war. The equation of the various operational factors with the state of tank-development makes it plain that the necessary development must proceed in two stages.

Our Present Tank Stockpile

Before proceeding with the description of these two stages of development, however, we will take a moment to review our current standard tanks and the requirements for same. *FIRST*—Our present main battle tank, the M48A2. This tank is also used as the infantry support weapon. To destroy the enemy's heaviest Armor we have the M103.

To meet the ever increasing demand for reconnaissance we have the M41A1 light gun tank.

While not a tank, the M56 SP gun is utilized by airborne units to fulfill the requirement for large caliber direct fire support.

The need for a family of three tanks is generated by two major considerations:

FIRST—Enemy Armor—which must be defeated on the battlefield if we are to gain a decisive objective. *SECOND*—What we wish to accomplish with our own Armor by exploiting the characteristics of protected firepower and mobility. These two major considerations develop a number of factors which we have not been able to incorporate in a single armored fighting vehicle.

Within the present state of the developmental art, to defeat the heaviest enemy tank we must have heavy firepower if we are to secure penetration of its Armor. The heavy weapons giving us this firepower limit sustained battle action because of problems of ammunition stowage and supply. On the other hand, sustained battle action against the majority of enemy Armor and in support of Infantry is required for our main battle tank. Thus, the main battle tank, where the greater emphasis is on sustained battle capability, is complemented in actions against enemy Armor by the heavy gun tank.

Neither the main battle tank nor the heavy gun tank, however, are able to perform missions with the speed and versatility demanded of units which have assumed the cavalry role in modern war. Reconnaissance operations require the ability to fight for positive information, to traverse great distances and to maintain combat integrity in the difficult process of finding the enemy, searching out his soft spots, and developing target suitability. Reconnaissance troops must have firepower so strong that it can enforce the object of their mission against enemy reconnaissance units and can defend themselves against superior enemy forces. From the foregoing, it can be seen that the demands for mobility, protection and firepower are not satisfactorily integrated into a single vehicle; hence the need for a family of tanks.

Equally as important is the economics of the family of tanks. The Army has the basic requirement to engage the enemy in combat in any part of the world, as exemplified by Europe and Korea in the recent past. In Southeast Asia; in the Arctic; and

at their conclusions makes an interesting story and sets a pattern for the next few years.

in the area South of the Sahara, the light gun tank would be tremendously effective while the medium gun tank would not. Other theaters would place a premium on the heavier gun types.

Current development programs with respect to the family of tanks are aimed at continuing progress in development, while remaining responsive to complex operational and such non-battle factors as technology, modernization and budget.

It follows then, that development of the tank in the Army should proceed, as we have mentioned, in two major stages.

There must be an *immediate* stage which provides *first,* an improved battle tank; *second,* a heavy-gun tank to defeat the heaviest enemy Armor as the enemy continues to improve his Armor; *third,* a light-gun tank of economical weight for security, economy of force, reconnaissance, counter-reconnaissance and radiological reconnaissance missions, in all theaters of the world; and *fourth,* an airborne assault weapon. These are the developmental objectives of the immediate stage, derived from the Army's requirement for a main battle tank; the firepower the heavy gun tank represents until there is developed an acceptable weapons system to supplant the heavy gun tank; and the increased demands for positive reconnaissance. Pending attainment of these immediate objectives, the current major component development programs should be continued at high priority to facilitate development of a single main battle tank, an improved reconnaissance vehicle, and an airborne assault weapon, in the future stage. With respect to the merits of a component development program, it is appropriate to mention Project ASTRON. Civilian industry was given a free hand in designing a weapon to perform the roles of the tank in battle. The concepts featured novel ideas, but the project foundered due to a lack of major components to support the proposed developments.

Developmental activity in the immediate stage has kept pace with requirements. We are currently engaged in the development of an improved main battle tank having the capability of defeating the majority of enemy Armor. An improved gun-ammunition combination, programmed for this tank, should permit the attainment of this objective, including large capacity integral ammunition stowage to fulfill the firepower requirement of a battlefield day. Different gun-turret combinations will be utilized on various models of the tank to permit the ultimate selection of the most efficient of our developmental weapons. Development of more efficient engines is also in progress for possible use in our new main battle tank.

In developing a new main battle tank, it is hoped that significant improvements over the M48 series tank can be attained, including a reduction in weight, improved hull and frontal armor protection, a better cruising range with reduced fuel consumption and improved main armament penetration capability.

The requirement for firepower capable of defeating enemy heavy Armor will be met through the development of turrets containing heavy guns for mounting on the same chassis as is utilized by the development main battle tank. These weapons should provide the means to defeat the heaviest Armor that it is practicable to place on the battlefield, insuring that U. S. tanks will not again be outgunned in combat. As noted previously, in providing firepower of this caliber, the number of rounds of ammunition carried within the vehicle is limited, which is offset by the capability of defeating enemy heavy Armor without sacrificing large numbers of main battle tanks on the battlefield.

With respect to the requirement in the immediate stage for a light gun tank suitable to increased reconnaissance and security needs; the new light gun tank represents major progress. This tank, developed by the Aircraft Armaments Corporation, appears to be the best approach to fulfilling our requirements for a lightly-armored cross-country reconnaissance vehicle. No other U.S. vehicle, standard or developmental, more closely approximates these requirements. Engineer tests of this vehicle have started and orderly testing and evaluation should be completed in order that production can be undertaken if required. Meanwhile, the M41 tank series, modified for increased operating range by fuel injection engines, provides sufficient light gun tanks from assets on hand.

The M56, 90mm SP gun is now programmed for use by airborne troops as the airborne assault weapon.

Our objectives for the future include the development of a single main battle tank, an improved reconnaissance vehicle and an airborne assault weapon. Development of the single main battle tank may be facilitated as a result of the tests conducted with the developmental medium and heavy gun tanks in the immediate stage. However, as of now, accomplishment of this objective cannot be foreseen unless a major breakthrough in technological progress should occur.

Consideration has also been given to the development of a single all-purpose tank which would fulfill all requirements for Armor on the battlefield There is, however, no indication at this time that it is technologically feasible to provide such a single armored vehicle within the foreseeable developmental future. Furthermore, in addition to the single main battle tank, it is considered that there will continually remain a requirement for a reconnaissance type vehicle, because the demands of the missile-atomic battlefield are magnifying, rather than lessening the requirement for positive combat reconnaissance. It is equally doubtful that this reconnaissance vehicle can or will meet the requirement of an airborne assault weapon for airborne or air-transported units.

A
RANGE REDUCING DEVICE

THE key to obtaining a first round hit with a tank gun is determining the correct range to the target. To help the tank crew determine the correct range, our medium gun tanks are equipped with range finders. The range finders, however, will not do the job by themselves; they must be operated by trained operators.

The task of training qualified range finder operators has not been easy since the present range finders are stereoscopic range finders and require that an operator see the ranging reticle in depth. He must be able to see this reticle move through space, as he ranges, and finally align it with the target to determine the correct range. Once an operator has been trained to range accurately, he must practice ranging continually or he will lose his proficiency.

The procedure to be followed when training range finder operators is outlined in FM 17-78 for the M12 range finder and in FM 17-79 for the M13 range finder. These manuals state: "The training area for range finder instruction must include a target ranging area with ranges up to at least 3,500 yards." The requirement that a suitable training area must have ranges up to 3,500 yards presents a problem to many units since areas of this type usually are not available except during Summer training, or if available, are located at considerable distances from unit motor pools. Under the new Army Training Program for tank companies, only 44 hours are allotted for range finder training. This creates an additional problem in that some of this valuable time is lost while the unit moves to the training area from the motor pool, notwithstanding the gasoline consumption and the additional maintenance involved.

Realizing the impact of the problems previously mentioned, the Army has developed a range reducing device. This device which is now available to tank units, is an optical wedge *(Figure 1)*, designed for use with the M12 and M13 range finders. Its function is to optically reduce the distance on the ground to permit the gunner to practice ranging on targets up to 5000 yards within an actual space limitation of less than 100 yards.

The wedge is mounted in a metal ring which has two spring clamps. It can be attached to either the right or the left window of the range finder. There is a red dot on the ring which should always be directed toward the barrel of the gun. After the device has been mounted, a test should be made to determine if the image is sharply defined as one picture. If a double image is seen, the device must be turned slightly (right or left) until the image is correctly defined. In general, the device will be mounted correctly when the clamps are vertically aligned *(Figure 2)*. Special care should be taken in the mounting of the device to ensure that it is pressed on as far as it will go.

The device is designed with a 1° 16′ 25″ deflection in the wedge. Therefore, when the M12 range finder is set for 500 yards, the actual distance will be reduced to about 65 yards. The greatest range for the M12 range finder is 5000 yards, which is reduced proportionately to a little more than 73 yards. Because range reducing devices have a natural unit of error, all devices have been individually tested and grouped according to their unit of error. These groups are numbered from one through nine with the group number being stamped as shown in *Figure* 3 in the red circle. If, for example, a range reducing device is used which has been classified and stamped with the

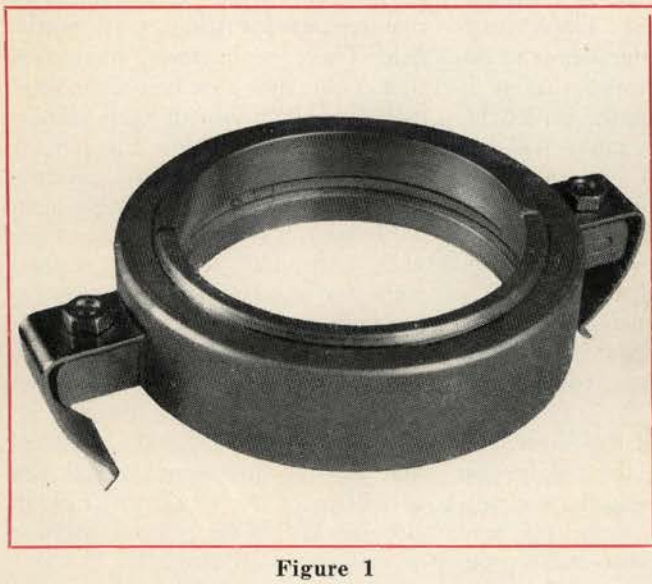


Figure 1

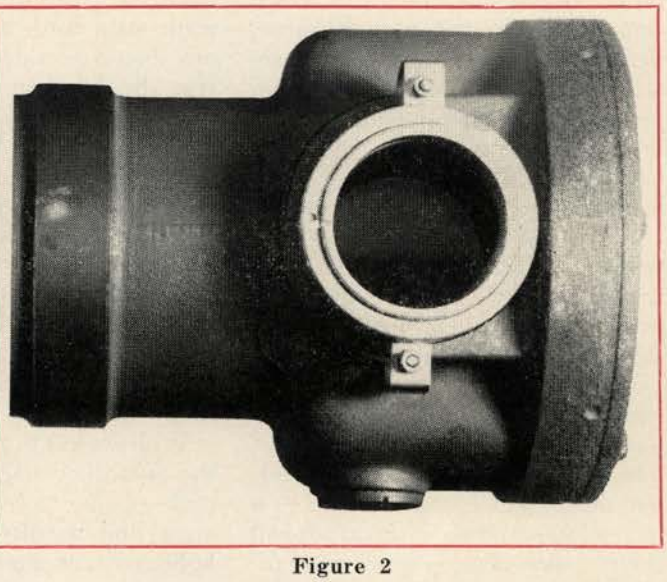


Figure 2

number 5, then the data as listed under column 5 in the table shown in *Figure 4* issued with the device is to be used for that particular range reducing device. This table is in the form of a chart showing the range finder readings compared with the true distances from the range finder to the targets for the M12 range finder. These distances are measured to the nearest 1/64 of an inch. This may not be practical for troop units as it would be necessary to position the tank at the exact distance, and the mere traversing of the turret would make more than a 1/64 of an inch error. Consequently it is not recommended that the device be used for testing range finder operators due to the difficulty in setting up a range to the exact dimensions shown on the chart; it is recommended that the targets be placed out in the ranging area at various distances which need not be measured just as long as the targets give readings over the entire range scale of the range finder.

This device does make it possible for each company size unit to construct its own miniature ranging site in the vicinity of the unit motor pool. Depending upon the area available, the targets can be placed either on the ground or on stakes. Target identification and ranging practice can be accomplished simultaneously when targets are cut in the shape of miniature tanks or to represent other silhouettes.

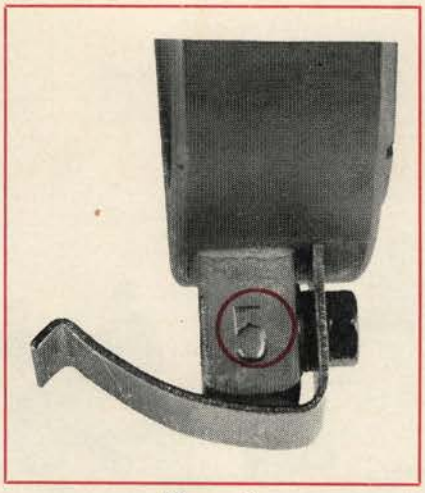


Figure 3

With a ranging site, located near the unit tank park, the unit commander may at times supplement the time allotted for ranging practice by conducting ranging concurrently with scheduled maintenance. Several tanks can be moved to the ranging site and while two or three of the crew members are performing maintenance, another crew member could be ranging. After 10 to 15 minutes of ranging, the crewman would change positions and another one would practice ranging. Using this method, all members of the crew could learn to operate the range finder and their proficiency could be maintained through this practice.

The time allotted in the training program could then be utilized on a full scale ranging site for testing the operators and in giving the crewman practice ranging over the actual ranges. The small amount of time available for ranging practice would thus be used to best advantage.

The device, obtainable from the local U. S. Army Training Aids Subcenter, which procures them from the U. S. Naval Training Device Center, Port Washington, New York, solves many of the problems facing the unit commander who must train range finder operators. It permits him to use a small area near the company tank park for a practice ranging site that will enable him to supplement the training of his range finder operators.

RANGE FINDER READING	TRUE DISTANCE FROM RANGE FINDER TO TARGET								
	1	2	3	4	5	6	7	8	9
500 YDS	64 YDS 2'9 45/64"	64 YDS 2'11 9/16"	65 YDS 0'1 1/2"	65 YDS 0'3 11/64"	65 YDS 0'4 31/64"	65 YDS 0'7 13/64"	65 YDS 0'8 3/8"	65 YDS 0'10 6/32"	65 YDS 0'11 53/64"
750 "	67 YDS 2'6 45/64"	67 YDS 2'8 41/64"	67 YDS 2'10 9/16"	68 YDS 0'0 17/32"	68 YDS 0'2 15/32"	68 YDS 0'4 7/16"	68 YDS 0'6 3/8"	68 YDS 0'8 21/64"	68 YDS 0'10 17/64"
850 "	68 YDS 1'9 41/64"	68 YDS 1'11 41/64"	68 YDS 2'1 39/64"	68 YDS 2'3 5/8"	68 YDS 2'5 19/32"	68 YDS 2'7 19/32"	68 YDS 2'9 9/16"	68 YDS 2'11 9/16"	69 YDS 0'0 3/4"
1000 "	69 YDS 1' 3 29/32"	69 YDS 1' 5 61/64"	69 YDS 1' 8 1/64"	69 YDS 1' 9 31/32"	69 YDS 2' 0 1/16"	69 YDS 2' 2 1/16"	69 YDS 2'4 1/64"	69 YDS 2' 5 47/64"	69 YDS 2' 8 7/32"
1200 "	70 YDS 0'9 5/32"	70 YDS 0'11 13/64"	70 YDS 1'1 17/64"	70 YDS 1'3 23/64"	70 YDS 1'5 15/32"	70 YDS 1'7 9/16"	70 YDS 1'9 39/64"	70 YDS 1'11 47/64"	70 YDS 2'1 13/16"
1500 "	71 YDS 0'3 3/64"	71 YDS 0' 5 1/4"	71 YDS 0' 7 27/64"	71 YDS 0'9 35/64"	71 YDS 0'11 5/8"	71 YDS 1' 2 37/64"	71 YDS 1' 3 59/64"	71 YDS 1' 6 5/64"	71 YDS 1' 8 9/32"
1700 "	71 YDS 1'5 51/64"	71 YDS 1'7 5/8"	71 YDS 1'10 59/64"	71 YDS 1'11 61/64"	71 YDS 2'2 5/64"	71 YDS 2'4 21/64"	71 YDS 2'6 13/32"	71 YDS 2'8 19/32"	71 YDS 2'10 47/64"
2000 "	71 YDS 2'9 51/64"	71 YDS 2' 11 45/64"	72 YDS 0'2 1/8"	72 YDS 0'4 9/32"	72 YDS 0'6 1/2"	72 YDS 0'8 57/64"	72 YDS 0'10 25/32"	72 YDS 1'0 43/64"	72 YDS 1'3 9/32"
2200 "	72 YDS 0'6 21/64"	72 YDS 0'8 1/2"	72 YDS 0'10 21/32"	72 YDS 1'0 41/64"	72 YDS 1'3 5/64"	72 YDS 1'5 9/32"	72 YDS 1'7 31/64"	72 YDS 1'9 11/16"	72 YDS 1'11 13/16"
2500 "	72 YDS 1'4 13/32"	72 YDS 1'6 25/32"	72 YDS 1'8 63/64"	72 YDS 1'11 3/16"	72 YDS 2'1 25/64"	72 YDS 2'3 23/64"	72 YDS 2'5 27/32"	72 YDS 2'8 5/64"	72 YDS 2'9 59/64"
3000 "	72 YDS 2'5 11/64"	72 YDS 2'7 27/64"	72 YDS 2'9 27/64"	72 YDS 2'11 55/64"	73 YDS 0'2 7/64"	73 YDS 0'4 11/32"	73 YDS 0'6 19/32"	73 YDS 0' 8 27/32"	73 YDS 0'11 3/64"
5000 "	73 YDS 1'6 7/8"	73 YDS 1'9 5/32"	73 YDS 1'11 29/64"	73 YDS 2'1 3/4"	73 YDS 2'3 31/32"	73 YDS 2'6 19/64"	73 YDS 2'8 35/64"	73 YDS 2'10 59/64"	74 YDS 0'0 27/32"

Figure 4



(Louisville Courier-Journal)

RETRAINING OUR NCO's

By Sp3 ROBERT A. LODER, JR.

CURRENTLY the Army is confronted with overages of noncommissioned officers in certain MOS's and a shortage of noncommissioned officers in others, the latter generally in combat arms. This situation exists as a result, first, of the rapid expansion of the Army during the Korean conflict, and, second, the subsequent reduction in forces in which a greater proportion of combat arms noncommissioned officers elected to leave the service than those in administrative and service type MOS's.

Two solutions exist to the problem of what to do with the surplus noncommissioned officers. One, the surplus can be discharged or reduced in grade; two, the surplus noncommissioned officers can be retrained to fill slots where shortages exist.

In order to capitalize on the background of extensive military experience of the NCO's in the overage categories, it has been considered desirable to adopt the second solution and to retain them in service by retraining them to fill existing vacancies.

As a prime example of the above situations, The US Army Training Center, Armor (USATCA), at Fort Knox, Kentucky, has been sorely pressed by a shortage of Armor noncommissioned officers. Correspondingly, the Training Center, as well as other units at Fort Knox, has had an overage of noncommissioned officers in other MOS's. A considerable number of the above overages have been retrained into usable MOS's, usually by the "on-the-job" method. However, the Armor noncommissioned officers in USATCA are required to perform duties as instructors of Armor trainees in furtherance of the mission of the Training Center. This was an immediate need, and was a job which required the individual noncommissioned officer to be quali-

Sp3 ROBERT A. LODER, JR., is a 1955 graduate from the University of Pennsylvania, majoring in Journalism. He worked for 15 months as Public Relations Director for a New Jersey Hospital prior to entering the service in July 1956. He is an Information Specialist with the Public Information Division, USATCA, Fort Knox, Kentucky.

The Army is confronted with the problem of having too many noncommissioned officers in certain MOSs. At the same time there are shortages in other fields. How The US Army Training Center, Armor, corrected this deficiency might prove helpful to other commanders.

fied as a tanker to a degree generally not attainable by on-the-job training except over a long period of time. To overcome the above unsatisfactory situation, USATCA developed a program of rapid but thorough training of the surplus noncommissioned officers. This was accomplished by establishing an Armor Noncommissioned Officers' School with a concentrated training program of five weeks' duration.

Armor noncommissioned officer students for this five-week course were drawn from positions throughout Fort Knox and USATCA. The first class of 96 included, among others, former Military Police, company first sergeants and instructors in various specialty schools.

At the outset, it was recognized that different problems would be encountered in dealing with and training veteran noncommissioned officers, as opposed to young and inexperienced trainees. With this in mind, wide revisions in the training schedule were undertaken by the 1st Training Regiment which had been designated to operate the school.

As the noncommissioned officer students were already well-versed in basic Army subjects, lesson plans were concentrated on Armor training with the elimination or minimizing of general subjects contained in current ATP's.

The average Armor trainee receives 352 hours of instruction spread over an eight-week period. The Armor NCO program was cut to 220 hours —a difference of 132 hours—for this five-week cycle. The command planned the course so that NCO students would receive one-third as much classroom instruction as the average trainee and two-thirds of the practical work on all phases. The assumption was that veteran NCO's would more easily grasp the subjects included in the Advanced Individual Armor training program.

In addition, a heavy schedule of required reading was inserted in the NCO's training schedule, with the express purpose of compensating for reduced classroom and field training time of the abbreviated program of five weeks. Training manuals furnished in part by the US Army Armor School were issued to each Armor NCO student, and examinations on the assigned reading matter dealing with such subjects as gunnery, maintenance and leadership were given at regular intervals throughout the cycle.

General military subjects were cut from the 43 hours given to trainees to 13 hours for the NCO students. Map reading was stressed and casualty evacuation integrated with first aid instruction.

Time spent by the NCO's in combat skills was doubled; that is, from 13 hours for trainees to 26 for this abbreviated cycle. The full schedule of communication training was, however, retained in this section of the lesson plan. Training in the .45 caliber pistol and .30 and .50 caliber machine guns was transferred to the combat skills phase, with four additional hours added to the normal eight hours spent on machine guns.

In further revisions, the 89 hours spent on vehicles, driving and maintenance were condensed to 45 for the Armor NCO students, with practical work and actual driving stressed, and classroom lectures cut to a minimum. Throughout the driving instruction, further map reading was stressed. The Armor proficiency test followed these first phases of instruction.

Similarly, time spent on gunnery



(U. S. Army)
Major General Paul A. Disney, CG, USATCA, discusses training with a student.

was cut from 130 hours to 64 for the NCO's. Throughout the various firing tables, concurrent training was given on the .30 and .50 caliber machine guns including familiarization firing of the weapons in conjunction with Tables V, VI and VII.

Selection of Instructors

Now that the curriculum for the five-week cycle had been compressed and established, the selection of instructors from the 1st Training Regiment remained as one of the more important jobs left to do. These men were hand-picked from the Regimental Instructor Group on the basis of complete knowledge of Armor. However, rank was also a major factor in selection. From a psychological standpoint, it was decided to use highest ranking enlisted instructors and officers whenever possible to create the most favorable teaching climate, as well as to minimize the possibility of "sharpshooting" at lower ranking instructors by the NCO students.

The 29th of July was set as the target date for the beginning of the school because fewer than the usual number of companies were in training cycles in the regiment. Consequently, it was possible to divert more instructors to the training of the Armor NCO students. While four instructors and assistant instructors are normally present at any given class, the number was now boosted to six to provide more individual training. As the cycle progressed, the more proficient Armor NCO students were permitted to act as assistant instructors.

With the curriculum established and instructors selected, the entire program was subjected to the scrutiny of the usual "murder board" composed of the Regimental S3, Chief of the Instructor Group, and other individuals connected with the school. Instructors delivered the entire series of lectures to the board. Deficiencies in both subject matter and method of presentation were ironed out and the program re-presented to the board until perfected.



(Louisville Courier-Journal)
An instructor (right) briefs students on the intricacies of a tank turret.

Company B, 2d Training Battalion, was selected as the "carrying" organization for the school, and the Armor NCO students reported on the 27th of July. Personnel on separate rations were permitted to live off-post, reporting at a specified time on each day of training, and on-post personnel were billeted in the company area. Training manuals and lesson schedules were issued to the students at an initial briefing.

At this orientation, Major General Paul A. Disney, USATCA Commanding General, explained why the school was being conducted and emphasized that everyone would benefit —the Army, the student, and the Training Center. General Disney stated: "We are depending on you (the students) to fill instructor and cadre positions in this regiment and in any expanded Armor training units planned for the command in the future. The question is frequently raised as to 'Why am I being retrained in another branch of the Army when basic trainees are still being trained in my branch?' The answer is that



(U. S. Army)
An instructor (right) explains visual aid of ballistic computer to students.

you are chiefly being retrained because you possess too much rank for the Table of Distribution slots you were filling. Therefore, Department of the Army must still maintain schools for the purpose of training younger men with lower rank in the same MOS to fill positions you vacated. Therefore, we must use you elsewhere, unless, of course, you wish to remain in your original branch at a considerably reduced grade."

These assignments will fill a critical need at the Training Center which is now operating at peak capacity. Recently, the strength of Reserve Forces Act volunteers at USATCA passed 10,000. This figure, coupled with nearly 8,000 more Selective Service and Regular Army trainees, as well as permanent party, brings the strength of USATCA to over 18,000.

During the first week of the cycle, individual interviews conducted among the students showed a variety of opinions about their abrupt change. A number of NCO's were content with the change because of previous assignments in closed MOS's. Some felt that being soldiers, they must be prepared for and go along with MOS changes from time to time during their careers. Some frankly admitted they did not like the change.

In addition to the regularly conducted interviews, weekly progress reports from the company were submitted to General Disney. The initial report noted that the first week of training was marked by a degree of "depression" on the part of many of the NCO students. "Frustration and indecision," as stated in the report, "were obvious during informal interviews. However, the general attitude completely reversed during the second week and the men have subsequently applied themselves well, with certain exceptions."

Throughout the cycle, subsequent reports showed participation and interest growing and a competitive spirit developing among the class. The NCO students tended toward a lack of interest in initial classroom lectures, but as practical work increased, participation and response increased considerably.

During the third week, a misunderstanding as to the treatment of senior NCO students arose in regard to assignments during training. This problem was solved at a briefing which established that each man was to be treated as a student with details such as maintenance and ammunition handling rotated, regardless of rank. Consequently, NCO students participated in range details with no subsequent signs of rank consciousness.

At the end of the cycle, a report on each individual's qualifications and training record was submitted to General Disney. The statistical section of the report represented scores attained by the NCO's on 15 examinations given throughout the five weeks. Those scoring anywhere from 1425 to the perfect rating of 1500 were cited as "superior," with additional ratings of excellent and satisfactory progressively downward to 1124 and below—"unsatisfactory." An additional rating of "qualified" or "unqualified" was attached to the evaluation. 'Qualified" meaning those NCO's who passed the course, regardless of attitude or efficiency; "unqualified" denoting those individuals who failed to attain a satisfactory score for the course, regardless of extenuating circumstances, attitude or efficiency.

Statistically, 13 NCO students were rated "superior;" 27 as "excellent;" 47 as "satisfactory;" and 12 were rated "unsatisfactory." Students were recommended as potential instructors and cadremen in Armor units on the basis of leadership ability, attitude, interest, dependability, cooperation and technical knowledge of the subject. Others, though qualified by score, were evaluated as lacking other desirable qualifications for instructor and cadre positions.

On the strength of these reports, a follow-up program of on-the-job surveillance was initiated by General Disney. Four students were recommended for reduction in grade due to lack of NCO qualifications and capabilities which came to light during training.

Consideration for future promotion was directed with respect to a second group of highly rated NCOs, while 19 were placed under careful scrutiny for possible future elimination or reduction because of marginal capabilities exhibited during training.

It is, of course, obvious that five weeks of schooling will not transform an administrative worker into an efficient tanker. Therefore, the graduates were assigned to further on-the-job training not only to increase their knowledge, but also to develop teaching ability.

Resumption of the Armor Noncommissioned Officers' School is planned when the number of surplus NCO's warrants its reopening.



(Louisville Courier-Journal)

General Disney joins in the discussion of an azimuth indicator during training.

THE GOER CONCEPT



THE GOER TANKERS AND AMMUNITION CARRIERS HAVE FLOTATION CAPABILITIES, EVEN WHEN FULLY LOADED.



By LIEUTENANT COLONEL GREGG L. McKEE

The objectives of this article will not be met if it serves merely to brief the reader on the GOER Concept. It is hoped that this article will be a challenge to every ARMOR reader; that it will stimulate a deluge of thoughtful letters and articles on this very important aspect of any future military operation.

The GOER Program is yet in its infancy, but appears most promising. Unlike many developmental programs, its future success is not contingent upon basic research yet to be accomplished.

The program has moved ahead rapidly when compared with others, but it has not moved as fast as possible. Much of the delay has been due to slow and cumbersome administrative procedures.

The reader is reminded that the mainspring of mobility is the mind of the commander. No imaginable equipment can impart mobility to the sluggish. No equipment, however mobile, can be exploited faster or farther than permitted by the administrative procedures which set it in motion.

FOR two years the US Army Armor Board has intensively investigated ground transportation systems for field army use. The present and continuing need for improved ground transport is clearly evident, even for the Air Force and the Navy. The purpose of the board's study has been to determine how best this need may be satisfied. The scope of investigation has been extremely broad. It has not been restricted to one or another of several individual vehicles or systems. All known and pertinent aspects of the ground transportation requirement have been analyzed together with all conceived methods for solution. The results of this work have led to initiation of the Army GOER Program.

The bulk of the work accomplished has been done by the board's General Test Section. It has not been the work of any one individual. Recognition cannot be given to all those who have contributed, but acknowledgement must be paid to Colonel John C. Welborn, President of the Board, and to Colonel Jasper J. Wilson, former Chief of the General Test Section. It is questionable that the project would have been pushed to conclusion without the understanding encouragement of the former and the relentless energy of the latter. Of tremendous help has been the splendid cooperation of the technical services in general and the Ordnance Corps in particular.

The sympathetic understanding, encouragement, and unstinting support received from many of the Nation's leading industrial concerns and their individual members have been vital in this work which was initially unfunded. Without them, the GOER Concept would not have been born.

GOERS

VEHICLES differ; the GOER is a vehicle.

This article will explain how the GOER differs from convention and why these differences are necessary and desirable.

The word "GOER" is a generic term coined by the US Army Armor Board to identify its concept for a new family of military wheeled vehicles adequate to the demands of the air-missile age and the atomic battlefield.

These demands are exacting. Such a vehicle must be able to move significant loads at an acceptable speed with a degree of off-road and off-bridge mobility sufficient to make the large scale, cross country, logistical operation truly feasible. It must do this dependably, with minimum demand for preventive maintenance and an enduring freedom from breakdown. When inevitable breakdown does occur, maintenance must be simple, fast and easy. All this must be accomplished with a vehicle which can be manufactured in time and in sufficient quantity, and which will provide economy in total numbers, manpower, fuel, replacement parts and overseas shipping space and tonnage. Such a vehicle must be compatible with other transport systems. The GOER meets these requirements; current standard vehicles do not.

To the optimum feasible extent all members of the GOER family will possess six interrelated, compatible and mutually reinforcing design features. These six features, which will comprise the context of this article, are:

1. Large diameter, low pressure tires.
2. Two wheel prime mover with positive powered wagon steer.
3. Rear wheel traction, at least in low and reverse gears.

LIEUTENANT COLONEL GREGG L. McKEE, Armor, a 1941 USMA graduate, served in Europe during World War II with the 5th Armored Division and Ninth Army Headquarters. Subsequent to the War he served in China and instructed at West Point. He has attended The U. S. Army Armor School, C&GSC, the Strategic Intelligence School, and while detailed to Ordnance, he received graduate training at Oklahoma A&M. Returning to his basic branch he was Assistant Army Attaché at Lisbon, Portugal prior to his present assignment as Chief of the General Test Section, U. S. Army Armor Board at Fort Knox.

4. Exoskeletal design and inherent floatability in inland waters.

5. Simplicity.

6. Improved ratios of payload to gross laden weight.

Tires

MOBILITY is a tremendously complicated subject; so complicated in fact that we even lack a widely accepted definition of the term. In this article a mobile vehicle is one which can go wherever within reason you may wish to drive it and this includes lakes and rivers of moderate current flow.

The difficulty of attaining vehicular mobility is caused by the infinite variety of terrain configurations and soil types and conditions which must be conquered. This very variety has precluded to date the development of a science of terradynamics comparable to the sciences of hydrodynamics and aerodynamics. This does not mean, however, that the attainment of greater vehicular mobility is beyond our reach until such a scientific discipline has been developed. On the contrary, the GOER embodies three specific and proven features which lead to a vast improvement, in off-road, off-bridge mobility.

The first and most important of these is the use of *large*, low pressure tires, all of which can be driven when required so as to produce the full mobility of the vehicle.

The reader may easily satisfy himself as to the importance of wheel size. First, ride a bicycle across the parade ground. Note the effort required, the quality of ride and the speed attainable. Now, repeat the exercise on roller skates. Note that the one system employs two wheels of large diameter whereas the other brings eight small wheels into play. The same results occur in the case of automotive vehicles mounted on tires of different sizes.

All tires, whether driven or free rolling, encounter rolling resistance. It is due not only to deformation and hysteresis of the tire, but more importantly in off-road operation, to deformation of the ground. The tire carries a load and this load causes it to sink into the ground over which it is rolling. The softer the ground the deeper it sinks. The result is that a tire always rolls uphill, even on level ground. As tire diameter increases, rolling resistance decreases rapidly. The situation is schematically portrayed in *Figure 1*. It will be noted, even when the depth of tire sinkage into the soil is identical, as shown in the illustration, the smaller tire must always climb a steeper rolling resistance grade than does the larger tire. The greater the rolling resistance encountered, the greater must be the traction developed to propel the vehicle and the greater will be the fuel expenditure.

The traction which a tire can develop is not determined solely by the amount of torque available at the axle. The tire must get a tractive "bite" on the ground which permits the ground to develop a counterreaction and it is this counterreaction which actually propels the vehicle.

The amount of tractive "bite" which can be obtained on a given soil depends primarily upon the size of the tire, its inflation pressure, and the nature of its tread or lugs. Coefficient of traction is the term used to describe quantitatively that percentage of load on the tire which can be developed as traction if sufficient torque is available. As inflation pressure is lowered the coefficient of traction is increased. As tire size increases, so also does the coefficient of traction. This leads to the conclusion that a greater number of small tires can never develop as much traction as a lesser number of larger tires. Consider a 16,000-pound vehicle with eight small wheels, all of which drive. (The near side of such a vehicle is shown schematically in *Figure 2.)* Ideally each wheel would carry 2,000 pounds. The coefficient of traction might reasonably be 0.4. Each wheel could then develop 0.4 x 2,000 = 800 pounds of tractive force for a total of 6,400 pounds of traction. Now let us assume another vehicle which also weighs 16,000 pounds, but is mounted on only four tires of a considerably larger size. Each wheel ideally would carry a 4,000 pound load. Because of their greater size, the larger tires will exhibit a higher coefficient of traction, possibly 0.5. In this case each wheel will develop 2,000 pounds of tractive force for a vehicular total of 8,000 pounds of traction. Thus the vehicle on four large tires develops 25 percent more traction than does the eight-wheeled vehicle, while at the same time it actually requires less, because of its lower rolling resistance. Tests have repeatedly shown that two tires of 63-inch diameter will outpull ten tires of 42-inch diameter when the total loads on the driving members are identical and even though the many tired vehicle has the higher horsepower rating. A test of this

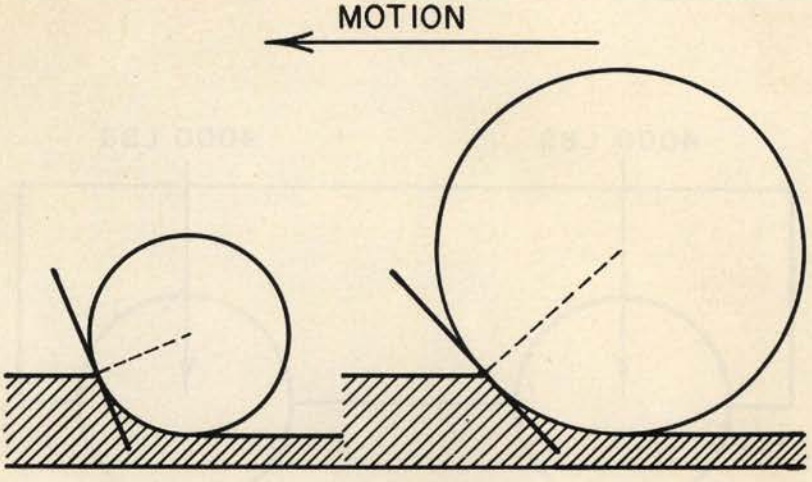


Figure 1. Rolling resistance vs tire diameter.

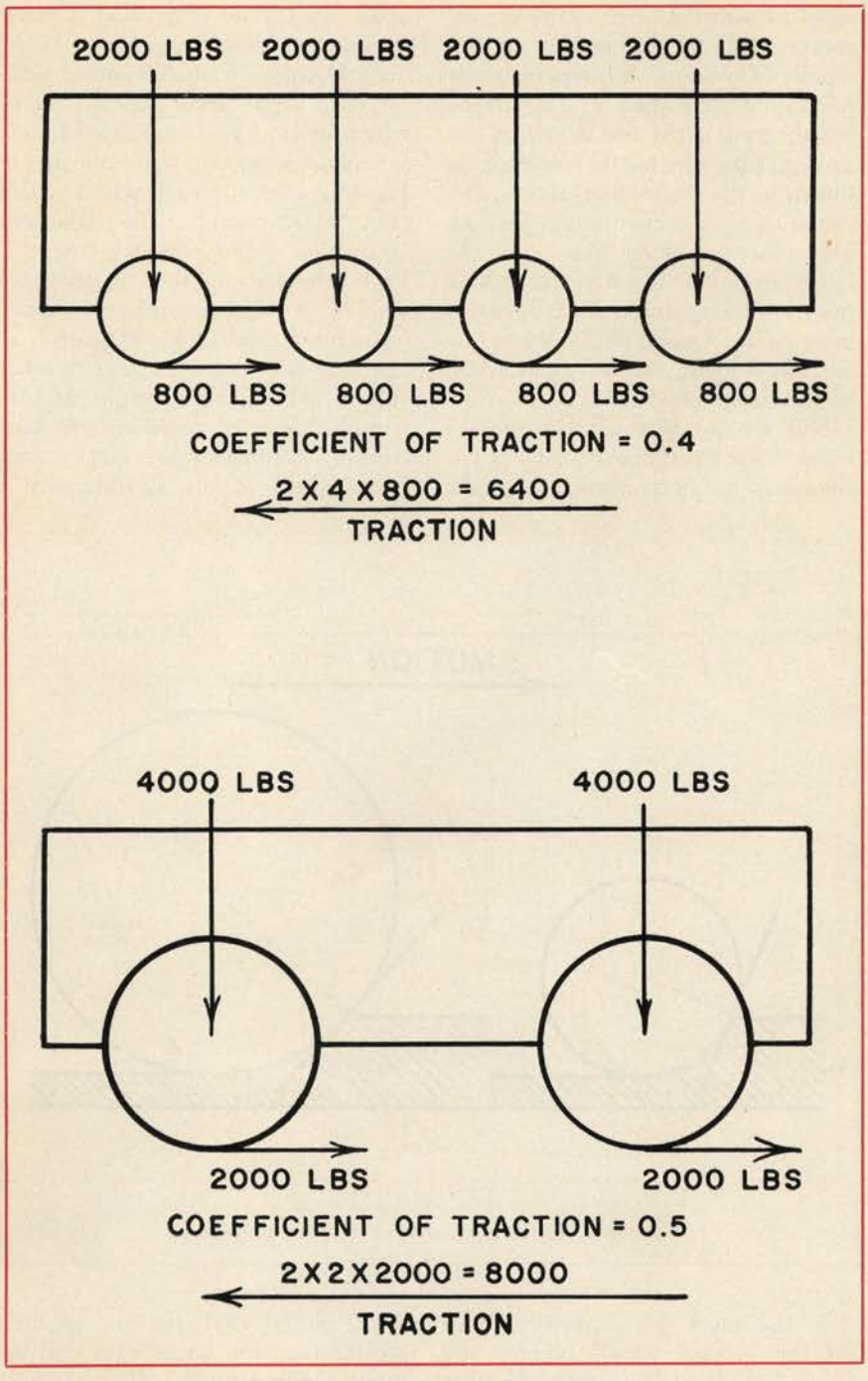


Figure 2. Coefficient of traction.

type is shown in the *Tug of War*. The self-propelled scraper on the right, a standard Army Engineer Corps vehicle, has drive only on its front wheels. It is pulling a standard 5-ton truck rearward even as the truck tires spin in the opposite direction.

Lowered rolling resistance and increased coefficient of traction are not the only benefits which accrue from the use of larger diameter tires. The height of vertical obstacle which can be conquered by a free rolling wheel is dependent upon the height of its center of rotation. The larger the tire diameter the higher its center of rotation and the greater its ability to negotiate obstacles as shown in *Figure* 3.

Operations in mud deserve special consideration. Some areas of the world are populated; others are not. Decisive land battles in modern war are usually fought in populated areas. Most populated areas are located where they are because of the ability of the soil in that region to produce food. When agricultural soil becomes wet it turns to mud. "Mud-ability" is therefore a most important performance requirement.

The ability to negotiate mud is composed of many factors but briefly it may be said that the vehicle must either possess sufficient flotation to stay on top, or failing to do so, must possess sufficient under-axle and underbody clearance to permit the tires to penetrate to a depth where they can get an adequate traction bite prior to the time the vehicle bellies. Most Army vehicles do not possess sufficient flotation to permit them to stay on top nor do they have enough underbody clearance to permit adequate tire penetration prior to bellying. As a result, they get stuck.

It seems unlikely that efficient cargo carrying wheeled vehicles can ever be given sufficient flotation to permit them to remain on top of mud; hence under-axle and underbody clearances become exceptionally important.

The greater the tire diameter the more easily and simply the design can achieve adequate ground clearances. The presently standard 2½ and 5-ton trucks have less than 12 inches of under-axle clearance yet loading heights range upwards from 48 inches, the intervening space being occupied with a vulnerable tangle of frame members and articulating suspension and power train components as shown in *Figures 8, 10* and *12* on pages 45 and 46.

A GOER utilizing tires of six-foot or greater diameter may reasonably be expected to have at least 24 inches of under-axle clearance. Underbody clearance (along the vehicular length between the axles) can readily be established at whatever value desired for the particular vehicle. Ground clearance in this region is necessary, not only in mud, but also to permit the negotiation of "hog backs." In the GOER concept, loading heights and centers of gravity will be low while at the same time ground clearance will be high.

Tests of commercial equipment embodying certain GOER design features have proven the GOER to be an exceptionally capable mud performer.

The two photographs at the bottom of the next page depict movement through mud. The International Harvester has a 25-ton payload and the

Euclid is carrying 35 tons. The underbody of the International Harvester does not even get dirty, yet this same test course is generally impassable to all standard wheeled vehicles. The Euclid has drive on all four wheels. (Editor's note: There were other photographs submitted showing the ability of other commercial type vehicles of different makes to move through mud. However, there were too many to illustrate all at this time.)

These photographs illustrate spectacular performance, the kind of performance which will make an off-road logistical operation truly feasible.

The GOER's "mud-ability" is not derived solely from its use of large tires. Also important is its smooth underbelly unlike that shown of the 2½-ton truck on page 46, and its positive powered wagon steer, about which more will be said later.

In final analysis it may be said that tire size is the *most important single factor* in establishing the level of off-road performance which can be attained with a wheeled vehicle. In the GOER concept, the vehicle designer will start with the estimated gross weight of the vehicle and choose a tire size which will give the user the desired degree of mobility when carrying that gross weight. The vehicle will be designed to ride on tires of this size. This differs from the usual design practice of commencing with the vehicle itself and concluding by mounting the vehicle on the smallest tires which can carry the load and still render acceptable service life. In other



Tug of War.

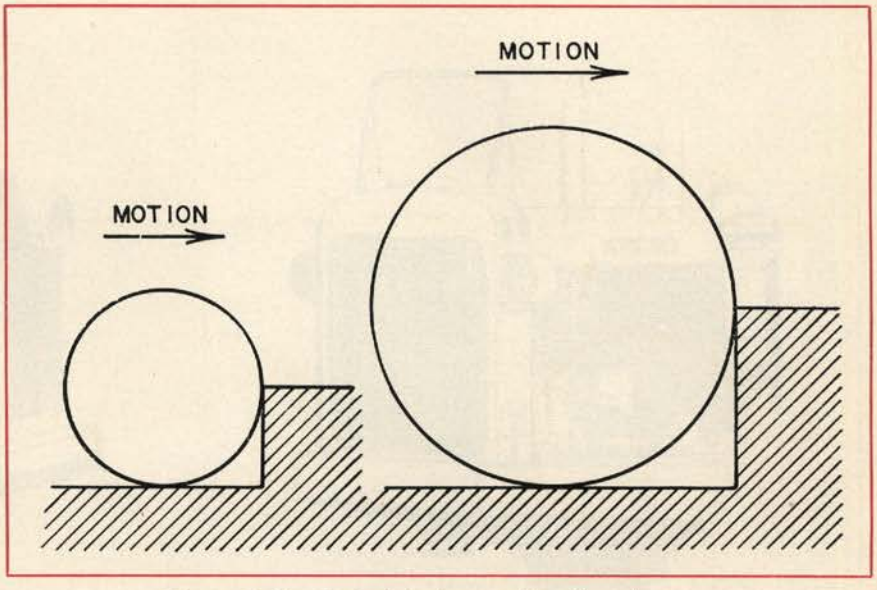
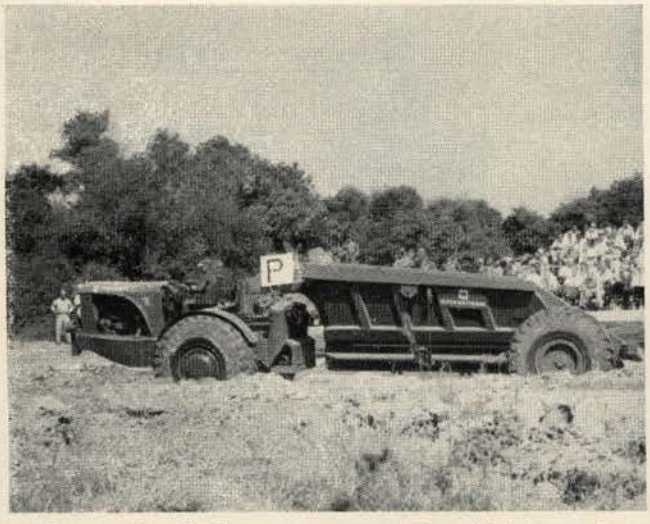


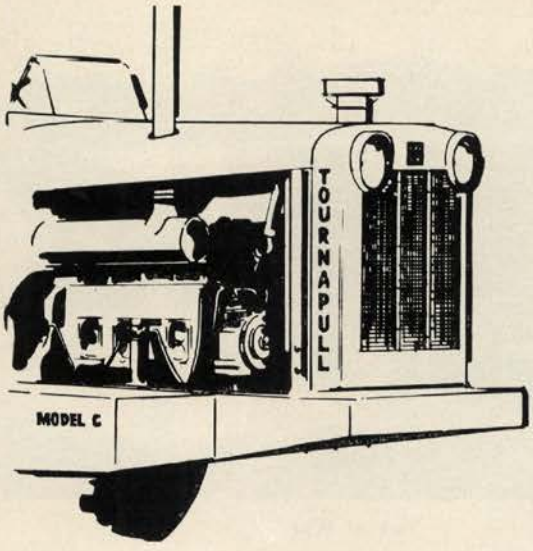
Figure 3. Vertical obstacles vs tire diameter.

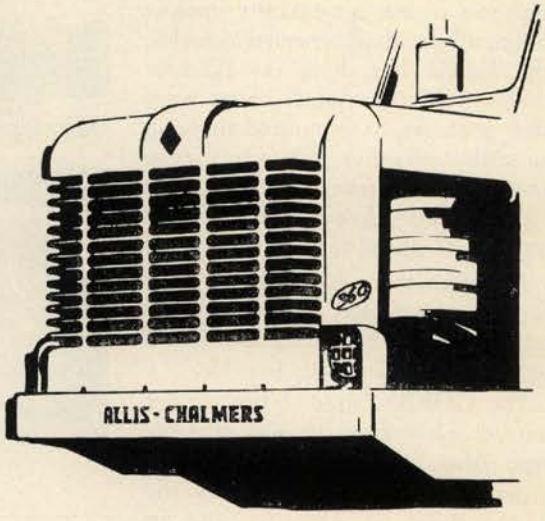


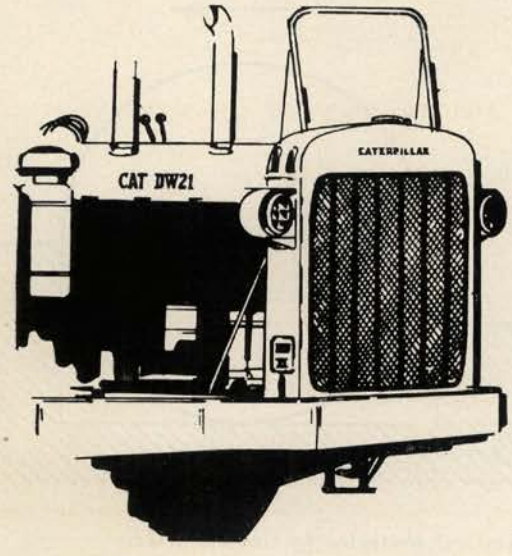
International Harvester negotiating 18-inch mud.

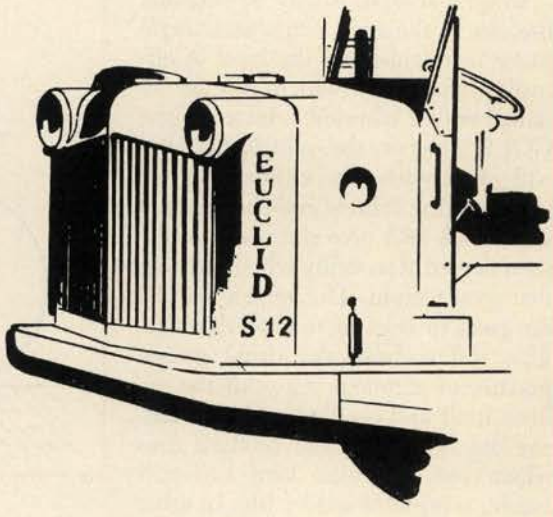


Euclid TS-18 negotiating 18-inch mud at 20mph.

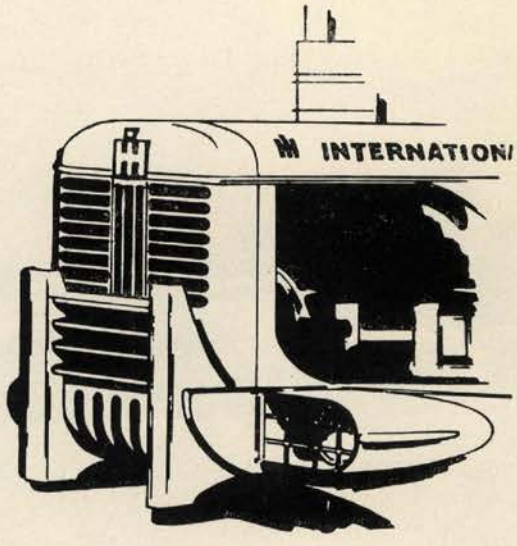












Noses of 6 major commercially available, 2-wheel GOER-type prime movers.

words the GOER is designed from the "ground up."

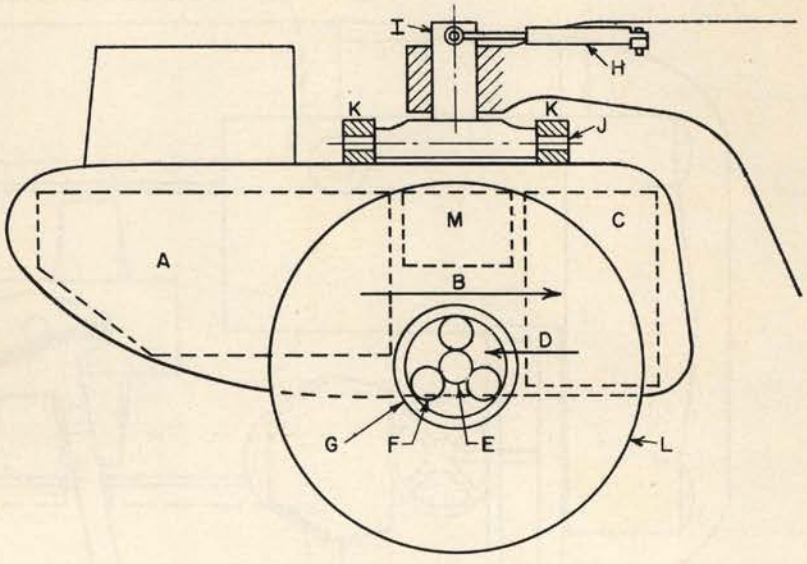
A second great advantage stemming from the use of large tires is mechanical simplicity through elimination of the suspension system and articulating power train. This will be discussed later.

Steering

VERY few revolutionary innovations of lasting, fundamental importance have been made in the design of military vehicles. The truck especially has been the product of patient evolution as can be seen by comparing the trucks manufactured in 1923 and 1956.

Among those truly revolutionary innovations which history does recognize are the pneumatic tire and the track. In the GOER concept we have a third great innovation, *Positive Powered Wagon Steer*. The two-wheel prime mover on which positive powered wagon steer is used is important to the GOER concept, and promises to exert a no less far reaching influence on the design and performance of army vehicles than have the pneumatic tire and the track. The benefits which accrue from its use are many and varied.

A bit of doodling on the part of the reader will suffice to show the impossibility of incorporating tires of the size called for by the GOER concept onto a conventional truck of acceptable size and loading characteristics; yet such tires are absolutely necessary if mobility is to be achieved. The two-wheel prime mover with positive powered wagon steer complements the large tire. It not only permits the rational design of useful vehicles of moderate size, mounted on the desired large tires, but it goes beyond this by making significant contributions to mobility, agility, reliability-durability, ratio of payload to gross laden weight, air transportability, and simplicity and ease of maintenance. The acceptance which the earthmoving contractor has accorded the two wheel prime mover, together with a general idea of the ever growing industrial base which exists for its manufacture, may be deduced from an examination of the trade names appearing on the drawings on the page to your left. An idea as to the capabilities and characteristics of the machines can be had by a brief visit to almost any major construction job that involves earthmoving.



LEGEND

A - ENGINE
B - DRIVE LINE - ENGINE TO TRANSMISSION
C - TRANSMISSION
D - DRIVE LINE - TRANSMISSION TO DIFFERENTIAL (NO SLIP)
E - DIFFERENTIAL AND AXLE
F - PLANETARY FINAL DRIVE IN WHEEL
G - BRAKE
H - HYDRAULIC STEERING CYLINDERS
I - VERTICAL KING PIN
J - HORIZONTAL KING PIN
K - BEARINGS
L - TIRE
M - HYDRAULIC PUMP OR ELECTRIC GENERATOR ON ELECTRICALLY STEERED MACHINES

Figure 4. GOER Two-wheel prime mover.

The two-wheel prime mover-tractor (*See Figure 4*) carries the GOER's engine, A; transmission, C; two front wheels, L; steering system, H; and operator. It is fastened to the trailing load carrier through an inverted letter "T" kingpin, I-J. The prime mover holds in bearings, K, the two ends, J, of that part of the kingpin which is horizontal. The neck of the trailing load carrier holds (in bearings) the vertical portion, I, of the kingpin.

When the GOER is moving straight ahead on smooth level ground the front and rear axles are parallel and horizontal. When one wheel strikes a bump or hits a hole the tractor or the trailing unit is free to tilt approximately 20 to 25 degrees in either direction about the horizontal kingpin, J, so that all four wheels remain on the ground. When a turn is desired by the operator, his steering command causes the hydraulic steering cylinder, H, to apply torque between the neck and the tractor about the vertical kingpin, I, so that the tractor swings either right or left as he commands it. GOERs, in common with their commercial cousins, are so designed and powered that the tractor may be swung a full 90 degrees to either right or left, as shown in *Figure* 5. The front axle may be swung to this attitude whether or not power is being transmitted to the wheels and whether or not those wheels have a tractive "bite." Once positioned, the front axle maintains its attitude and the vehicle circles un-

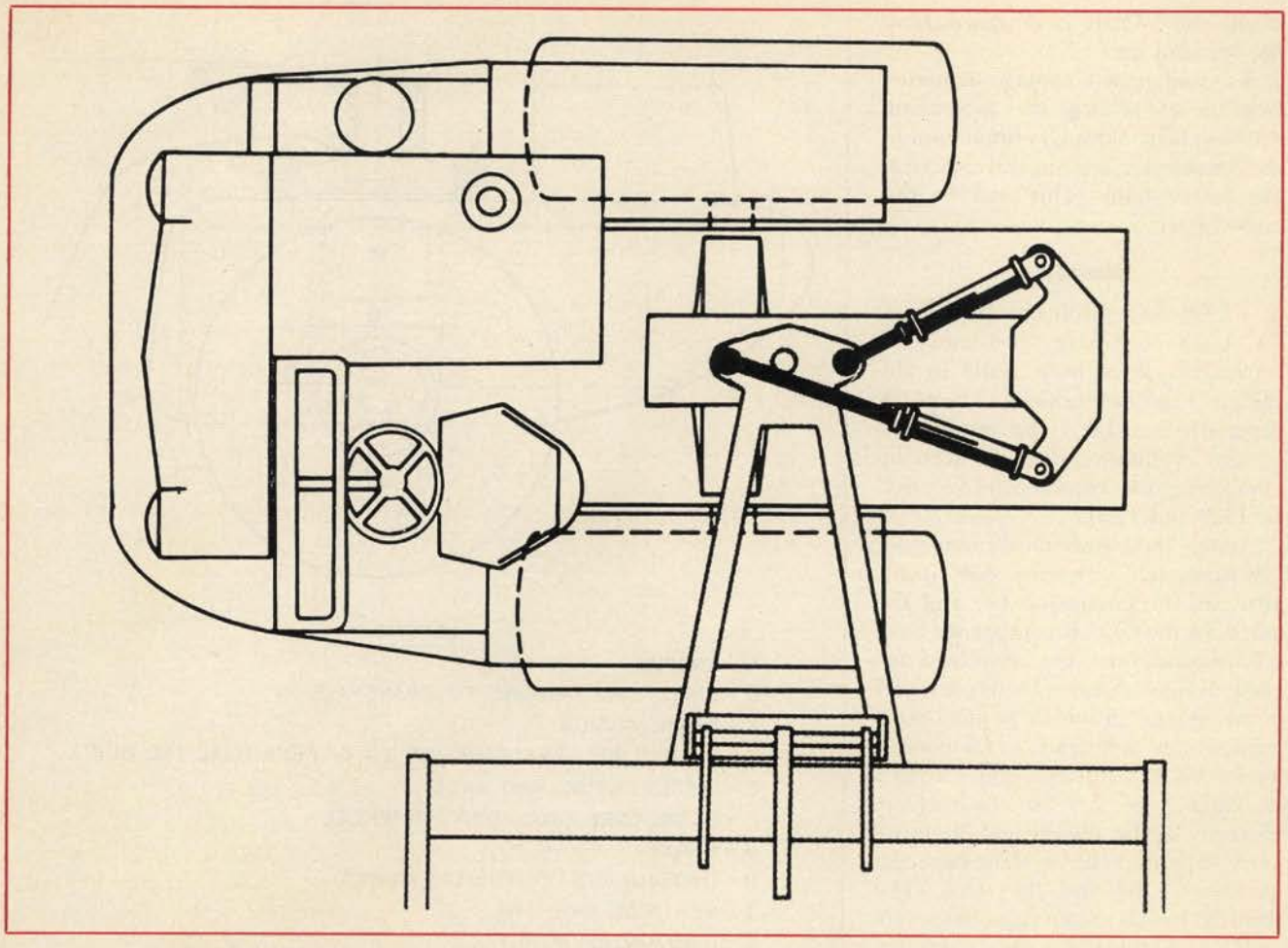


Figure 5. Full 90-degree steer position of hydraulically steered GOER type prime mover.

til a contrary steering command is given to restore the straight ahead orientation. This then, is *positive powered wagon steer. Wagon steer* because the entire axle swings and carries the wheels with it as does the farm wagon. *Positive powered* because the driver has complete and positive control over axle position anywhere desired within its limits of angular travel about the vertical kingpin.

Commercial earthmoving machines generate steering torque either electrically or hydraulically. In the electric system the steering command first causes release of a motor brake and then causes electric motor rotor rotation. Through a gear reduction unit a high torque at reduced speed is developed by a pinion. The motor, gear reduction unit and pinion are rigidly fastened to the neck. The pinion causes the rotation of either an internal gear or a spur gear segment which is fastened to the prime mover, with its center on line with the axis of the vertical kingpin.

Various hydraulic systems are in use. Most manufacturers use two hydraulic rams although one ram and four ram systems are to be seen. One manufacturer employs hydraulic rotary piston motors with gear reduction units. Still another has entered the market with a pair of hydraulic rams which push gear racks. These engage pinions to drive an internal gear on the mating half of the machine.

It will be noted that this system of steering differs markedly from the familiar Ackerman system universally used on the passenger automobile, bus and truck. In the Ackerman system the wheels are caused to pivot about the extremities of the axle. In wagon steer the entire axle is swung, and as used on the earthmover and the GOER, the steering axle not only carries the wheels but also swings the entire prime mover and its operator.

From the point of view of space engineering the problem of using large tires has thus been tremendously simplified. It is no longer necessary to leave room between the tires into which they may pivot when steering. This space may now be used for the power package and the operator as shown in *Figure* 5. This is a tremendous advantage in that a vehicle of acceptable width can now be designed on large tires.

The wagon steered GOER is agile. Since the front axle and its wheels can be swung a full 90 degrees in either direction, the GOER has an astonishingly short turning radius. Without stopping and backing, the GOER can make a nonstop "U"-turn on a road less wide than the vehicle is long. Anyone who has had occasion to reverse the direction of a convoy at night on a narrow road in an unfamiliar area will appreciate this feature. It is extremely useful also when the vehicle is finding its own way off roads and must often stop, back up and try another route. An illustration of such a situation is shown

at the bottom of this page. Even a vehicle as small and maneuverable as a ¾-ton truck cannot negotiate this serpentine side slope course without repeated backing and turning. The wagon steered vehicle on the other hand experiences no such difficulty.

Some backing will inevitably be necessary with any vehicle. In reverse, the GOER steers as easily as when moving forward. The driver finds it easy to position his trailing load carrier wherever desired in contrast with the well known difficulties encountered when backing a truck with two-wheeled cargo trailer or a truck-tractor, semitrailer combination.

The full mobility of standard trucks can only be realized when all wheels drive. It is not a simple mechanical problem to power wheels which also pivot in steering. To lessen shock on steering system, operator and drive line it has been found necessary to use expensive, failure prone, constant velocity joints and these must be located at a point on the vehicle which is extremely vulnerable to damage from outcroppings, mud and sand. The steering linkages which cause wheel pivoting by the Ackerman system must also be located in vulnerable areas. For proper handling and acceptable tire wear, proper steering geometry must be maintained. None of these problems exist in the GOER. This simplification adds greatly to the reliability and durability which has been clearly proven in the earthmover and is anticipated with the GOER.

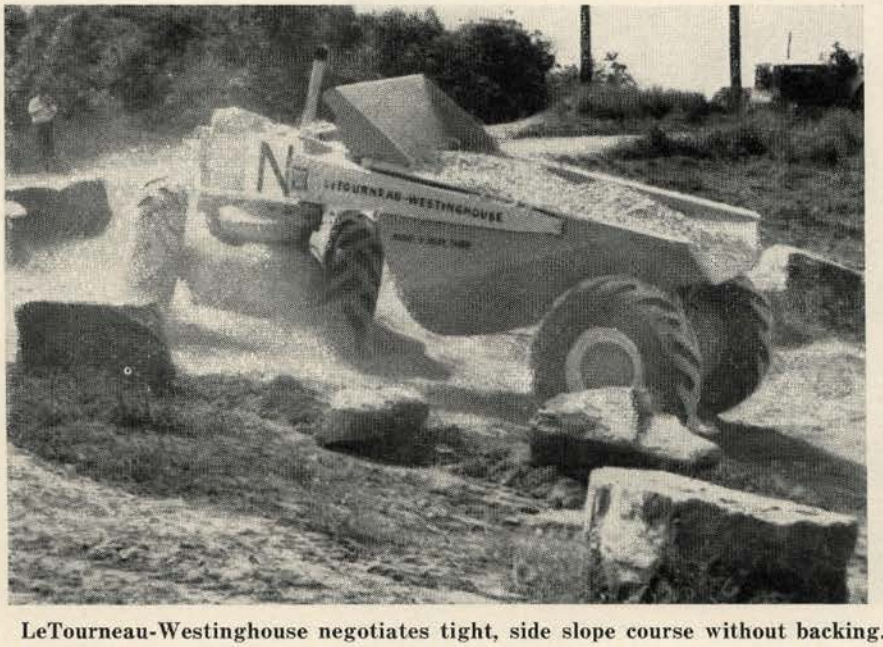
The efficiency of a transportation method can be measured in part by the ratio of payload carried to the gross laden weight of the machines. In the GOER (*See Figure 4*, page 39), this ratio will approximate 50 percent. The standard 2½-ton truck offers a 27 percent and the 5-ton truck a 33 percent ratio. This subject will be discussed in greater detail later because the improvement comes from several factors, one of which is the steering system. The front and rear axles of the GOER are free to tilt, each with respect to the other, about the horizontal kingpin, J. The result of this freedom to tilt is that no rack, no twisting of the frame, can be developed in the two body sections of the GOER unless the limit of oscillation is exceeded. This permits the framework to be more lightly constructed and the weight saved can be carried as payload.

Positive powered wagon steer offers a unique advantage for air transportability in that the GOER can be separated at the kingpin by field disassembly into two loads of approximately equal weight. Since the GOER will be designed for a 50 percent ratio of payload to gross weight, the net weight of the vehicle will approximately equal its payload. Thus a 15-ton payload GOER will weigh 15 tons or 30,000 pounds. When disassembled at the kingpin, each of the two units will weigh about 15,000 pounds which makes them conveniently air transportable.

The two wheel prime mover with positive powered wagon steer makes one more significant contribution to the GOER. Second only to the large low pressure tires, it is responsible for the GOER's mobility.

The agility aspect of mobility has already been covered. It also has been pointed out that steering does not depend on traction as it does on a tracked vehicle. This is a necessary clarification because the early models of two-wheel earthmoving prime movers were steered differentially. Rotation about both the horizontal and the vertical kingpin was free and the tractor axle was swung when the wheel on one side of the machine was speeded up as the other was slowed. That produces differential wagon steer which must not be confused with positive powered wagon steer as used on the GOER.

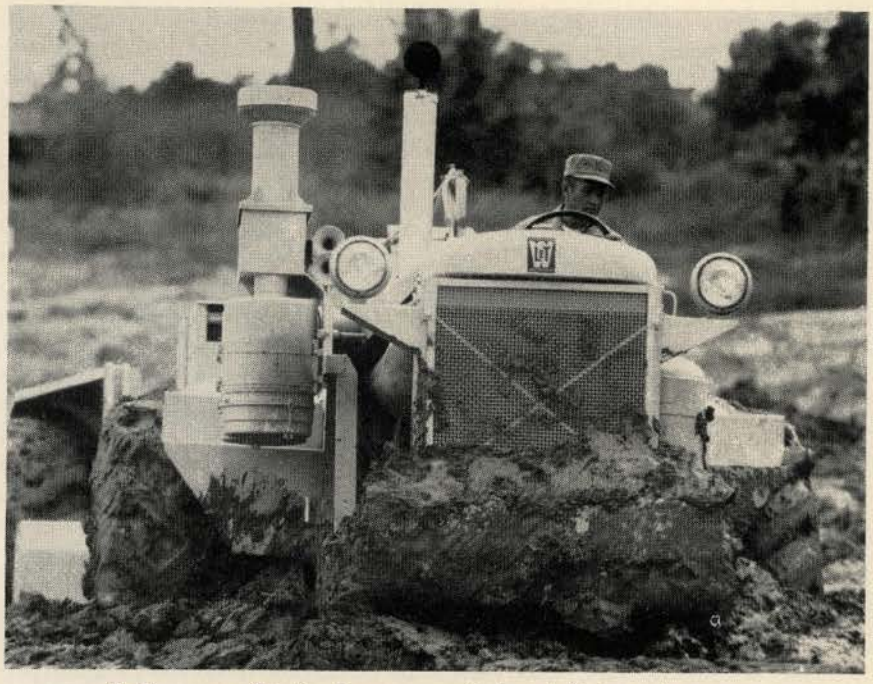
The mobility advantage derived from positive powered wagon steer is most apparent in mud; fortunately the medium in which mobility is most difficult to attain. Since GOER steering does not depend on traction, the prime mover may be swung from side to side even though the tires have no tractive bite, even though the vehicle appears stuck. When this is done, the tire on the off side is pushed forward by the axle to a position where it may secure a fresh tractive bite on a footing which has not yet been made slippery by futile tire spinning. It might appear that the inside tire would move in and rearward a like distance so that nothing would be accomplished. In practice this does not occur. Instead, the inside wheel tends to remain where it is on the ground, merely pivoting about the center of its footprint. The outside tire is rolled forward both by the steering push it receives from the axle and by its own improving traction bite. When this happens the vertical kingpin over the center of the axle moves forward one half as far as the outside wheel travels, carrying the trailing unit along with it. This creates a 2 to 1 multiplication of that part of the tractive effort applied to the kingpin. When the driver repeats the operation by swinging his tractor in the opposite direction the identical thing occurs



LeTourneau-Westinghouse negotiates tight, side slope course without backing.

and the load again moves forward.

This unique behavior permits the driver to duck-waddle or elbow his way through mud of a surprising depth as indicated by the photograph on the right. The vehicle shown in this photograph has drive on all four wheels when in low gear and this adds greatly to its "mud-ability." *Figure 6*, below, on the other hand shows a 26-ton load being pulled through an 18-inch mud course by a GOER type vehicle which does not have rear wheel traction and which, as may be seen in the photograph, has extremely low underbody clearance. This same mobility advantage prevails, but to a somewhat lesser extent, in sand as well as in mud, although in sand it is less needed because the large low pressure tires give a degree of performance, even when carrying extremely heavy loads, which far surpasses that of all standard wheeled vehicles.



LeTourneau-Westinghouse negotiating 4-foot mud course.

Not all commercial earthmoving machines employ the two wheel overhung tractor with positive powered wagon steer. Other machines use four wheeled tractors; still others, also mounted on four large tires, feature skid steer, two and four wheeled Ackerman steer, and combinations of Ackerman and skid steering. The tests which have been conducted on all these different types of vehicles during formulation of the GOER concept have clearly shown the mobility superiority of the two wheeled tractor with positive powered wagon steer. At the same time Ackerman steering has been found to permit higher operating speeds where the going is easy. Skid steer does not appear advantageous for wheeled vehicles except for a few special purpose machines where criteria other than mobility may make its use desirable.



Figure 6. Caterpillar DW-21 carrying a 26-ton payload through 18-inch mud.

IF a digression may be permitted at this point it is interesting to take note of a bit of ancient history. The origins of the wheel itself are obscure although it is known to have been in use during the protoliterate period of Sumerian Civilization about 3600-3000 B.C. The Egyptians improved the design of the solid Sumerian wheel by decreasing its weight through the use of spokes. The Egyptians were possibly the first to use a tire and it was probably made of leather affixed with copper nails. The Greeks also knew the wheel and made great use of it on chariots both for war and racing. Unfortunately for human progress the Greeks left the wheel much as they found it, dissipating their imagination, skill and artistry not on technological improvement of the wheel but rather on chariot styling and ornamentation. The primary wheeled vehicle for the Sumerians, Egyptians and the Greeks was the two-wheeled cart and chariot. A few 2-axle, 4-wheeled carts were in evidence, but their usefulness was limited because no means had been developed for steering. Both axles were fastened rigidly to the body.

It remained for the Romans to invent wagon steer. The four-wheeled wagon now became a powerful transport tool, capable of carrying far heavier and bulkier loads than the two-wheeled cart and with less fatigue to the draft animals. It was soon put to work by the Roman legions and gave them a tremendous edge over their logistically backward opponents. Wagon steer and the four-wheeled vehicles which it made practicable should be added to the short sword, close order drill and good red wine as sources of Roman strength.

This vehicle also gave reason for the insatiable Roman desire for road building, even as the automobile has done in modern times, with the result that the Roman Empire by the fourth century boasted 51,000 miles of paved road —almost ten times the mileage of paved highway which is in the USSR today according to latest encyclopedias.

Rear Wheel Traction

MOST earthmovers have only two-wheel (front) traction. This is not adequate for the GOER.

It has already been pointed out how the wagon steered two wheel tractor complements the large tire. Fortunately, the converse is also true. The higher coefficient of traction which is exhibited by the larger tire is what has made the two wheel tractor feasible.

Earthmoving operations are seldom conducted, if avoidable, when the ground is muddy, not so much because the machines lose mobility, but rather because of the difficulties in loading, ejecting and otherwise handling the wet earth. The military operation must on the other hand go on in spite of rain and adverse terrain.

The two wheel wagon steered tractor is an extremely capable machine and can in most instances furnish all the traction which is necessary to propel the vehicle under normal circumstances. For the climbing of steep grades and for the utmost in "mudability," however, rear wheel drive becomes essential.

When an earthmover type vehicle ascends a steep grade, a load transfer occurs. Weight is shifted from the driving front wheels to the idling rear wheels with a consequent loss of traction. As a result, the gradability of the conventional front wheel drive earthmover is limited to about 30 percent. This limitation can be overcome by driving the rear wheels which have received the weight transferred from the front.

Operations in severe mud, as well as those on extreme grades, are essentially slow speed operations. For that reason the GOER requires rear wheel drive only in low and reverse.

It does not appear feasible to transmit power mechanically through the articulating kingpins, nor is this necessary. Industry has solved the problem in two different ways, both of which have clearly proven practicable.

In one method rear wheel drive is provided by mounting a second engine and automatic transmission between the rear wheels. Both are pneumatically controlled from the driver's position. No objectionable driving complexity is involved because the same throttle and shifter positioning lever which control the front power package also control the rear. This solution to the problem offers both advantages and disadvantages. It is now possible to put tremendous engine power into the unit without causing excessive length or overhang of the prime mover. It is also possible to obtain that "limp home" capability which is possible with a twin engine installation should one engine fail. The twin engine approach makes all wheel drive available in all gear ratios. It is possible that a certain fuel economy can be had with twin engines by using only one when the speed and route permit. If the maximum in total possible engine horsepower is not required, it then becomes possible to use two smaller engines instead of one of larger size. Smaller engines are more readily available from established commercial production facilities.

Among the disadvantages of the twin engine installation are the impossibility of rear loading the GOER, which is already difficult enough because of the relatively narrow space between the rear wheels, and the added maintenance burden of caring for two power packages instead of one.

Another manufacturer offers electric traction assist which can be set to cut in automatically in low gear. This machine already incorporates a high capacity generator in the prime mover to provide electric power to its steering system and winches. No difficulties have been experienced in transmitting electrical power with flexible cable through the kingpin region. A machine of this type is shown at the top of the preceding page.

This system like the other has both advantages and disadvantages. The traction motors are relatively small and can easily be placed in whatever location may be most convenient so as not to interfere with vehicular configuration and loading characteristics. Only one internal combustion engine and transmission are required.

The engine crankshaft is coupled directly to the generator rotor so that both turn at the same speed. By employing a squirrel cage, AC, induction motor at each rear wheel, each with its own reduction unit of proper fixed ratio, the rear wheels are caused to turn at the same speed as the prime mover wheels with no added sychronization complexity. The squirrel cage induction motor develops extremely high torque at slow speed and by virtue of not having a wound armature, commutator or brushes, proves extremely dependable in field use. It is a rugged piece of machinery not at all temperamental, and relatively immune to damage from water, mud and grit.

The electrical generator of the prime mover can provide considerable power for a host of ancillary applications when the vehicle is at rest. These might include machine shops, arc-welding, pumps, compressors, winches, lighting, heating etc. In a vehicle using a 260 horsepower engine, the commercial generator can furnish a 250 ampere output of 480 volt 120 cycle alternating current.

The primary disadvantage, possibly pertinent only during the period of maintenance training, is that associated with a different, basic system of power transmission.

In addition to the two systems already discussed in detail the rear wheels may be powered with DC, variable speed motors and some work is being done by industry on the use of air and hydraulic motors for this purpose.

Exoskeletal Design

EXOSKELETAL is a term chosen to describe the type of body construction to be used in the GOER. This construction differs from automotive practice.

The word is intended to convey a meaning similar to that understood when used in biology. A lobster is exoskeletal. The vertebrates, including man, are endoskeletal. There are existing engineering terms used to convey a meaning similar to that of exoskeletal but they are applicable to limited cases and not accurately descriptive of the type design contemplated for GOERS. Examples of related-meaning words are: monocoque and stressed skin (aeronautical), hull and longitudinal framing (marine), and unitized body-frame (automotive).

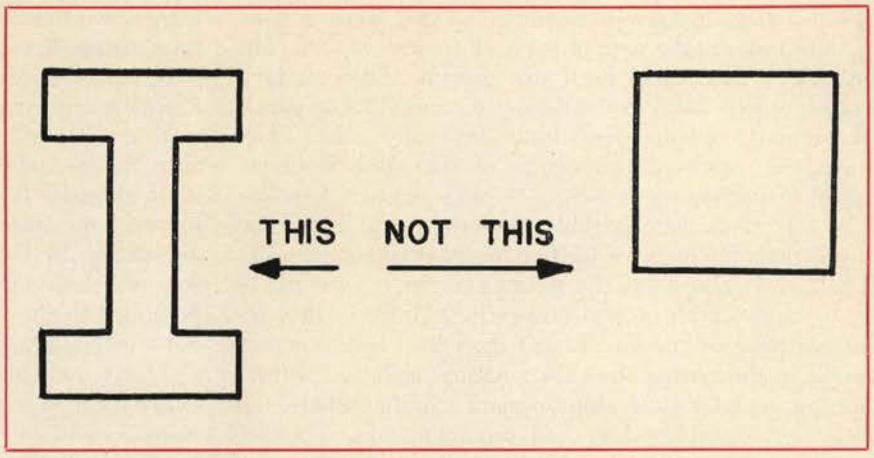


Figure 7. The Exoskeletal principle.

The bending moment caused in a beam by a load or system of loads is resisted by the material of the beam. This resistance varies not only with the amount and strength of the beam material, but also with its shape or disposition. For each element of cross section, the stress is proportional to the distance from the central or neutral axis, and its moment is proportional to the square of that distance. The summation of all the elements is the total moment of resistance. In general, the greater the depth, or the more the material can be kept away from the neutral, nonworking axis, the stronger will be the beam for a given amount of material; or conversely, the lighter in weight can be a beam of a given, required strength. This is effected in practice by the use of beams having web and flanges instead of solid rectangular cross section, as shown in *Figure* 7. Exoskeletal, GOER design calls for the fullest possible extension and application of this well known engineering principle.

Exoskeletal structures have long been the basis for both naval and aircraft design. Its worth is being increasingly recognized by the architectural and the automotive designer. Exoskeletal tanker-semitrailers, having no frame structure, are growing in popularity. So is the unitized body-frame in the passenger automobile. More strength, less dead weight, heavier payloads and lower cost are the reasons for its use in the civilian economy. The GOER will reap these same benefits and in addition will gain an inherent capability for flotation in inland waters. This will permit crossing most inland water obstacles without bridging and will facilitate direct, rapid unloading of water based transport aircraft. GOERS are not amphibious to the extent of a capability for negotiating heavy ocean surf although it may prove possible to give them this capability.

Investigation has shown that every vehicle now standard in the United States Army would float, from a displacement point of view, if "boxed in" rectangularly about its present exterior dimensions. This includes such vehicles as the M48A2 tank and the 280mm Atomic Cannon. Flotation may be had, literally for the asking, in the case of the exoskeletal vehicle. This is not the case with the conventional amphibian as can be seen from the following extract from TM 9-2700 "Principles of Automotive Vehicles," "Amphibian trucks . . . have both a hull and a frame. Designed to provide buoyancy necessary for flotation, the basic hull assembly is of all steel, watertight construction, with reinforcements to add to its rigidity. It is built to accept the chassis frame and power plant. The frame, similar to a conventional truck frame is installed inside and bolted to the hull. The power plant and power train are supported by the frame; running gear underneath the hull, is attached to both hull and frame." In the GOER, frame and body are one.

Exoskeletal design obviates the need for waterproofed engines and accessories; furthermore, almost all functioning components of the GOER are inside the exostructure, protected

not only from water but also from damage due to hummocks, stumps, rocks, frozen soil and the abrasive action of grit.

Exoskeletal design permits faster, easier and more thorough CBR decontamination.

The exoskeletal design of the GOER will permit van models without further modification or hut installation to be used for enclosed workshops, surgical operating rooms, fire direction centers, radar vans, photographic and mapping laboratories, living quarters, command posts, and communications and code centers.

Simplicity

SIMPLICITY is a virtue much sought after in military equipment to the extent that it neither impairs performance nor requires unreasonable operator skill levels. Its importance can hardly be overstressed.

A commercial highway truck is simple, but has little off-road mobility. Such a truck becomes complex when it is redesigned or modified so as to give it an appreciable degree of off-road mobility. This is especially true if the additional mobility is to be derived from an increased number of powered wheels. The situation is further aggravated if these additional wheels must be not only powered but also steerable. Power train complexity is especially undesirable because it is in this region of the vehicle where most failures occur.

The 4-wheeled GOER is inherently more simple in design than either the 6x6 or the 8x8 truck. *Figures 8 through 12* show why. The GOER prime mover type of power train illustrated in *Figure 11* is that of the 10-ton payload vehicle shown in the photograph on page 41.

The price of complexity, as it affects reliability and maintenance requirements, is shown in *Figure 13* on page 47.

The very key to increased reliability and durability lies in the degree of mechanical simplicity which can be attained. The GOER is not a "Rube Goldberg" device; on the contrary, it is patterned closely after the simple, robust, enduring equipment so widely used by the American Construction Industry. That equipment is designed to give 10,000 hours (approximately 100,000 miles) of economical service under "tote road" and



Figure 8. Suspension, 2½-ton truck.



Figure 9. Suspension, "D" Tournapull.



Figure 10. Power Train, 2½-ton truck.

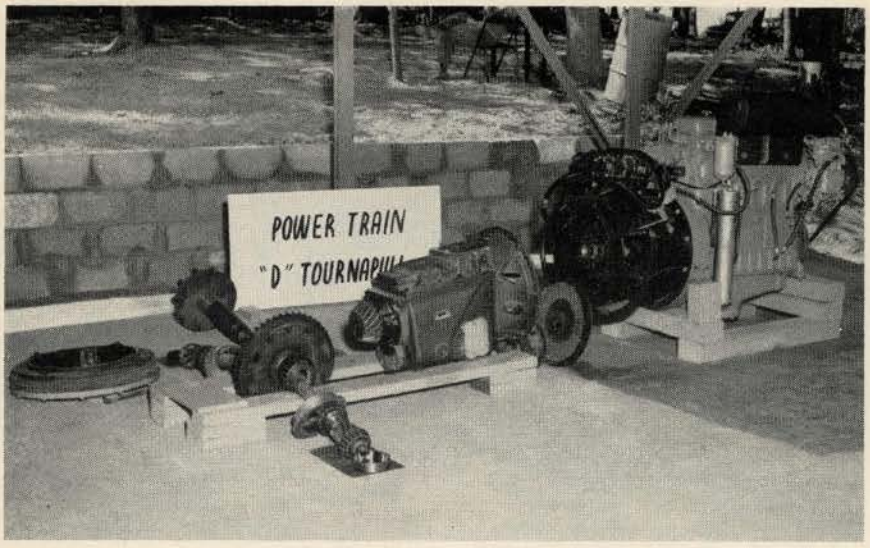


Figure 11. Power Train, "D" Tournapull.

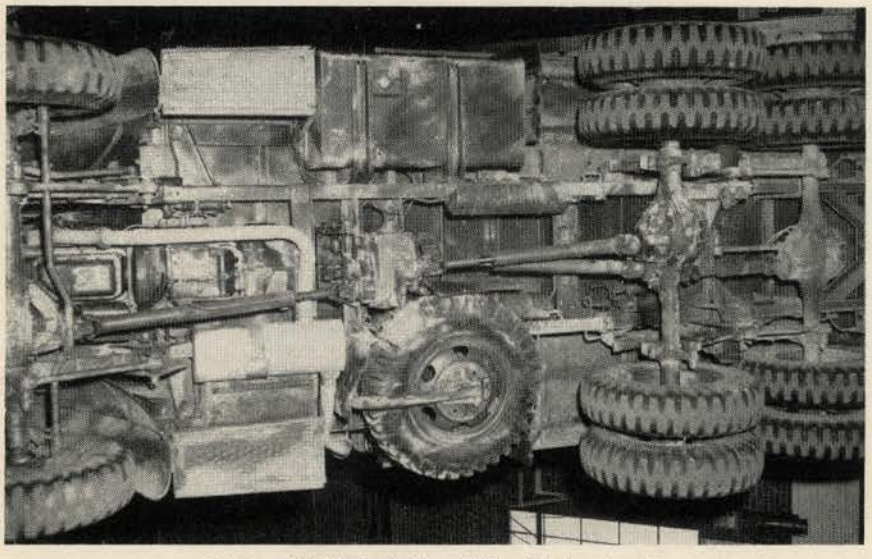


Figure 12. Underbelly of the 2½-ton truck.

cross country conditions; conditions comparable to those encountered by the Army. Construction equipment has a high availability factor throughout that extended life span.

Figure 4, page 39, and *Figure 11* illustrate the GOER type power train. Its simplicity is outstanding and gives increased efficiency, durability and ease of maintenance. The engine may be withdrawn readily through the front of the machine. When the prime mover has been swung 90 degrees, free access is offered to the transmission which can easily be serviced or removed through the rear of the tractor. The steering system is conveniently located for service or replacement and does not require frequent adjustment of steering geometry. It requires none because none is possible. When a wheel cover has been removed, the axle may be withdrawn by simply pulling it straight out. In the same way, and quite as simply, all components of the planetary final drives may be inspected or replaced without removal of the tire or wheel. There is no suspension system requiring service.

The GOER is actually one vehicle, not two, as in the case of a truck tractor-semitrailer combination. It is not feasible for example to operate the two wheel prime mover independently of its trailing load carrier as can be done in the case of the truck tractor, nor can the coupling and uncoupling of the trailed unit be accomplished as simply as with a truck tractor-semitrailer. On the other hand the two complementary units can be separated in a relatively short time. The interests of maintenance are served by making possible the replacement of an inoperable prime mover with an operable unit. This permits cross exchange in lieu of cannibalization in the event that the tractor of one GOER and the trailing unit of another require maintenance. When this occurs, the still operable units of the two machines can be mated so that the deadline rate is only 50 percent of what it would have been with 6x6 trucks.

Maintenance is also served in one other important way. The GOER tractor is an extremely versatile machine which can serve as prime mover for a limitless variety of trailing units. In commercial practice the same two wheel prime mover is used to pull scrapers, dumpers, tankers, rollers, cement mixers, flat beds, cranes, logging arches, sugar cane haulers etc. The Army can take advantage of GOER flexibility in the same way. This will minimize the variety of spare parts which need be available and will greatly simplify the training of maintenance personnel.

The changing and repair of a GOER tire will be more difficult and time consuming than with current standard vehicles. By the same token, the necessity for doing so will be far less frequent because of the greater tire circumference, section height, flexibility and tread thickness. The GOER tire for example, is virtually invulnerable to C-ration cans and spent shell fragments, the two major causes of tire failure in World War II. The GOER tire will not require chains.

Simplicity gives economy, both in initial cost and in operation. Complexity on the contrary leads to an increasing number of working parts. Working parts require machining; machining costs dearly and so does careful assembly. The simple machine is economical in operation. Its less frequent breakdown and faster maintenance give higher availability which justifies fewer maintenance facilities and less standby equipment.

Shorter, simpler, nonarticulating power trains suffer lower power losses than do the longer, more complicated,

articulating power trains of the 6x6 and 8x8 trucks. This permits the use of smaller engines consuming less fuel.

Mechanical simplicity is a reality in the GOER concept, not a cliche, as it has become in the design of small tire, multi-axle trucks. Mechanical simplicity in GOERS is realized as follows:

The large diameter, low pressure tire used in conjunction with positive powered wagon steer permits elimination of the suspension system with its many springs, shock absorbers, and tie rods. *(See Figures 8 and 9.)* This, in turn, eliminates the necessity for articulating power trains with their many prop shafts, universal joints, extensible joints, seals, bearings, pillow blocks etc.

Tractive effort is concentrated in fewer driving wheels on the GOER than on the 6x6 or 8x8 truck. This permits shortening of the power train so that it becomes stocky and rugged.

Positive powered wagon steer permits elimination of constant velocity joints and related components necessary in the Ackerman steering system. Conventional steering mechanisms, presently located underneath the vehicle where they are susceptible to misalignment and vulnerable to serious damage from hummocks, stumps, rocks, and the abrasive action of grit, are changed in design and relocated atop the vehicle in relatively invulnerable positions. The GOER underbody is smooth and clean in contrast with that of the truck as shown in *Figure 12.*

Exoskeletal designs are simple and for the most part can be welded structures. This eliminates many screw and rivet fasteners which tend to work loose and set the stage for mechanical failures.

Exoskeletal design permits the use of simple, unwaterproofed engines and accessories. Flotability does not require kit application when its method of attainment is premeditated and designed into the vehicle instead of attempted as an afterthought.

These benefits, all cumulative, can be attained with simplicity. They are worth having.

The GOER pays a price for its simplicity however. Extensive tests have pretty well established the usable top speed of such an unsprung vehicle at about 30 mph, and this speed of course can be attained only on roads. Against this limitation must be weighed the many real advantages which have already been set forth, the probable nature and theaters of operation of another conflict. Also worthy of consideration is the extent to which the Army profits from the 60 mph top highway speed of most of our currently standard wheeled vehicles. The GOER most surely will increase speeds in the off-road operation.

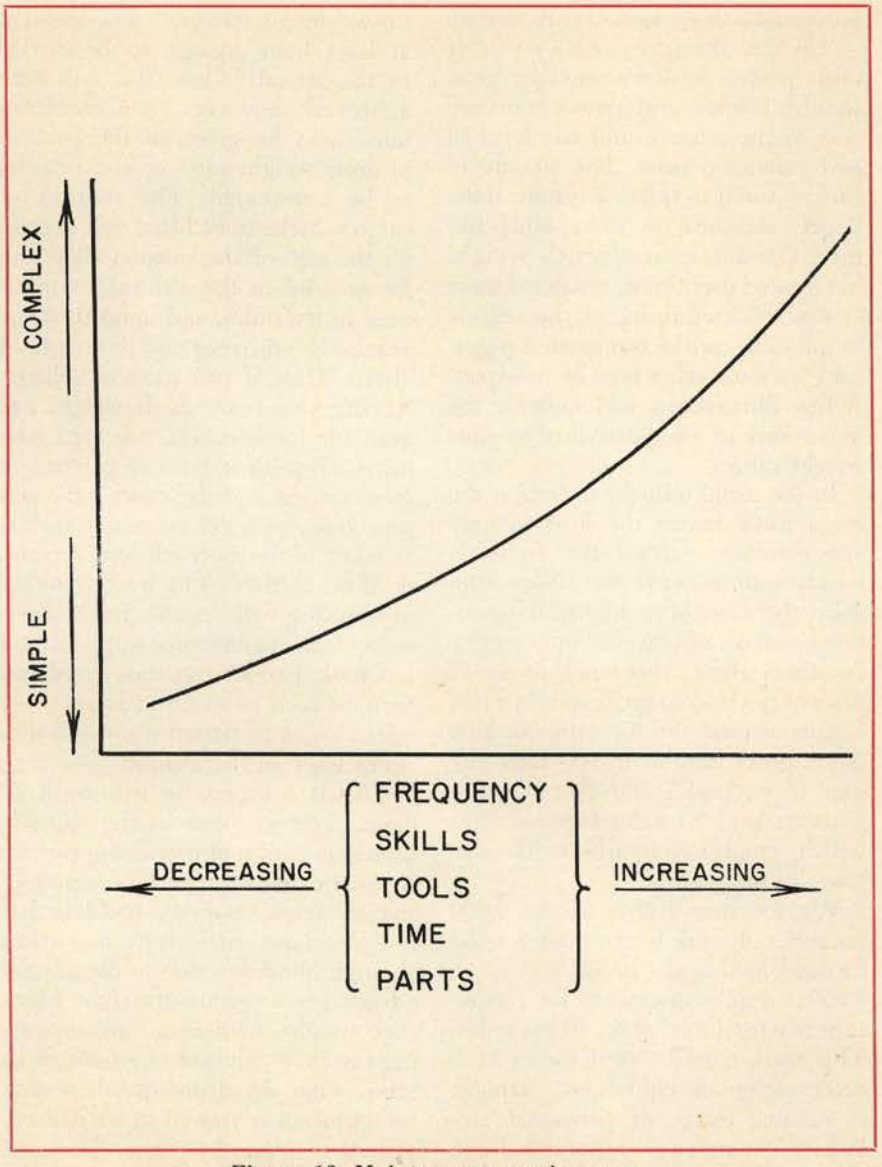


Figure 13. Maintenance requirements.

Payload vs Gross Weight

THE simultaneous use of exoskeletal structures and large diameter, low pressure tires without suspension systems, has given earthmoving and logging equipment off-road, payload to gross vehicle weight ratios of 50 to 70 percent. This is in contrast to off-road payload ratios of 25, 27, 33 and 39 percent in the Army's ¼ and ¾-ton, 2½-ton, 5-ton and 10-ton trucks. Army truck tractor-semi-trailer combinations have more favorable ratios than do the trucks, but at the same time they have nearly negligible off-road mobility. GOERS will have an off-road, payload to gross weight ratio of approximately 50 percent while at the same time they will have high off-road and off-bridge mobility with improved durability when so used.

This ratio is extremely important in determining the efficiency of a transport system and has far greater significance than the usually em-

ployed ratio of payload to curb weight.

The size of engine which a vehicle must possess is determined by gross weight, efficiency of power transmission to the wheels, and the level of performance desired. The amount of fuel required to travel a certain route largely depends on these same factors. Consideration of curb weight has limited usefulness, restricted more or less to determining if the vehicle in question can be transported piggyback by some other type of transport. A few illustrations will indicate the importance of a high payload to gross weight ratio.

In the usual military operation the cargo truck moves the load in only one direction—toward the front. It returns empty to the rear. Now, consider the case of a logistical operation based on a force of 2½-ton trucks. As stated above, this truck has a 27 percent payload to gross weight ratio. Let us assume the force in question has a gross weight of 100 tons (27 tons of payload), and that it transports its load 50 miles forward after which, empty, it returns a like distance to the rear.

We see that 100 x 50 = 5,000 ton-miles of work is necessary for the forward haul and (100-27) x 50 = 3,650 ton-miles necessary for the return trip for a total of 8,650 ton-miles. This work must be paid for in fuel, deterioration of equipment, damage to routes, usage of personnel etc. When we measure what we have achieved however, we find that only 27 x 50 = 1,350 ton-miles of accomplishment has been registered. The ratio of accomplishment to expenditure is only 15.6 percent, and this is the measure of our efficiency. Stated another way it appears that at least 84 percent of our logistical endeavor consists merely in moving the dead weight of the trucks! Small wonder that our logistical tail now wags the fighting dog. This efficiency can be improved and will be in the GOER.

Operational efficiency is not the only benefit accruing from an improvement in the payload to gross weight ratio. Great emphasis is currently being given air transportability. Our military journals are full of articles extolling the advantages of light weight. Light weight equipment, in the case of the cargo carrier, is advantageous only to a degree. Quite obviously an individual vehicle cannot be air transported unless it is at least light enough to be carried in the aircraft. Once this has been achieved, however, consideration must next be given to the payload to gross weight ratio of the vehicles to be transported. The number of cargo vehicles to be lifted will depend on the size of the mission they will be assigned in the airhead, as measured in ton-miles, and upon their operational efficiency, as determined above. Thus, if two types of vehicles having the same curb weight are available for selection, one type having a 27 percent ratio of payload to gross weight and the other a 50 percent ratio, only 54 percent (27/50) as many of the more efficient vehicles need be airlifted. The lesser number of vehicles will require fewer operators, less maintenance support and less fuel. The aircraft thus saved can then be used to mount a larger scale operation or to permit a faster build-up of force in the airhead.

This is a means for causing a vicious circle to rotate in the opposite direction until it almost disappears up its own exhaust pipe. This aspect of the air transportability problem has not received sufficient attention through blind devotion to the alleged advantages of light curb weight. Light curb weight, without an accompanying favorable payload to gross weight ratio, is not all advantage when such an operation is viewed in its entirety instead of plane by plane. The goal must be to deliver efficient capability to the airhead, not impressive quantities of inefficient equipment and large numbers of personnel, rendered unproductive for lack of an adequate tool.

In addition to an improved operational efficiency through increased payload to gross weight ratio, the GOER offers a concept whereby simple, enduring, mobile vehicles of higher carrying capacity can be provided at a reasonable size and weight. As earlier described, the 15-ton payload GOER can be air-transported.

The necessity for logistical vehicles of increased carrying capacity is clearly evident when viewed through the manpower window. The commercial highway trucker carries the largest, heaviest load that consumer demand and the law allow. He does so to achieve equipment and manpower economy. The same thing is true of railroads, marine shipping and the airlines. The Army must follow suit. That we have not done so in the past may be deduced from the World War II European Theater ratio of one wheeled vehicle per 4.3 soldiers. Many, possibly most of the vehicles, had two drivers and carried thimble size loads. We cannot continue to haul gasoline in thimbles when one armored division can consume 400,000 gallons per day. This quantity of gasoline can be transported in 48 GOER tankers of 25-ton capacity or 80 15-ton GOERS. Furthermore, these tankers can go almost anywhere the tanks can go and can float across rivers which the tanks cannot.

We have made tremendous strides in increasing the firepower of the individual soldier and of the unit to which he belongs. We can now increase the "log power" of the logistical soldier in the same way. Until this has been accomplished, the sparsely populated Army area will remain a myth.

General

IN a land where rails, highways, bridges and airports abound and in a military situation where off-road movement is neither required nor forced through threat of use of atomic weapons by the enemy, the fastest, most capable, and most economical transport for the Army is offered by those transport vehicles which have been already developed, and are constantly being refined, for use by the peacetime, commercial transportation industry. These vehicles should be exploited to the fullest possible extent wherever and whenever the situation permits them to do the Army's job.

Unfortunately, most regions of the world do not have rails, highways, bridges and airports in abundance; the established communications network does not always lead in the direction of necessary Army advance; and the very nature of military operations recognizes few instances where extensive off-road movement is not required. These factors were true during World War II and are yet more evident for the atomic age. Road bound vehicles can neither disperse nor concentrate with the speed and flexibility required in modern war and dispersion appears essential. The civilian ground transport tools are def-

initely restricted to operation on rails and highways. Air transport is not restricted in this same way, but has still other operational and availability limitations.

It is axiomatic, at least for the foreseeable future, that the greatest effectiveness, flexibility and economy in Army transport will be achieved by judicious integration of all air and ground transport media into a team effort. The leadership of this team must recognize the inherent limitations of all transport means, regardless of type, and conduct its operation in such a way as to minimize the effect of these limitations while at the same time exploiting the unique capabilities of each system so as to complement the work of the other team members.

The commercial highway truck and truck tractor-semitrailer combinations are not only roadbound today, but are becoming increasingly more so. Commercial vehicles are designed to take full advantage of a constantly improving highway system. Curves are being broadened, grades made less severe and the road surface smoother and less undulating. Every improvement in the highway system which makes it a more gentle and less demanding environment for civilian vehicles leads to new commercial designs less well suited for Army off-road employment.

The truck tractor-semitrailer combination has almost completely replaced all other types of long distance or high capacity highway hauling units in commercial practice. The "softening" design trends outlined above have already progressed to the point where this equipment in particular must be considered totally incapable of off-highway operation.

On the other hand, the postwar period has seen the phenomenal growth of a true off-road vehicle manufacturing industry. It appears logical that the Army should look to this young, imaginative and dynamic new industry for the solution to some of its off-road transportation requirements.

There obviously is a requirement for Army off-road vehicles. These must necessarily differ from commercial vehicles, but they need differ less from the commercial off-road vehicle than from the commercial highway truck and truck tractor-semitrailer.

Ground vehicles may be classified according to the nature of their running gear, be it tracks, wheels or runners. Various attempts to improve upon each of the simple systems have led to such developments as the space link track, rolligon bag, terra-tire, lipsoid-tire, Agnides wheel, runner, ski, toboggan, etc., but at the present state of the art the basic families remain these three.

There appears to be no way yet devised in which a running gear which slides on the earth (runners, skis and toboggans) can be gainfully employed to any great extent other than on snow and ice.

Full study has been given to tracked vehicle systems. Recognition has been accorded the off-road mobility which is possible from tracks, but it has been concluded that the wheeled vehicle will retain its dominant position as the primary transport means. This conclusion has been reached on grounds of simplicity, dependability, durability, weight and the inherent economy possible both in manufacture and operation of wheeled equipment. The validity of this conclusion has been strengthened through a greater appreciation of the off-road mobility which can be had in the case of a properly designed off-road wheeled vehicle.

The Army in the field employs wheeled vehicles in three primary operational roles:

1. Tactical
2. Distribution/Impedimenta
3. Logistical

A requirement exists for three families of vehicles, each family specifically designed to achieve the most effective and economical mission accomplishment within each of the three operational roles.

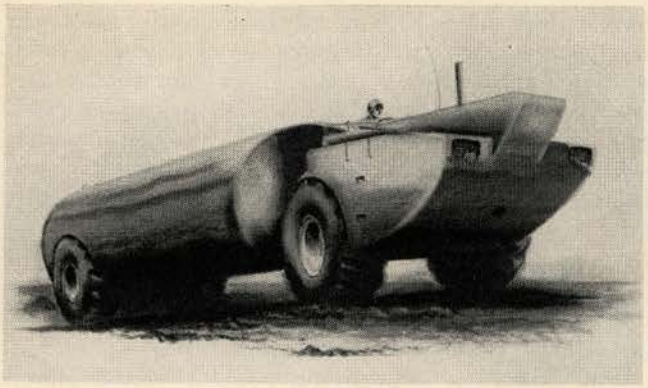
The GOER Concept assigns the following nomenclatures to these three families:

1. GOER, Battlefield, Air Liftable
2. GOER, Distribution, Air Droppable
3. GOER, Freighter, Air Landable

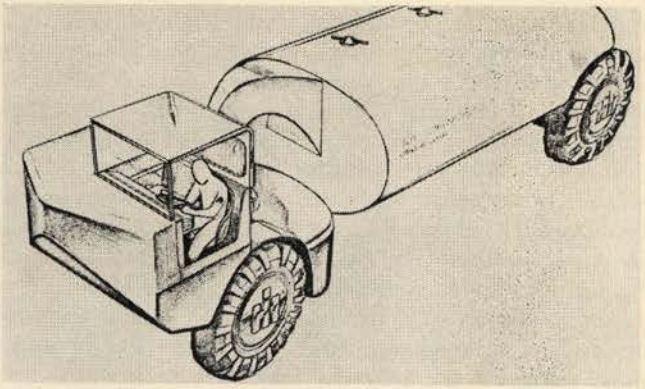
In ground combat, or in close proximity to ground combat, the GOER Battlefield, Air Liftable, is used for the rapid transport of leaders, weapons, crews, ammunition and communications equipment. These GOERS permit rapid, effective movement and facilitate the exercise of control, two items which complement firepower as essentials to battle success. GOERS of this class are characterized by light weight, small size, low silhouette, high agility and mobility, easy ingress and egress, quiet operation and the capability for being both manhandled and air-lifted. Cargo carrying capacity is subordinated to these battlefield requirements.

Distribution GOERS are employed in the forward combat areas, usually not under direct fire, to move impedimenta and supplies for small combat units. Examples of this role are company, battery and battalion kitchens; and maintenance, impedimenta, ammunition and fuel carriers. Such vehicles must have high cross country mobility, ease of hand loading and unloading, high ratio of cubage to tonnage capacity, ease and quietness of operation, high durability and reliability and easy maintenance. They are air droppable and may be adapted for special purpose uses such as communications centers, offices and mobile workshops. They are used to resupply using units with fast moving expendables such as water, rations, fuel and ammunition, and to distribute such material from forward distribution points, drop zones, and pick-up rendezvous with freighter GOERS or aircraft to the place of consumption.

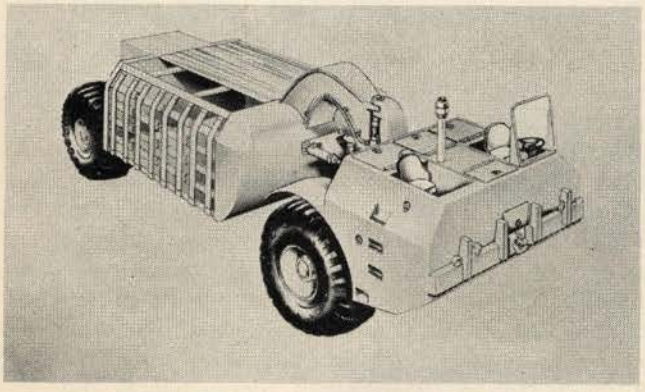
Freighter GOERS move large quantities of material from rear area depots, dumps, supply points, beachheads, pipeheads, railheads, etc., to forward area distribution points or rendezvous with distribution GOERS. Cargoes are usually homogeneous and distances of haul are relatively great and over poor routes. The vehicles are characterized by high ratios of payload to gross weight, high payload tonnage ratings, long cruising range and economical requirements for manpower. In general they are operated only in active combat theaters. They permit the mobilization of supply stocks and are capable of direct offloading into distribution GOERS. When required quantities of expendables are sufficient to make the use of freighter GOERS practicable, as in the case of ammunition and gasoline for armored and artillery units, the freighter GOERS may make deliveries past the distribution points



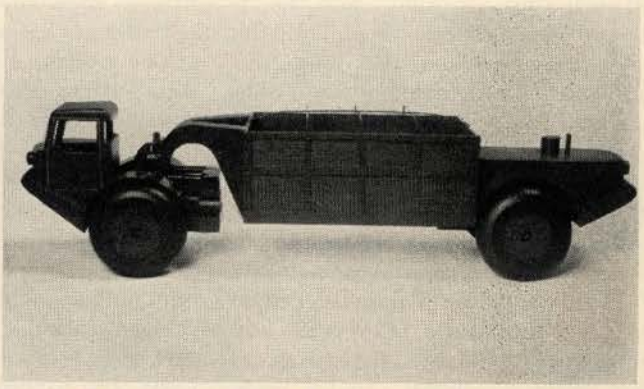
LeTourneau-Westinghouse, 5,000 gallon tanker.



International Harvester, 5,000 gallon tanker.



Caterpillar, 15-ton ammunition carrier.



Euclid Division, GM, 15-ton ammunition carrier.

directly to the consuming units.

The GOER Concept is peculiar in one respect; it is easier to design a large GOER than a small one. At the present time it is known that the six salient design features enumerated at the beginning of this article can all be attained in good measure in GOERS having payload capacities of 8 to 10 tons and greater. As the size further diminishes, the ratio of payload to gross weight is the first characteristic to suffer. This same phenomenon, however, also occurs with the conventional truck as evidenced by the 39, 33, 27 and 25 percent ratios which prevail for the 10-ton, 5-ton, 2½-ton and ¾-ton trucks respectively. If payload to gross weight ratio is to be kept high, then a smaller tire must be used. To do so means loss of mobility and simplicity and the benefits begin to vanish.

At first look this might appear to be a disqualifying limitation of the Distribution Size GOER, inasmuch as the Army has grown so accustomed to the 2½-ton truck in this role. Further examination, however, reveals that the 2½-ton truck is usually overloaded, to four or five tons, at the expense of durability, and that many trucks pull the 1½-ton cargo trailer which also is frequently overloaded. In other words, the Army appears to need a larger truck, possibly seven to eight tons, in the distribution role. This need has been recognized as evidenced by the increasing demand for the 5-ton truck. The Distribution GOER therefore regains its superiority.

In the case of the battlefield class of vehicle, the requirement for a low silhouette will limit the size of tire which can be used and mobility will suffer. Recent developments in this field, however, have led to a substantially improved ¼-ton truck, the M151, which was recently standardized. It has improved mobility and durability, and is lighter in weight than its predecessor. Although it is not inherently flotable in its present form, it can easily be given this capability because of its unitized body-frame, fixed differential cases and independent suspension. If its design were so modified, the M151 would be a welcome addition to the GOER family.

A GOER somewhere in the 10 to 25-ton payload range would be most similar to the bulk of the earthmoving machines currently being manufactured. As a result a vehicle of this size appears to be the most logical starting point for development. The 15-ton size has actually been selected as the first GOER to be developed. A machine of this size has been used as the basis for this article. It will profit from the wealth of design, manufacturing, and operational experience already available in the construction and construction machinery manufacturing industries. In addition, a GOER of this size can take full advantage of proven, on-the-shelf components so that cost will be low and time for development short. Industry is prepared to deliver initial prototypes within six to eight months after receiving a firm go-ahead order, and at a cost far below that experienced in automotive development.

Two types of GOER are initially planned; one, a 15-ton ammunition carrier, the other a 5,000 gallon tanker. The pictures shown above portray the initial design concepts of several different manufacturers. These concepts have been prepared at no cost to the government.

OUR MISSING MAINTENANCE SPECIALISTS

Prepared by the U. S. Army Maintenance Board

IS your organization constantly short of trained maintenance specialists? Before you curse the pipeline and requisition again, here is a suggestion: Conduct a survey of your subordinate units and note *who* is in *what job*. Unless yours is an unusual unit, you will find that you are blessed with some extraordinarily versatile specialists. Your athletic noncom might be a capable, school-trained motor sergeant. Good parts specialists have been known to pursue jeep driving as a way of life, and radar repairmen often make excellent clerks. Automotive mechanics sometimes turn up in the company kitchen, and you may find that the chaplain's helper is a talented radio repairman.

Certainly it sounds ridiculous—but a lot of specialists are lost, and they have to be somewhere. The data in *Figure 1* was extracted from a personnel survey report by the Adjutant General's Office during the period July-December 1956 (data for CONUS only):

The percentages shown as improperly utilized do not reveal the full extent of the tragedy. In some cases, there is actually an overall shortage of specialists and a simultaneous malassignment of those available. For example, at the time of the report, there was a 42% shortage of helicopter repairmen within CONUS, yet 38% of those available were being improperly utilized. In the case of Ordnance Parts Specialists, there was a 20% shortage overall within CONUS, while 18% of those available were malassigned.

This dissipation of our maintenance capability can occur in a number of ways. Sometimes it is simply a matter of carelessness and poor administration. On occasion a unit officer of some influence has found that our expert mechanic is also a superior driver, and is unaware of or indifferent to the maintenance needs of the unit. Often the explanation is more complicated. Consider the case of Division "A," which has plenty of mechanics because of an aggressive training policy and anticipation of future needs. Nevertheless, Division "A" gets in a shipment of mechanics as a result of requisitions some time ago when they were needed. In the meantime, Division "B" has an acute shortage in the same specialty. Why isn't A's surplus shipped to B? Because Division "A" suspects that the personnel system is fickle, and keeps the overage as future replacements. In the meantime, the excess mechanics are assigned to "temporary" duties of an irrelevant nature (which often turn out to be permanent). Or perhaps Division "A" is in a different geographical area than Division "B," in which case Joint Travel Regulations may be an obstacle to reassignment of personnel.

MOS.	JOB	IMPROPERLY UTILIZED
632.1	Track Vehicle Mechanic	21%
634.1	Fuel and Electrical System Repairman	30%
672.2	Helicopter Repairman	38%
773.1	Ordnance Parts Specialist	18%

Figure 1

What commander today does not experience a constant turnover, or outright loss, of trained maintenance specialists because of the short-term enlistment situation and the time required to train personnel on complex equipment? We can ill afford the malutilization of hard-to-get specialists on top of our other personnel problems. It is hardly appropriate that while Mr. Cordiner seeks an economic remedy for our specialist ills we assign the blacksmith to the bakery!

NEWS NOTES

New Air Transportability Techniques

New techniques of loading and unloading aircraft for mass transportability of heavy construction equipment that will enable the U. S. Army to meet the demands of modern warfare anywhere in the world were demonstrated by the Corps of Engineers at McGuire Air Force Base, near Trenton, New Jersey, recently.

The techniques will increase air-lift tonnage by 50 percent and make the Army capable of moving an entire Engineer unit with its standard equipment into a distant area to perform general type, road, airfield and bridge construction in the event of military or civilian emergencies.

The Air Force participated in the demonstration, which included the loading and unloading of Engineer equipment with C97, C119, C123, C124 and C130 aircraft; assembly of a 20-ton crane; disassembly of construction machines for air movement; making composite loads, such as tractor-scraper combinations, and the loading of construction machines.

The study resulted in plans for disassembling heavy construction equipment so that it could be more readily loaded on the aircraft. It also provided a specific pattern that enables the Engineers to approach a maximum load on each plane movement for individual pieces of heavy equipment. The disassembly procedures also have been designed to permit speedy reassembly as soon as a plane lands in an operations area.

Initiated in 1954 to overcome problems such as those that arose from the Berlin airlift—when disassembly of heavy equipment meant cutting it in half with an acetylene torch and reassembly meant putting it back in one piece in a welding shop—the new techniques are expected to cut "turnaround" time as much as 50 percent. Turnaround is described as the time required to land, unload and reload a plane and get it into the air.

Speeding Planting of Mines

A mechanical mine planter which will substantially reduce the time formerly required to lay an antitank minefield manually has been successfully developed, the Department of the Army announced recently. (Pictures were first released at the 68th Annual Meeting of the U. S. Armor Association.)

The mine planter, which requires only one man for its operation, was developed jointly by the U. S. Army Engineer Research and Development Laboratories at Fort Belvoir, Virginia and the International Harvester Company of Chicago, Illinois.

The machine carries the mines to be planted in a "lazy susan" type machine which automatically feeds them into the planting mechanism. The planting mechanism consists of a device to arm the mines and a side elevating plow which opens a trench into which the armed mines are dropped. The plow is designed to lift the turf or soil on its side and, after the mine is placed, drop the soil over the mine.

Fully mobile, the planter is mounted on pneumatic tires and can be pulled by any large crawler tractor during operation. On highways it can be towed by standard military trucks at regular speeds.

Details as to the planter's rate of operation cannot be released for security reasons.

Lightweight Floating Bridge

A hand-erectable floating bridge that can support 60-ton loads has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., and adopted by the U. S. Army and Marine Corps.

Commonly referred to as the M4T6, the bridge utilizes lightweight components that can be transported by air. A 750-pound neoprene-coated nylon float is the heaviest single component.

The pneumatic half-floats join together to form a complete unit for use as a support at 15-foot intervals. Deflated floats are stored and transported in canvas carrying bags.

Hollow aluminum alloy deck sections, less than 16 feet long and weighing 225 pounds each, are placed side by side in a staggered position to serve as a road surface. Steel beams and plywood panels are used to provide stiffness and distribute the load to the floats.

The bridge can be manually erected at rates up to 1½ feet per minute. Construction can be speeded by the use of newly-developed bridge erection aids, such as a tilting bed trailer that carries and launches a complete bay with ease.

The bridge was subjected to exhaustive tests at Prince, West Virginia, and in Europe before it was adopted.

A School for Missile Master Crews

A temporary school for Army crews who will man the Missile Master system of firepower coordination of Army Air Defense Command guided missile batteries will be established at Fort George G. Meade, Maryland, the Department of the Army announced.

The school, which will be moved to Orlando, Florida, after the first class finishes its training, will be conducted by the Martin Company, principal contractor for the Missile Master.

More than 100 officers and men will be enrolled in the first class of the school. These men will form the nucleus of a 135-man Missile Master team in the Washington-Baltimore area when the system becomes operational in the near future.

The system will be installed in other key defenses as rapidly as equipment and trained operator personnel become available.

The Missile Master is a complete, semi-automatic system for the coordination of all Army antiaircraft weapons, including the Nike-Ajax, Nike-Hercules and Hawk.

Further Reductions in Army Troop Units

The Department of the Army recently announced further reductions in Army troop units to remain within the strength ceiling of 900,000 to be met by June 30, 1958 in compliance with Department of Defense directives issued on July 16 and September 19, 1957.

To effect an overall reduction of 100,000 in Army strength for Fiscal Year 1958, the Army will cut its manpower by 71,000 by January 1, 1958, and an additional 29,000 by next June 30.

In order to maintain maximum combat strength, manpower reductions are being concentrated to the extent possible among personnel engaged in administrative, logistical and specialized activities.

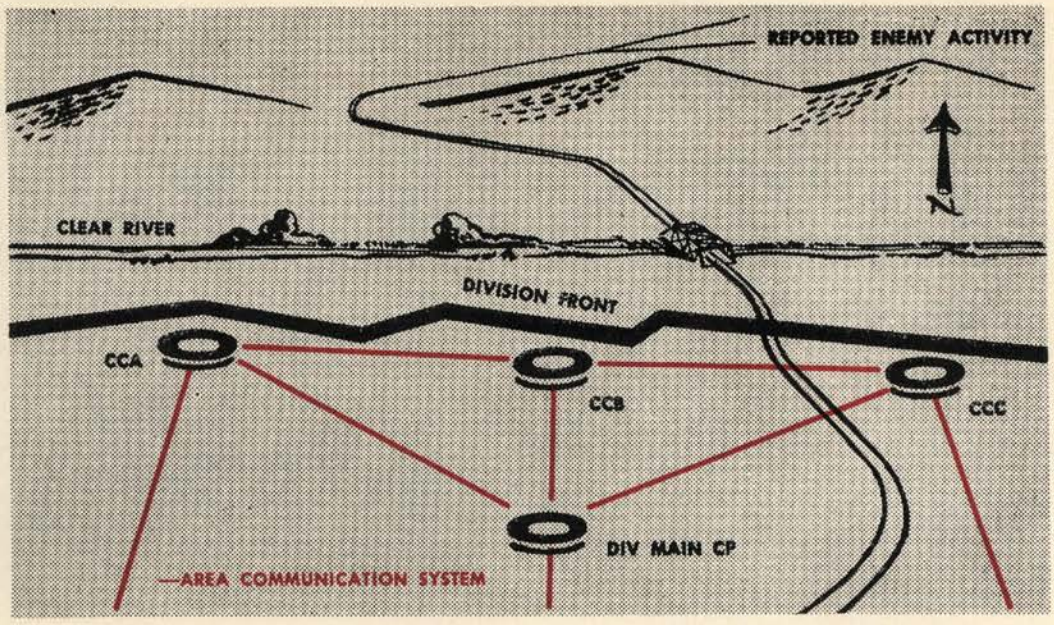
Following are the additional reductions and changes in the Army Force structure:

One Armored Combat Command of 5,000 men will be substituted for one of the two Armored Divisions in the United States.

Fourteen air defense battalions will be eliminated. These will be either gun or Skysweeper units, the need for which is gradually lessening with the progressive introduction of new Army air defense missile units.

Five Aviation Construction Engineer battalions will be dropped. Construction requirements of the Air Force have fallen off.

The Regimental Combat Team in Panama will be reduced in size to one battle group.



How Would You Do It?

US ARMY ARMOR SCHOOL PRESENTATION



Situation

The 301st Armored Division, following a breakthrough of enemy battle positions, has been leading the corps exploitation with the mission of destroying enemy forces and installations to the north. The remainder of the corps has been following approximately one day behind the 301st Armored Division. The leading elements of the division had reached a line just south of CLEAR RIVER when Army aircraft of the corps and division confirmed earlier reports that advance elements of an Aggressor mechanized corps were advancing from about 20 miles away, to the north and beyond a range of hills. The corps commander ordered the division commander to halt his advance and establish a defense of the corps sector until the remaining forces closed up.

The division commander then sent out a covering force, the 3d Reconnaissance Squadron, 33d Cavalry, with the mission of contacting and reporting the direction and strength of Aggressor forces and delaying them until the division could be deployed in a defensive formation.

As the squadron advanced, its frequency-modulated voice radio transmissions to the division main command post rapidly became unintelligible. By 0800 there was no direct communication with the leading elements of the squadron, although progress reports were being received through radio relay. By 1000 the squadron commander had placed two radio-equipped vehicles between his command group and the division main command post in order to maintain contact. Information was transmitted from the leading element of the squadron to the first vehicle, relayed to the second vehicle, and from there relayed to the division main command post.

At 1000, the squadron commander reported that he had made contact with the enemy. The division commander ordered that direct voice communication, preferably full duplex, be established with the leading elements of the squadron so that he could talk personally to the squadron commander.

Problem

As division signal officer of the 301st Armored Division, you receive the order to establish direct voice radio communication with the leading elements of the 3d Reconnaissance Squadron, 33d Cavalry. The commander desires full duplex, which means that the conversation can be carried on as in a telephone call. Transmission is possible in both directions at once.

You have at your disposal the equipment provided in tables of organization and equipment for the squadron, the division headquarters, and the division signal battalion, under Reorganization of the Current Armored Division (ROCAD). However, you are already operating more than the normal number of radio nets, and you have no extra tactical equipment in the signal battalion which you can use to establish direct voice communication to the reconnaissance squadron. What do you do?

AUTHOR: CAPT F D PENAS

ILLUSTRATED BY MR J BAIN



Solution

Setting up automatic retransmission with tactical frequency-modulated radios is difficult and time-consuming. In addition, the quality of the complete system is not very good. You would have to assign different frequencies to each transmitter and have a highly skilled operator at each retransmission point. To provide full duplex operation, another vehicle would have to be added at each point and still more frequencies (channels) assigned. This becomes a very involved and impractical undertaking. It would take, in this case, four AN/VRQ-1 radios and six frequencies.

However, the armored cavalry squadron is equipped with three armored personnel carriers, in each of which Radio Set AN/VRC-29 is permanently installed. These radios normally are used in the division command radioteletype net and the division logistical and intelligence radioteletype nets. However, they will operate on voice and radioteletype simultaneously. The squadron commander can easily talk to the division commander on the existing division command radioteletype net, because both command groups have Radio Set AN/VRC-29 operating in this net. Voice communication can be carried on simultaneously with the teletype traffic. Full duplex operation can be provided by assigning an additional frequency and improvising an additional antenna on the AN/VRC-29. The basic radio in the AN/VRC-29 is the AN/GRC-19, an amplitude-modulated set with a power of 100 watts on 1.5 to 20 megacycles. At these frequencies, especially in the lower portion of the band, communication should be excellent, even over the hills.

Discussion

The above is not the only solution. The possibility of a voice link, using AN/GRC-3's with AN/VRQ-1's as relay stations, was mentioned. It would be difficult and complicated to establish and operate, since the adjustments are very critical.

There is a possibility of using two AN/GRC-26 radios, sending one forward and using the other at the division main command post. These radios are probably being used in high-level nets. However, since the power of an AN/GRC-26 is three times as great as that of an AN/VRC-29, it would be a surer means of communication if conditions were difficult. The facilities provided by the AN/GRC-26 are the same as those of the AN/VRC-29, with power increased to 300 watts. There are five AN/GRC-26's in the armored division signal battalion, all normally used in rear-echelon radioteletype nets. Four of these radios are mounted in 2½-ton trucks, which are not suitable for use in forward combat zones. The fifth is mounted in an armored personnel carrier and could be sent forward. However, it is normally used at division headquarters for communication to corps.

It should be noted that the AN/VRC-29 will net with both AN/GRC-26 and the AN/GRC-46. The latter is the same as the AN/VRC-29 except that it is mounted in a ¾-ton truck instead of an armored personnel carrier.

One other way of setting up communication facilities to the forward unit should be mentioned. The backbone of an area communication system is its radio relay facilities. These are provided and installed by the armored division signal battalion, which is equipped with 13 4-channel terminal sets AN/MRC-68, 15 12-channel terminal sets AN/MRC-69, and 3 12-channel relay sets AN/MRC-54.

If the division moves forward, these radio relay links will eventually have to be installed for the area communication system. However, these facilities operate only on a line-of-sight basis, and an intermediate station on a high point in the range of hills would be required. This installation would probably have to be made with the assistance of helicopters from the armored division aviation company to airlift the equipment and personnel. The equipment is heavy and complex, not suited for use in forward areas, and the whole operation would be time-consuming. Use of even the 4-channel equipment would require four times as many channels as are normally required.

Therefore, the best solution is to use the AN/VRC-29 radios to provide a direct link, both voice and radioteletype, between the armored cavalry squadron and the division command group.

FROM THESE PAGES

65 Years Ago

Cavalry, capable of executing an effective dismounted fire, can be scattered broadcast, as it were, to a distance of many miles to the front and flanks of an army, without running the humiliating risk of being stopped by a handful of well posted infantry.

It is indeed to our own war that we must turn for all positive lessons in dismounted fire action; but that mode of action is so peculiarly suited to American ideas, so easily grasped by the American soldier, that we can well afford to turn to a foreign war for lessons in an employment of cavalry, in which we have much to learn.

At the same time, I do not wish to underrate the lessons taught us by our own war in every mode of cavalry action; for I do not believe that the history of the world can offer a better illustration of the triple use of cavalry than that presented by the battle of Gettysburg—Buford reconnoitering to the front and keeping in touch with the enemy; then seizing the critical position, and holding it by dismounted fire action on the right of the line of battle.

But we must never for a moment forget that dismounted action is exceptional, to be adopted only at considerable sacrifice of effective force, and only under peculiar conditions which render such a sacrifice desirable. Consequently it is not in the results to be produced by dismounted fire action that we are to find the *raison d'etre* of cavalry.

SECOND LIEUTENANT R. G. PAXTON

The Action and Minor Tactical Use of Cavalry in the Light of the War of 1870-71.

25 Years Ago

Invulnerable to rifle fire and fearing machine-gun fire little more, able by their speed to largely nullify the fire of one-pounders, which besides are too few to be available all along the column, the fast tank can either lie in wait under cover, or failing cover, can strike in from a considerable distance and reach the column before adequate measures for defense can be taken. Making due allowance for their disadvantages, the possibility of detection from the air, the noise they make, frequent mechanical troubles, their supply difficulties, they still constitute a possibility to which we cannot shut our eyes.

The infantry column as now constituted is a large, fat caterpillar, ambling along at the mercy of nimble ants which can leap on it with impunity, do their dirty work and disappear. If our long train of slow-moving wagons accompanies it, the case is worse, for then the caterpillar is dragging another caterpillar and is further handicapped in defense. Let us assume that even though our own people still cling to General Grant's wagons, the march of progress and the scarcity of animals in this highly mechanized country will soon force us into complete motorization of our combat forces. High speed has now become so essential in warfare and has been attained to such an extent in some branches that it is not thinkable that the basic branch can be allowed to continue to crawl.

LIEUTENANT COLONEL J. W. STILWELL

Caterpillar or Scorpion?

50 Years Ago

The oath of enlistment to many men who enlist is an oath simply because of the penalty provided for its violation. To a great many others its perfunctory administration robs it of all significance, and many do not realize that they are being sworn. This is certainly deplorable. We talk of patriotism, we try to inculcate it into the minds of our children, and yet when we convert one of our citizens into a soldier, when we enroll him into that noblest of professions, we do it in a cold-blooded matter-of-fact way. With us it is a pure business matter: "I'll pay you thirteen dollars per month, and you'll serve three years."

Under these circumstances, how can we expect the enlisted man to regard the profession of arms as a noble one, how can we expect him to regard the oath of enlistment as a sacred pledge, and his service to his country as a sacred duty? If all the thousands whom we enlist could be impressed with the solemnity of their oath of enlistment by the addition of a few ceremonies, causing them to regard the oath in a new light, as a sacred pledge which they dare not violate, not because of the penalty provided, but because of the pledge itself, the evil of desertion would be materially reduced.

FIRST LIEUTENANT W. KRUEGER

Desertions and the Enlistment Oath.

10 Years Ago

This much is clear from the lessons of history. We must develop light armored vehicles. We must develop air-transportable lightweight antitank guns for use on our armored vehicles and on the ground. We must develop light armored reconnaissance vehicles. We must lighten all items of combat equipment used by the armored forces, and their signal, medical, quartermaster, ordnance and other services. And finally we must develop and produce aircraft suitable for the peculiar requirements of future airborne combat. This last requirement means track-laying, detachable fuselages, and 10-ton payload aircraft of an operational radius of 1,000 miles that can land in practically any area that is cleared of trees, poles, fences and similar obstructions.

Only when we learn these lessons and apply them will the armored cavalry again have regained its traditional combat role. Striking at high speed by air, and entering ground combat that requires mobility and the retention of the initiative until the decision is gained, the armored cavalry will play the decisive role in future airborne combat. It is in airborne combat that the future of armor lies.

MAJOR GENERAL JAMES M. GAVIN

The Future of Armor.

The Book Section

In war the only sure defense is offense . . . . The effiency of the offense depends on the warlike souls of those conducting it.

Patton

DRIVE. By Charles R. Codman. 335 pp. Boston: Atlantic-Little Brown. $5.00.

Reviewed by Don Schanche

IN his introduction to the late Colonel Charles R. Codman's war letters, entitled *Drive,* John P. Marquand recalls his own first meeting with Codman's wartime boss, General George S. Patton, Jr. It was at a dinner in Palermo at the end of the Sicilian campaign. Marquand, fresh from the States and visiting Harvard classmate Codman, who was Patton's aide, was treated to one of the strong and outspoken remarks for which Patton was famous. Asked by the General about United States reaction to the American campaign in Sicily, Marquand replied that the American forces seemed to have met only token Italian resistance while the British had done the tough fighting around Catania.

"By God," Patton stormed, "don't they know we took on the Hermann Goering division? Don't they know about Troina? By God, we got moving instead of sitting down, and we had to keep moving every minute to keep them off balance, or we'd be fighting yet—and what were they doing in front of Catania? They don't even know how to run around end. All they can do is to make a frontal attack under the same barrage they used at Ypres."

"He was speaking solely for his troops, aroused because their exploits had not been given proper recognition," writes Marquand. In that recollection of a single Patton outburst, John P. Marquand has deftly added the blunt Patton personality and his forceful military philosophy into a first-rate one-paragraph picture of the



(Little, Brown & Company)

THE AUTHOR

Colonel Charles R. Codman, deceased, a 1915 Harvard graduate, saw action in World War I as an ambulance driver and a pilot. Shot down over Germany, he received the Silver Star. President of a real estate firm and author of other books, he travelled extensively throughout Europe making wine selections for S. S. Pierce. Volunteering at the outbreak of World War II, he served in Military Intelligence; then he became General Patton's aide de camp for the remainder of the War.

man. And the reader of *Drive* is thereby tempted to anticipate more of the same kind of frank close-up in the body of the book, from Colonel Codman, who was Patton's aide from April of 1943 through V-E day. Unfortunately, Codman, writing under severe limitations, adds very little.

In a unique position to study Patton as man and soldier for more than two years in North Africa, Sicily, France and Germany, Codman noted his experiences and reflections in letters to his wife. As Patton's aide, it is almost remarkable that Codman found the time to write as much as he did. What he did write, however, probably will have only marginal value to military historians. In Codman's own words, the letters are "in no sense an attempt at either biography or military analysis, [but] simply an account describing such day-to-day personal experiences in wartime Africa and Europe as I felt might interest or amuse my wife."

Although the letters lack the detail of biography, they do at times reveal some of Patton's qualities as a leader. Codman tells of one encounter with a group of soldiers laconically shredding a dummy in bayonet practice. "You're all too gentlemanly," exhorted General Patton. "Get mad and keep mad all the time. After all, your outfit comes from a part of the country that has produced fighters."

Later, at the villa that was Patton's headquarters, Codman asked, "Where does that outfit come from, the one from the part of the country that produces fighters?"

"I haven't the slightest idea," Patton said. "That was just Speech Thirty-three."

Colonel Codman's own sense of humor warmly fills the gaps between his infrequent reports on the Patton flair. Shortly before becoming the General's aide, Codman did odd staff jobs in North Africa. Because he had spent much of his life in France during and after World War I and knew both the language and the people, he was assigned to interpret for General Giraud at a meeting of the Combined Chiefs of Staff during the Anfa conference. General Marshall opened the meeting with a brief word of welcome to Giraud. Giraud waited expectantly while the American interpreter, Colonel Codman, reddened. He had forgotten the French word for "welcome." In a stage whisper, Codman asked Lord Louis Mountbatten, who sat across the table. "Bienvenue," said Lord Louis, and amidst a table full of smiles, the meeting of the Combined Chiefs continued.

Under the heat of the North African sun, Codman's sensitive skin burned so severely that he asked his wife to send him a sun helmet. In many letters thereafter, he mentioned peevishly that the helmet had not arrived. Finally, he reported the arrival of the long-awaited sun helmet, and with its arrival a brief Patton soliloquy.

"That evening," wrote Codman, "the boss launched forth in his most picturesque vein about a guy he disliked above all others—a crook, a coward, a pimp, a bastard, a complete S.O.B.—'but those,' he said, 'are not the *real* reasons I disliked him on sight—the *real* reason is that he turned up at *my* headquarters in an *elephant* hat.'

" 'Do you mean a sun helmet, sir?'

" 'Call it what you like, but if any misguided so-and-so turns up here with one I'll throw him in jail for the duration.' "

Codman thereupon put his sun helmet away and lived sunburned but happily with Patton for the duration.

Although much of *Drive* is necessarily sketchy and incomplete because it is a collection of mostly amusing letters, not a serious war memoir,

Buy and Use Christmas Seals



Fight Tuberculosis!

THE REVIEWER

Don Schanche, a 1947 graduate from the University of Georgia with a degree in Journalism, has been writing for newspapers and magazines since that time. He commenced writing on military affairs in 1951 when he covered the Korean War for International News Service. He has been with *LIFE* magazine since 1953 except for a year and a half period during the founding of a new magazine, *SPORTS ILLUSTRATED*. Mr. Schanche is presently the Washington Military Correspondent for *LIFE*.



(Life)



(U. S. Army)

NORTH AFRICA—General Eisenhower and Patton looking at map in Patton's headquarters.

Colonel Codman does at one point penetratingly explore the drive behind George S. Patton. Writing from France in August, 1944, he relates:

"Yesterday, on the way back to our headquarters, we were speeding along through choking dust under a high blue heaven criss-crossed with vapor contrails. It was a bad stretch of road from which our bulldozers had recently pushed to either side the reeking mass of smashed half-tracks, supply trucks, ambulances and blackened German corpses. Encompassing with a sweep of his arm the rubbled farms and bordering fields . . . the General half turned in his seat. 'Just look at that, Codman,' he shouted. 'Could anything be more magnificent?' As we passed a clump of bushes, one of our concealed batteries let go with a shattering salvo. The General cupped both hands. I leaned forward to catch his words. 'Compared to war, all other forms of human endeavor shrink to insignificance.' His voice shook with emotion. 'God, how I love it!'

"And here, I believe, in the unabashed enthusiasm, the passionate ardor for every aspect and manifestation of his chosen medium, lies the key to General Patton's success. The aide de camp of an Army Commander is afforded the opportunity of observing the personal approaches and techniques of scores of other commanders from battalion to the summit. I am quite ready to believe that there may be other E.T.O. Commanders who equal our own in mere technical proficiency. I have seen or heard none, however, who can even remotely compare with General Patton in respect to his uncanny gift for



(U. S. Army)

SICILY—Patton going ashore during the Sicily invasion.



ITALY—Patton and Major General Geoffrey Keyes, CG, II Corps, at Corps Headquarters. (U. S. Army)

sweeping men into doing things which they do not believe they are capable of doing, which they do not really want to do, which in fact, they would not do, unless directly exposed to the personality, the genius—call it what you will—of this unique soldier who not only knows his extraordinary job, but loves it. . . . The General knows exactly what he is doing, and if at times the higher staffs turn green around the gills when across their astonished situation maps flash the prongs of seemingly unprotected spearheads launched deep into enemy territory, it is only because they have yet properly to gauge the man's resourcefulness. As for his subordinates, more than one corps and division commander, in the course of a whirlwind visit from the Old Man, has felt a sinking in the pit of his stomach on finding himself and his command catapulted into outer space, but all of them have learned that he never lets them down. They know that if the unexpected happens, he will find a solution, and what is more, he will be up front to see that the solution is applied."



GERMANY—Patton visiting men of the 1303rd Engineer Battalion. (U. S. Army)

While *Drive* does not fight the war from hedgerow to hedgerow and hill to hill, nor detail with a biographer's keen sense the day-by-day activities of a man, there does emerge from it, almost imperceptibly, a feeling of what it was like to be close to Patton. Equally important, because it is so often ignored in more detailed war stories, Codman in tracing his own activities draws a wonderfully informal portrait of the often humdrum, sometimes chaotic and frequently frustrating staff life in an Army headquarters.

HEROES behind BARBED WIRE

The dramatic story of the "anti-communist heroes"—the thousands of Chinese and North Korean prisoners of war of the United Nations Command who chose to remain on freedom's side of the Bamboo Curtain after the Korean armistice.

by Kenneth K. Hansen, Col., USA
$4.95

THE PRICE OF COURAGE

This is a fast-moving, realistic, well-plotted story of combat as seen through the eyes of a rifle company commander. It is a "can't-put-it-down" book that excites and uplifts you as it tells of the growth of a man from a fumbling subordinate to a battle-tried commander. The author, a West Point graduate, is a twice-wounded Korean veteran.

by Curt Anders **$4.50**

FIRST BLOOD:

The Story of Fort Sumter

From the detached viewpoint of a century afterwards the author of *Sickles The Incredible* writes this absorbing narrative of the seven months that led up to the outbreak of the Civil War.

by W. A. Swanberg **$5.95**

CUSTER'S FALL

The author, an adopted son of Black Elk, an Oglala, gives the Indians' version of the Battle of Little Big Horn. His account, basically different from tradition, is based upon many years of interest and personal interviews with 71 Indians who fought in the battle.

by David H. Miller **$4.50**

THE TWENTIETH MAINE:

A Volunteer Regiment in the Civil War

A history of the Twentieth Maine Regiment compiled from official records, letters, personal documents and eyewitness accounts of such things as the battle of Little Round Top, Antietam, to Lee's surrender.

by John J. Pullen **$5.00**

DEW LINE

The remarkable story of the erection of a 3,000 mile radar fence across the far reaches of North America by the United States Armed Forces and the Western Electric Company.

by Richard Morenus **$3.95**

BEHIND THE RAPE OF HUNGARY

A full-scale report on the October 1956 uprising in Hungary, based on Communist and non-Communist sources, and written by a Hungarian journalist now living in Paris.

by Francois Fejto **$4.00**

THE CITIZEN ARMY

Looking at problems of defense in the atomic age, the author concludes that the best protection against aggression is the maintenance of a "citizens army" which can be quickly called upon in time of need. He describes the system used in Switzerland and tells how it can be applied in the United States.

by Frederick M. Stern **$6.00**

Roads, Rails & Waterways:

The Army Engineers and Early Transportation

A survey of the part played by the War Department's Corps of the Engineers in America's transportation history and early economic development.

by Forest G. Hill **$4.00**

LIFELINE IN THE SKY:

The Story of the U. S. Military Air Transport Service

MATS—the U. S. Military Air Transport Service—has been called the largest airline in the world. It is an unarmed service that covers the world to fly air rescue missions, transport troops. etc. This book gives the facts about MATS.

by Clayton Knight **$6.00**

AIR SPY: The Story of Photo-Intelligence in WW II

How the flyers who photographed German Activities and the interpreters (the author was one of them and "discovered" the V-1 and V-2) were able to help the Allies anticipate German moves.

by Constance B. Smith **$4.00**

THE HISTORY OF THE RUSSIAN REVOLUTION

(New Edition)

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