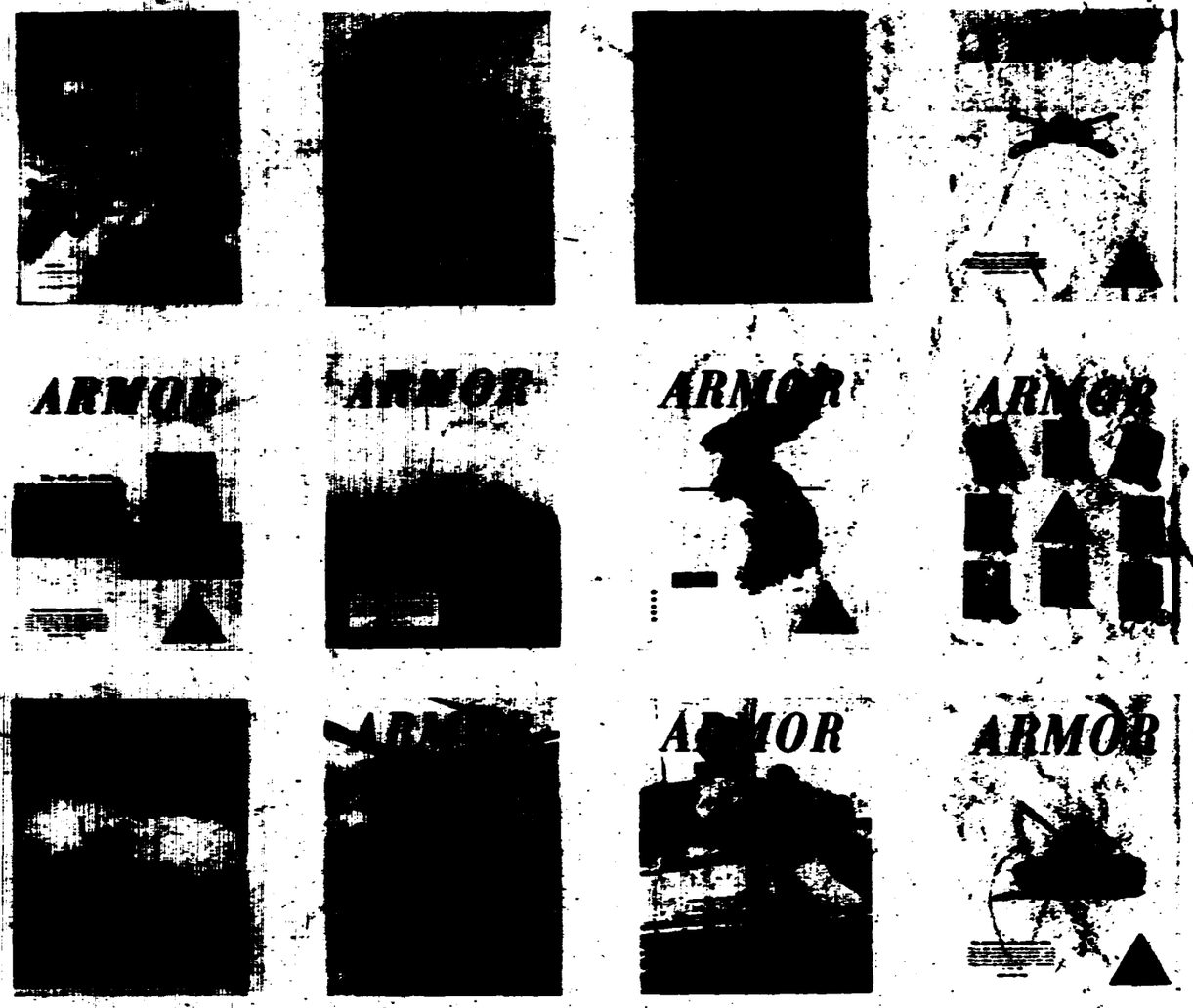
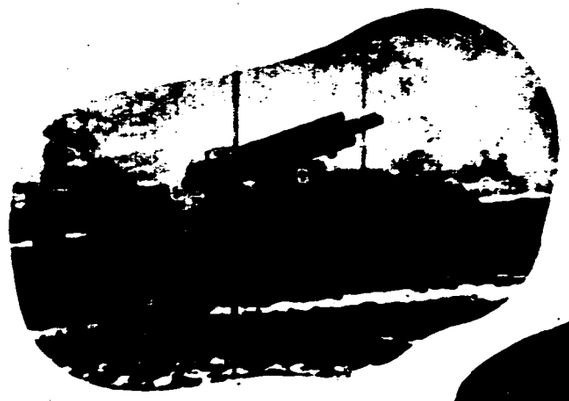


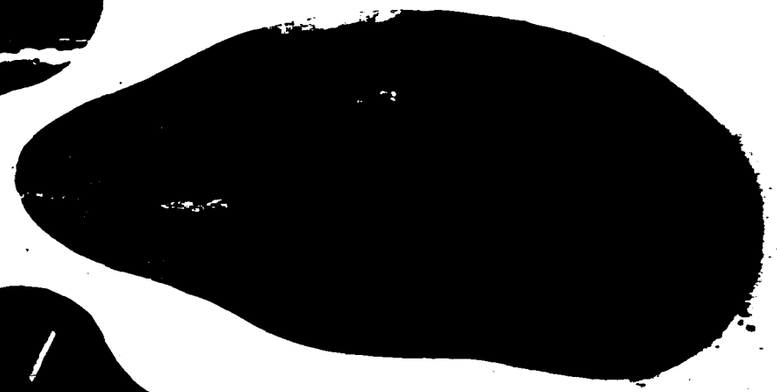
if you fight mounted . . .

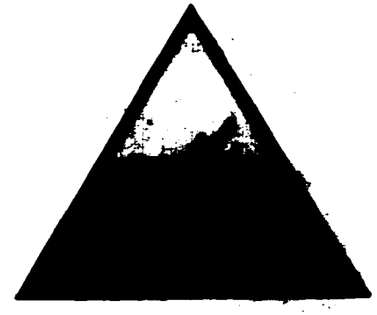
or fight a mounted enemy . . .

ARMOR *The Magazine of Mobile Warfare*

ARMOR







ARMORED ARTILLERY IN ACTION IN KOREA

Self-propelled artillery units are backing our ground action in Korea. The great versatility of our armored artillery makes it a favorite with many artillerymen.

[See page 10]

SEPTEMBER-OCTOBER, 1952 • 85 CENTS

ARMOR

The Magazine of Mobile Warfare

Continuation of THE CAVALRY JOURNAL

EDITOR
Major William Gardner Bell

CIRCULATION MANAGER
M Sgt Lester B. Smith

BUSINESS SECRETARY
M Sgt J. William Joseph

SHIPPING DEPARTMENT
M Sgt George W. Yankovich

BOOK DEPARTMENT
Sfc Michael E. Kekker

Volume LXI SEPTEMBER-OCTOBER, 1952 No. 5

CONTENTS

Publication and Editorial offices: 1719 K Street, N.W., Washington 6, D. C. Copyright, 1952, by The United States Armor Association. Entered as second class matter at Washington, D. C., additional entry at Richmond, Virginia, under the Act of March 3, 1879, for mailing at special rate of postage in Section 34.40, Act of October 30, 1951. 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, 85c.

LETTERS to the EDITOR

A Point of Difference

Dear Sir:

In the March-April issue of ARMOR, I read the report on the British officer who compared the M46 tank with their Centurion. I would like to make a few comparisons between the two tanks, having been afforded the opportunity to drive and fire the British tank in Korea in November 1950, when they first arrived and before they were committed in combat.

The Centurion tank is somewhat heavier than the M46 and presents a lower silhouette. On the other hand the Centurion tank is very much underpowered and has a narrow track for the amount of weight it has to support. The main gun of the British tank has a terrific muzzle velocity with a very flat trajectory. Upon firing this tank, it was very hard for me to make sight adjustments. This could be either a very good feature or turn out as a bad feature in some instances.

At the same time as the above observations were made, I was training my Heavy Tank Company for fighting in mountainous terrain. We weren't new to Korea; we had fought on the old Pusan perimeter and made the invasion at Inchon. During the previous action, all officers in our battalion had noticed the fact that we were reluctant to get upon the high ground to obtain the best firing positions and the training we were undergoing was to correct previous errors and to actually find out how steep an incline we could expect our tanks to negotiate. The British Centurions arrived in Korea and set up a camp next door to my company and we discussed the Centurion, the M26 (General Pershing), which we had at that time, and the M46 (General Patton). The British officer was a Lieutenant Rodgers, who was later killed, in January, 1951, while riding the British light tank, the Cromwell. At any rate, we used these tanks in different tests and came to the following conclusions:

a. The Centurion needed another 250 to 350 H.P. added to the power package.

b. The M26 and Centurion could not negotiate the majority of the steep inclines that were found in the terrain that the United Nations tanks were forced to fight over.

c. The M26 (General Pershing) was obsolete and should be replaced; it was slow, underpowered and not versatile enough to fight in Korea.

d. Both tanks had excellent fire power when used correctly.

In the early part of 1951, all the M26 tanks in our battalion were replaced with the M46 (General Patton) tanks. At the time I was the Assistant S3 of our battalion and we were in action alongside the British tanks. I was afforded an excellent opportunity to observe and compare the two tanks in action and I formed the opinion that the M46 could out-maneuver and outfight the Centurion in that particular terrain, day in and day out. However, put the two tanks in favorable tank terrain and my opinion may change due to the muzzle velocity of the Centurion gun and the low silhouette.

Regardless of which tank is the better, they are both far superior to the Russian T-34 which furnished the shock action for the North Korean army. Also, I fully realized in Korea, the American Army has a long way to go in developing and exploiting all the uses of the new and versatile tanks.

CAPT. O. M. HEARN
Assistant Unit Instructor, ORC
Harlingen, Texas

Collective Security

Dear Sir:

Not long ago I ran into some copies of ARMOR, which I read with great enthusiasm, as I shall soon become a tanker myself through joining the armored regiment in the Royal Dutch Army.

I think ARMOR is a fine magazine, from cover through contents, especially by virtue of the fact that its contributors are of all ranks and both military and civilian. One example of practical application of a much-used word—democracy.

Some of the articles which I read were, however, too general to suit me. I would like to see more technical articles, with graphs and charts, tables, etc., coveting such things as gas vs diesel engines, rubber-covered vs steel tracks and so on. Such articles would, to me, make your magazine an even more all-around tankers publication.

ANDRE W. AUSEMS
Zaandyk, Holland

Armor Association Chapters

Dear Sir:

In the interest of Armor and its objectives, several thoughts occur that I should enjoy submitting for comment and discussion.

If credence be given the popular premise that rare are the professional and social functions that do not terminate with the participants passionately engaged in creative, stimulating, and provocative . . . shop talk . . ., then why not exploit these human characteristics to the utmost of their educational value? Therefore, in an effort to enable Armor officers, regardless of assignment and geographical location, to increase their knowledge professionally and socially, thereby expanding the objectives of Armor, I propose the Association consider the organization of local chapters of the Armor Association.

These chapters, organized by interested active members throughout the world with the approval and supervision of the Association, could perpetuate the acquisition and dissemination of information on the history, activities, objectives, and methods of Armor through periodic meetings. In addition, and perhaps more important, these chapters by careful planning and organization, could sponsor or stage lectures, dinners, and/or civic functions and events designed to create supporting interest among the local populace, while simultaneously developing and encouraging the study of Armor by the young men of today.

With an eye to the future, the latter thought would be an excellent solution to the problem of acquiring spirited young men interested in machinery, ground speed, and mechanization, so necessary to the success of Armor.

CAPTAIN C. R. MCFADDEN
Washington, D. C.

• *ARMOR hastens to commend a fine idea to the Association membership and will be interested in having additional comment for Council consideration.*—ED.

ARMOR is published bimonthly by the United States Armor Association.

Copyright: ARMOR is copyrighted 1952 by the United States Armor Association.

Reprint Rights: Authorized so long as proper credit is given and letter of notification is forwarded to Editorial Office. Two copies of the reprinting would be appreciated.

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, 1719 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 two weeks in advance of publication date of each issue, which is the 25th day of the odd month of the year: i.e., Jan. 25 for the Jan-Feb issue, Mar. 25 for the Mar-Apr issue, etc.

Rates: See bottom of contents page.

Summer Training

Dear Sir:

The Armor Military Stakes as conducted at the Armored Center; The Tank Leaders Reaction Test Course of the 3rd Armored Division at Fort Knox, Kentucky; and the Tank-Infantry Platoon Combat Course of the 1st Armored Division at Camp Hood, Texas, are three examples of the proper method of testing individuals, crews and teams in the actual performance of combat functions under stress and competition. Naturally, these courses are well planned, elaborate in construction, and well organized, as well as efficiently operated.

Too often, however, the actual test phases of training are slighted, because of several factors; time for adequate preparation, time allowance in training schedules, and actual time to perform labor required to set in operation practical tests.

In all training doctrines, we are told that great preparation must be made, lesson plans prepared, equipment and training aids assembled, acquired or made, and complete detailed organization made prior to the scheduled time of the training. At the scheduled time of the class, the presentation may be excellent, interesting and skillful; the demonstration well executed, with a great amount of attention devoted to exact detail; and the men made to apply the lessons learned under the proper supervision of assistant instructors; the work of the group is critiqued, with a brief review; but the final part of each instructional period or phase—the test—is the weakest, because the test usually is given in a hurry, without too much preparation, and usually in writing.

At service schools, the test phase of the training periods is conducted in an excellent manner, although nearly always in writing. There are few practical tests, because much time is devoted to testing the results of the training; but, in the field with units, the tests of training periods or phases are the weakest link in the training chain, due to lack of time, lack of preparation and pride of unit—which falsely states "my unit is good, we can do anything." There is too much assumption on the part of all leaders. Actually, the only true test of training is combat; therefore, the next best test is a practical one, rather than a written test. Practical tests are better to determine the proficiency of the individual, the crew, and the combined team.

Our unit used the Military Stakes idea during the 1952 ORC Summer Camp for testing the individual enlisted men of our organization, and we are enthusiastic about results, the interest aroused, and the method of conducting the test. But, first, briefly, something of what happened prior to ORC Camp in 1952.

Our unit, the 705th Tank Battalion (M), is the tank battalion of the 102d Infantry Division, "OZARK," one of the Organized Reserve Divisions, made up of units from Missouri and Illinois. At the conclusion of the Summer Camp period in 1951, the Battalion Commander, Lt. Col. Edward C. Gruetzemacher, had a series of tests conducted in Tank Gunnery, Maintenance, Communications, and other subjects, based upon the training conducted during the camp period. These tests were written. We later learned that these tests were the first given by any ORC or National Guard Unit at the conclusion of a Summer Training Camp. The results of the written tests were satisfactory, but the method of testing was not.

Early in 1952, plans were being made for the Summer Camp. About the time these plans were taking shape, we received the March-April issue of ARMOR, and in it, the story of the Armor Military Stakes instituted at the Armored Center and adapted for the Officer Candidate Course. With this story about the Military Stakes and the approval of the Battalion Commander, we started planning on a series of tests to determine the proficiency of the enlisted men of the tank battalion. The results would be a test of the training conducted during the Summer Camp.

Prior to camp, we outlined the general idea of the tests, and made sample problems, all based upon practical work to be done by the enlisted men. The tests were to be in form of a competition, the winner receiving a cup and cash award, donated by the officers.

At Camp McCoy, Wisconsin, on the 7th of August 1952, the Armor Military Stakes were held to test the proficiency of the enlisted men of the 705th Tank Battalion (M), and the enlisted men of the Tank Companies of the 405th, 406th and 407th Infantry Regiments. The Tank Companies of the Infantry Regiments of the 102d Infantry Division were attached to the 705th Tank Battalion for training for the Summer Camp period.

Prior to the start of the competition, the only person with knowledge of the problems for each test was the officer in charge of the Armor Military Stakes. A block of three hours was allotted on the training schedule for the competition. A total of 12 hours was devoted to writing the problems, securing training aids, and the materials to make the Stakes a success. About three hours was required to set up an area about 400 by 200 feet to conduct the tests and an additional area of 100 by 100 feet for an initial and final assembly area.

The tests were conducted on the County Fair System, with 25 stations, each station with a practical test of one or more parts. Since the tests covered the entire Camp Period, many subjects were covered.

The winner of the competition had a score of 476 points of a possible 533 points. He was Sfc Baczenas of Co A, 705th Tank Battalion.

The announcement, on the first day of the Summer Camp period, of the competition and award increased the interest in the training. It aroused a spirit of competition between individuals and units. Conditions for conducting the tests were far from ideal. The time for the tests was limited, and crowded into the training schedule when tanks would be available. Due to the time limit, situations and solutions had to be simple and yet cover the training. The area was not satisfactory, because weapons could not be fired. The ideal situation would be to conduct this competition where all weapons could be fired as a part of the test. Due to the limited number of officers available, each station had only one officer or NCO from the Regular Army Supporting Unit, Co C, 198th Tank Battalion, 31st Infantry Division. All officers of the 705th Tank Battalion (M) and attached Companies were used.

We wish to extend our appreciation to ARMOR for keeping us informed of the latest developments in Armor, as well as the continual flow of new ideas, which we can adapt to training.

CAPTAIN ARTHUR E. STANZE
705th Tank Battalion (M) OR
St. Louis, Mo.

THE COVER

The versatility of armored artillery has been demonstrated in World War II and in Korea. However, the question of equipping our entire Army with SP artillery is a matter of cost as well as operational capabilities. Thus our primary efforts in this important field must be in terms of the armored division, where across-the-board mobility counts. Beyond that, towed equipment and some separate SP battalions must do the job of supporting the infantryman.

In the Labor Day issue of the *New York Herald Tribune*, columnist Walter Millis brought to the attention of the reading public a "large class of labor—most of it highly skilled and specialized—which has no union organization but which often works very hard indeed and to which this country owes a great deal." He noted that "one can find out something about it in the service magazines," the journals of this class of labor whose trade is war. (Mr. Millis' column is reprinted on page 31.)

Service publications are "the trade journals of war." They are the products of a profession and are published for the profession. The members of the various arms and services such as Armor, Infantry, Artillery, Ordnance, Engineers, Signal, etc., all have their trade journals, which are equally as important to them in their fields as, for example *The Journal of the American Medical Association* is to the doctor.

Professional publications have been a part of the military in many countries for many years. Their effect upon military thinking and upon professional qualification has been marked. General Wesley Merritt, famous Civil War and frontier cavalryman, writing in this magazine fifty years ago, stated "I have been told by more than one officer whose advancement in the Cavalry service has been marked, that much of the success was due to the influence of the studies [published as articles] induced by the Cavalry Association." General Merritt was the second president of this Association.

The importance of the service magazine in Germany was substantiated in conversations with Generalmajor Alfred Toppe, on the occasion of his recent visit to ARMOR as one of a group of NATO journalists. A former Cavalry officer and Quartermaster General of the German Army under Guderian, General Toppe is now editor of Germany's only authentic military magazine, *Wehr-Wissenschaftliche-Rundschau*, which deals with European defense. He can attest to the importance of the military periodical.

In the United States our own mobile arm was the first by some years to recognize the need for and value of a trade society and publication. The idea was picked up by the other branches progressively until today our arms and services are represented by organizations and magazines. The historical significance of developments in the field of mobility alone is evidenced in the change in name of the Association and its publication to remain abreast of the times. Thus have we progressed from Cavalry to Armored Cavalry to Armor. Another change would be met with equal flexibility.

The chart on these pages sets out the organizational history of our Associations and journals of the arms and services. Over and above these there are a number more of Army publications, some official, some non-official. Many more exist in the Air Force, Navy and Marine areas. They are far too numerous to mention here except to note as a point of interest that the U. S. Naval Institute was established in 1873.

ORGANIZATION DATES OF ASSOCIATIONS AND THEIR MAGAZINES

ASSOCIATION	DATE		MAGAZINE	DATE
U. S. Armor (Cavalry) Association	1885		ARMOR (Cavalry Journal)	1888
Association of Military Surgeons	1891		The Military Surgeon	1901
U. S. Antiaircraft (Coast Arty.) Assn.	1892		Antiaircraft (CA & Arty.) Jnl.	1892
Association of the U. S. Army (Infantry)	1893	merged 1950	Combat Forces (Infantry) Jnl.	1904
Association of the U. S. Army (Field Arty.)	1910	merged 1950	Combat Forces (FA) Jnl.	1910
American Ordnance Assn.	1920		Ordnance	1920
Society of American Military Engineers	1920		The Military Engineer	1920
The Quartermaster Association	1921		Quartermaster Review	1921
National Defense Transportation Assn.	1944		Nat. Def. Trans. Jnl.	1945
Armed Forces Communications Assn.	1946		Signal	1946
Armed Forces Chemical Assn.	1946		Armed Forces Chemical Jnl.	1946

The story of our own country's publications is by no means the full one. ARMOR carries an exchange arrangement with many publications in many countries around the world. Our editorial office might well be mistaken for a newsstand with the large number of magazines at hand. It is a source of great editorial interest to see the publications from Italy, France, Denmark, England, India, Jugoslavia, Germany, Ireland, The Netherlands, Canada, many South American countries, and even the Belgian Congo, among others. Although language is a barrier in some cases, something can be gleaned from them all.

The periodicals that deal exclusively with armor may be numbered on the fingers of one hand. England's *The Tank*, the Journal of the Royal Tank Regiment, is more a unit type of publication than otherwise, although it does cover some general material. *The Royal Armoured Corps Journal* publishes some armor material along with a variety of other matter. Our own ARMOR is the only magazine in the world devoted to all phases of mobile warfare in all parts of the world. Thus it has been a source of great pleasure to have the wide expression of comment and appreciation from many countries, particularly those of the North Atlantic Community, concerning the value of ARMOR. We would feel that this is a logical by-product of our primary mission—to serve the Armor arm, the United States Army and our country in this most special phase of warfare.

The Editor

Tactical Employment of Light Aviation with the ARMORED DIVISION

Armor's great mobility on the ground unites it automatically with the air dimension—a three-way tie with tactical aviation, air transport and light aviation. Light planes are now organic in the armored division. They provide the agile-minded armor leader with an ideal command tool for employing the arm of decision.

by CAPTAIN JAMES C. SMITH

U.S. Army Photos

THE availability of light aircraft to all commanders is something new in armor and infantry units throughout the Army. During World War II, only the artillery units contained organic light aviation. At times suitable to the artillery, tank and infantry units could employ the artillery aircraft but this disadvantage is readily apparent. The basic fact was established at that time that light aircraft were a necessity in all of the basic arms.

As a result of the lessons learned, light aircraft are now organic to armor and infantry divisions. With the aircraft came the need for development of the principles of employment with armor and infantry formations. Actually, there has been very little development of the tactical concept of integrating the aircraft with tank and infantry formations. This has been due in large part to the relatively small number of tactical units present in the United States. As for armor, only one armored division has been active, and it has been only since the activation of the 1st Armored Division that extensive field activity has provided the opportunity for this development. The 1st Armored Division at Fort Hood, Texas, has been used as the basis for this presentation of the subject of employment of Army aviation. This writing will explain the tactical principles of Army aviation employment from the beginning of small-unit training to the climaxing Exercise Long Horn, a period covering about twelve months.

During the basic training phase of the Division, the aviation section was practically non-existent, since the future maintenance personnel of the section were in their basic training with various battalions. At the end of basic training, selected trainees were pulled and sent to aircraft mechanic's school. Upon their return to the Division, the aviation section began to operate. Aviators and aircraft arrived about the same time and indoctrination was begun so that the proficiency of the aviators would enable the section to support the units as early as was required for training.

At the beginning of small-unit training, the aviation section was prepared to support the units in any of their many missions. The Division Commander from the beginning stressed to the unit commanders the importance of an air reconnaissance of any type of ground exercise and encouraged the use of the aircraft during the exercise itself. The principle of early application of the aircraft at the beginning of unit training cannot be over-emphasized. It is most important to indoctrinate all personnel with the mechanic's of light aviation operation at the outset. It should be understood that the aircraft is an essential weapon for the support of the smallest unit, a single vehicle in many cases. During this small-unit phase, the aircraft were used to reconnoiter for problem areas, check camouflage discipline of unit bivouac and assembly areas, correct march techniques and formations, control columns on the march, et cetera.

The idea of putting as many men as possible in the air to see for themselves the errors made by their units was used to excellent advantage. Not to be overlooked during this phase is the fact that the commanders were being trained to observe from the air, a technique in itself. As a result of the many flying hours, commanders of this Division are capable air observers. This can be true only after they have spent sufficient time in the air to develop good observer techniques.

This employment of the aircraft continued throughout the company-test period of training, with more and more training inspections being made in the air. A flaw in the tactics of the smallest unit is most evident while observing from the air, and the time required to detect errors or deficiencies is a great deal less than the time required on the ground.

With the schedule turning to battalion tests, the tactical employment of the aircraft became of major importance. The aviation section supported each battalion with one aircraft throughout its test period, including all of the preliminary battalion problems. To provide maximum support to the battalions, the same aviator, when possible, was assigned all missions with the pertinent battalion. It is felt that the aviator in reality functions in part as an instructor, advisor, and liaison officer to the battalion and personal contact at this period of training tends to further the close coordination demanded by this integration. Again it is brought out that heretofore, few ground force officers have had much experience with light aircraft and every attempt must be made to facilitate the operational procedures. This is the best period to indoctrinate the unit personnel with correct tactical employment of the aircraft. It is fortunate that during this phase, all personnel were fully convinced that light aircraft could be their "eyes" when utilized properly.

In this tactical phase, the technique of radio communications should be explained in order that the reader understands the operational procedures mentioned later. The type radio used is not too important, but there are several factors which must be considered so that the tactical integration of the aircraft with the units can be made possible. The success of all operations will depend on excellent radio communications because an aircraft in the air without a well operating radio is useless. This fact is mentioned because many units will wait until the last minute before tactical operations to determine whether or not their radios will operate properly.

Our particular radio is the well known SCR-510, an FM set with two preset channels. The A channel is tuned to a major command frequency and the B channel is tuned to what we call the Division Air/Ground frequency. This Air/Ground channel is the same on all Division aircraft, except the Division Artillery. This setting provides great flexibility which will be explained in higher-level operations.

For the battalion phase, channel A was tuned to the particular battalion being tested or supported, just another means of giving maximum support. During the operational period, the aircraft in support became a station in the command voice net of the battalion, thus enabling the battalion commander and all company commanders to maintain communications with the aircraft. During daylight hours, most enemy information will normally be transmitted by the aircraft in close support, so all commanders should be able to take advantage of all reports. If the battalion commander desires the aircraft to support a particular company, he can direct the aviator to work with the

---

CAPTAIN JAMES C. SMITH is a graduate of the Spartan School of Aeronautics. One of Armor's flight aviation specialists, he is now in the Far East Command following a tour with the 1st Armored Division, Fort Hood, Texas, where he was intimately connected with the training described in this article.

desired unit, and immediately the aircraft radio will be switched to the Division Air/Ground channel in order that traffic will not interfere with the command net. Since all units monitor the Air/Ground channel, they can obtain enemy information in this manner if they so desire. The Air/Ground channel in effect becomes a reconnaissance net, one which all units in the Division can monitor. With the mobility built into the armored division, timely enemy information is of utmost importance to all commanders, since the enemy situation will change accordingly. By the end of the battalion test phase, both the battalions and the aviation section were ready to proceed to combat command exercises to be followed by combat command tests.

Upon reaching the combat command phase of training, it was decided that in normal situations, two aircraft were needed for close support to this level of operations. Normally, a combat command will contain two or more reinforced battalions which in turn will employ tank-infantry teams. The control of such a force is paramount, and to facilitate operations, radio channel A was tuned to the combat command channel and the B again to the Air/Ground channel. With these two channels, the combat commander can either have them operate in his command net or assign them to operate with any one of his subordinate commands on the Air/Ground channel. This procedure enables the reinforced battalions to utilize the aircraft in close support without interfering with the command voice net. With so much radio traffic on the command net, it is virtually impossible for the aircraft to operate on this channel, except for reporting in to the command and receiving instructions for reporting to the various subordinate commands.

After completing a mission with a subordinate unit, the aviator reports back in to the combat command net for further missions. Using this method, the combat commander is insured maximum utilization of the aircraft operating in close support of his command. In addition to the normal flow of intelligence reports through command channels, the S-2 will normally monitor the Air/Ground channel, thereby receiving current enemy information. With eighty tunable channels in the new radio set proposed for light aircraft, even greater flexibility will be possible in assigning the aircraft to work with various battalions and companies. With the combat commander in the air, most of the communications will be on the command net, putting him in a position where he can see all of his command at once. Already our commanders had learned the value of command control from the air, and as a result, much time was spent by all commanders actually in the air.

The advantages of command control by air are increased during periods when the commands are moving forward in the attack, moving to contact, or exploiting the rear areas. The same advantages are true when the enemy is on the move, because early observation enables the commander to shift his forces to meet any or all threats. The larger the size of the combat command, the more important it will be for the commander to be in a position where he can see what is going on and make corrections or changes when necessary. The time lag in command channel reporting will, on many occasions, prevent the commander from reacting to changes of mission, altering of routes, reassigning of objectives, et cetera. In the air, the commander can move his forces as a checker player moves his checkers. Timing is a very important factor to consider in armor, and the ability to see enemy actions, report this action, and issue orders to counteract the situation, is one which all commanders can obtain with command control in the air.

Since the reinforced battalions of the armored division are capable of covering miles of terrain in a relatively short period of time, the problem of reconnaissance becomes pronounced. In the air it is possible for the commander to observe the ground over which he will move his battalions, directing them over the best terrain suitable to their assigned missions. A great amount of time can be saved an armored formation moving over strange terrain by utilizing this method. The use of a subordinate will, in many cases, cause a time lag which will prevent the over-all success of the mission. The loss of even an hour can mean the difference of ten miles in armored operation. Even after the receipt of information from a subordinate observer, it is impossible to react as rapidly as is necessary during critical periods of operation. Major General Bruce C. Clarke, Division Commander, spent over forty hours in the air over front-line commands during Exercise Long Horn, supervising their actions and movements, always in a position to take advantage of any target of opportunity.

To maintain two aircraft with the combat commands continuously, it was necessary for the Division aviation section to support the command with all aircraft assigned to the section, seven in number. Later, it will be seen how this limits the operational capabilities of the aviation section. When possible, one of the aircraft should be maintained in reserve so that one of the craft will be available over the front during all daylight hours. It is impossible for one aviator and aircraft to properly support a command of any size for more than four hours day after day in combat situation. This fact should be recognized in training so that full utilization of every flying hour is obtained, and all concerned are prepared for combat realism. By the end of combat command test, most of the problems of coordination and control between the aviation section and the tactical commands had been eliminated and sound techniques developed.

The problem of integrating seven aircraft with the Division as a whole became apparent prior to Division exercises, and in order to best support all three combat commands in addition to complying with Division requirements, the following are some of the considerations which dictated distribution to the commands: First, to get maximum utilization of every flying hour, it was evident that a ground radio station capable of operating all aircraft from the base strip was an absolute necessity. Remoted to the operations tent, it is possible to call an aircraft from an inactive area and place it in support of a unit which requires more assistance at the time. Secondly, in an evening conference with the Division G2 and G3, priority of missions must be given to those commands bearing the brunt of the next day's operations. To these commands the aviation is assigned a direct support mission, which means that initially, one aircraft reports in over that command at first light. The aviator, in effect, becomes a liaison officer to that command, and it becomes his responsibility to inform the Division Aviation Officer when one aircraft is not sufficient to support the command. There is no other individual in a better position to determine when more aircraft are necessary than the aviator who has been working with the command. This will be true in all instances except when the missions are changed and then it will be necessary to switch priority from one command to another. At this time, the G3 informs the Aviation Officer of the change; he, in turn, will put another aircraft in the air. With the ground radio station at the base strip, it is possible for the commands to call direct to the Aviation Officer for additional support, and they will normally get it if the aircraft are available. With this close system of control, it is possible to prevent a wasting of aviators or aircraft flying time over inactive fronts. The third principle is that in the final analysis, the Division Aviation Officer must determine how much support can be given any one command in accordance with the missions given him by the G3.

From a study of the above listed operational techniques, one can begin to see that our operations closely parallel the air/ground operations system of close fighter support. The ultimate in all our operations is to make the light aircraft available for close support to the front line companies and battalions.

After many days in the field on Division exercises, Exercise Long Horn was begun with a further determination to streamline the operations of close support Army aviation. Most of the operational periods were similar to the actions of former training exercises. Some of the limitations mentioned previously became pronounced during the phases of Long Horn, the main one being the shortage of assigned aircraft to the Division Headquarters section. To adequately support three combat commands and the Division, the following are considered minimum: two aircraft to each combat command, totaling six; one for the CG and Assistant CG; one for G3 activities; one for the reconnaissance battalion (possibly two); one for the engineer battalion and signal company. This distribution totals ten two-place aircraft and does not show aircraft on the ground for necessary maintenance activities and for other activities, such as courier and liaison flights to higher and adjacent units.

On many occasions, the 1st Armored Division was spread on a wide front (as much as thirty miles), and in these situations it is impossible to support the Division properly with seven aircraft. However, using the system explained in previous paragraphs, over four hundred hours were flown by the Division Headquarters section in close support of the front-line commands during sixteen days of operations. Only with close control and proper utilization of every aircraft and aviator was this possible. All Army aircraft in the Division, which includes Division Artillery, flew eight hundred thirty-one hours during this period without accident. This flying time includes fourteen hundred and sixty landings with over fifty-five hours of nighttime. All of the flying was done from rough field strips of which sixty-two were used during the maneuver in support of Division units. It is firmly believed that this record indicates clearly the merits of Army aviation in close support operating under centralized control.

In review, it must be emphasized that only under centralized control can the available aircraft be utilized to the best possible advantage, but it should be recognized that the assignment of aircraft in the present T/O&E for the armored division should be as listed above in order that all commands may be supported adequately. Under this control, the problems of messing, maintenance of aircraft, rotation of flying personnel, supply of spare parts and equipment, et cetera, are minimized. As has been brought out in Division critiques by General Clarke, 1st Armored Division Commander, "the Army aircraft is the most valuable single piece of equipment the armored unit commander has available, and its proper utilization and employment in training and in operations, will greatly enhance its value to the commander."

Artillery's historic support role in the ground combat picture has been much enhanced by developments in the self-propelled field. Mobility, protection, communications, control, shock—these are elaborations fitting to the modern battlefield and the major support arm. The inherent capabilities of the self-propelled battalion explain why many artillerymen say

ARMORED Artillery is the Thing!

by LIEUTENANT COLONEL LEON F. LAVOIE

Photos by the author

THAT history repeats itself is a generally accepted fact. Of considerable concern to the author, however, is how many recurring incidents of a particular pattern must be recorded in the annals of history before effectively motivating the mind to accept these recurring incidents as fact and guidance for the future?

At Faid Pass, North Africa, the Germans made an armor attack. The 17th Field Artillery Regiment (towed) was overrun and lost. The 91st Armored Field Artillery fought its way out of the trap. At Cassino in Italy the Germans launched an armor and infantry attack against the 93rd Armored Field Artillery. The attack was defeated with only minor loss in friendly casualties. At the Battle of the Bulge, the 106th Division Artillery (towed) was overrun and lost.

In the Pacific Theater there were numerous cases where the Japanese infiltrated sizable forces into our towed artillery positions and inflicted serious losses. In the earlier stages of the Korean campaign every towed artillery unit was attacked one or more times, suffering serious losses. The most serious loss was suffered December 1, 1950, by the 2nd Division Artillery (towed) in the Kunu-ri Road Block. Yet, on the 24th of April, 1951, northwest of Chunchon, the 92nd Armored Field Artillery Battalion soundly defeated, with terrific losses, an attack on their position by a sizable Chinese Communist force. Minor friendly personnel losses were suffered and no equipment was lost.

On or about 21 May 1951, the 213th Armored Field Artillery Battalion (105 SP M7) completely defeated a large enemy force that attacked their perimeter north of Kapyong. When the smoke cleared, they counted minor friendly casualties and gathered over 300 enemy dead and several hundred prisoners. In Korea alone we have suffered a loss of better than 400 towed artillery pieces, a priceless commodity at a time when it was needed most. Obviously circumstances were different in each case and no flat statement can be made that will fit any and every action. But an analysis of organization and capabilities and limitations goes far toward supporting the combat examples.

While Korea differs materially from the World War II pattern of Europe, Korea may well be representative of many actions in which we will be called upon to participate in our support of freedom-loving nations on all continents. Our potential enemy is certain to have manpower superiority as he does in Korea but as long as steel can penetrate flesh, our inherent firepower superiority will keep us with the initiative for the offensive.

> Tactical mobility is paramount in support of any rapidly moving situation. This battalion has provided fire power and shock action in suppport of nearly every type of offensive operation and has also been quite useful as a "fanny fender" in support of rear-guard action. The battalion, on occasion, has been called upon to act as a fire brigade, dashing from one division to another along the corps front, providing covering fires during the relief of other artillery units.—*Lt. Col. Cleveland, present commander of the "Red Devils," in Sum & Substance, ARMOR, July-August 1952.*

War implies seizing the initiative by force. The element of surprise initially favors that side which initiates war. As a nonaggressor nation, we must first be attacked or transgressed prior to active war. World War I and II found our allies taking the brunt of this initial force while the United States mobilized, equipped, and trained a balanced offensive force. In future wars, we are certain to meet the initial shock with troops and equipment on hand. These facts indicate a requirement for an initial highly mobile defensive force to defend, delay, and to gain time to assume the offensive—eventually. Obviously then, the effectiveness of our initial defensive force will greatly influence the eventual offensive. Both must employ the most modern, hard-hitting and decisive weapons that our science, industry, and economy can produce and sustain.

As Korea vividly illustrates, surprise and sneak attacks upon artillery positions have proven to be a particularly lucrative enterprise for the Red hordes who sought to stalk and ambush this dreaded weapon. Panic, resulting from a hostile act, often proves much more disastrous than the hostile act itself. In the first decisive moments, faith and confidence in equipment and weapons instilled through realistic training will alone override panic and influence victory. In artillery units, this faith and confidence is best realized and sustained in the self-propelled battalion through its superior fire power, light armor protection, cross-country mobility, and compact rolling stock.

Embarrassingly reminiscent of our Indian warfare of early days, the CCF's tactics emphasize infiltration and sneak tactics and close-in combat. Their initial object is the disruption of supporting units. Recognizing the numerical superiority of any potential enemy, this presents a serious threat to our present and future forces. The CCF in Korea follow the following general pattern:

a. The infiltration of small parties into our flanks to cut off our rear, transport, and resupply.

b. Night advance, to feel out our position and then attack promptly where our fire is weakest. (This is usually coordinated by signals from an OP.)

c. The utilization of noisemaking devices for our demoralization.

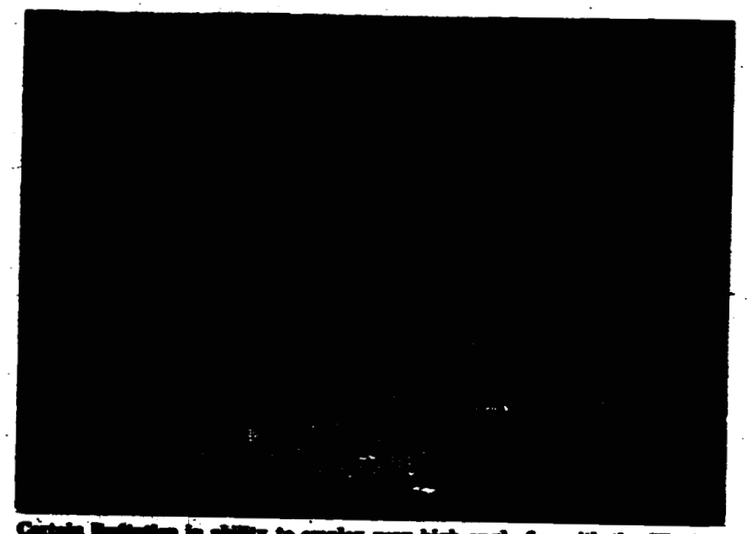
d. Charging the position with several CCF, loaded with grenades which they toss into ammo vehicles and gas tanks, to create confusion and panic within the position. Thereafter, they open up with supporting weapons to methodically reduce the position.

In contrast to the stabilized lines of conventional warfare of World War II in Europe, the CCF cash in on their numerical superiority to infiltrate to our rear, cut off our supply, and disrupt and subjugate our principal close-support weapon, the

---

LIEUTENANT COLONEL LEON F. LAVOIE commanded the 25th Field Artillery Battalion (towed 105s) in World War II. In 1949 he assumed command of the 92d Armored Field Artillery Battalion (SP 155s), taking it to Korea and leading it through the action there for more than a year. He is now a member of the staff of Fourth Army.

artillery. Under these circumstances, then, the artillery battalion's perimeter must become a tight, coordinated, and mutually supporting defensive ring, suggestive of the covered wagon camp of our early western pioneers. Obviously an infantry commander cannot make a battalion of infantry available for the security of every artillery battalion. Therefore, an artillery battalion must be able to secure and defend itself in the execution of its primary mission—that of rendering artillery support to the infantry and tanks. Yet, according to CCF tactics, the very moment at which the front lines are in urgent need of support may well be when the supporting artillery is itself under attack. Therefore, in our concept of the infantry-tank-artillery team, the sole justification for the existence of the artillery commander at this juncture is to insure his artillery support to his team.



Certain limitation in ability to employ very high angle fire with the SP piece is offset by placing the vehicle on an appropriate natural or built-dozed slope.

Through leadership, complemented by seasoned training, and based upon faith and confidence in weapons and equipment, the artillery commander must be ruthless in his defensive tactics. He must also be assured that, if he becomes surrounded, a counterattack will restore the initial condition. Abandonment of position must be a carefully considered order by a senior commander as part of a larger plan. The evacuation of an established defensive perimeter for the unknown, particularly at night, is most imprudent. One or two CCF, cleverly situated at a defile, may knock out a lead vehicle and thereby establish a road block as planned. Thereafter, the column is methodically reduced by grenades and automatic weapons that turn the column into a conflagration.

Dependent upon the degree of enemy air activity, the ideal artillery battalion perimeter becomes a tightly knitted and mutually supporting area of about seven hundred by seven hundred yards—largely influenced by the local terrain. With Battalion Headquarters nestled within a triangle formed by the three firing batteries, the organization and development of the battalion into an impenetrable ring of steel is possible by the employment of:

a. Strong outposts to detect, report, and delay the enemy and insure timely warning to the interior installations.

b. An interior, dug-in main battle line that can be manned in strength quickly and held at all cost.

c. A local and battalion reserve that can be readily dispatched to reinforce the threatened sector.

Visualize the SP Battalion perimeter with its thirty-five Armored personnel carriers, fifty-eight .50 caliber machine guns, thirty-eight .30 caliber machine guns, forty-three 3.5 rockets and several hundred carbines, submachine guns and grenades! Meanwhile, cannoneers are protected by light armor against small arms and fragmentation and, further, should the need arise, the SP guns can maneuver and fire in a manner similar to a tank in support of the perimeter.

With time permitting, as in a relatively stabilized situation, the outpost line may be further developed, to incorporate natural and improvised obstacles. Concertina and barbed wire aprons with trip flares, fragmentation and white phosphorus grenades intermingled, are an effective challenge to the intruder. Partially filled fifty-five gallon gas drums and oil-soaked straw stacks with waste powder increments can be readily ignited by tracer ammunition. To further satisfy one's fancy, white phosphorus and HE "Projos" (with damaged rotating bands) may be planted and wired across likely avenues of approach and detonated at will, by electric cap, field wired to any control point. All such obstacles must be covered by grazing fire.

Meanwhile, outposts organized around the half track or other armored personnel carrier become a veritable pillbox, with two or more machine guns, a basic load of fragmentation, white phosphorus, and illuminating grenades. Interconnected by a multiple hot-loop wire net, and with radio as a reserve, these outposts listen, detect, report, investigate, cause to deploy prematurely and, if possible, destroy the invader.

Should the enemy overrun an outpost, he has yet to face the worst—for the main battle line, completely dug in just beyond grenade throwing range of the artillery and related sensitive installations, has now been manned in strength. Small arms, automatic weapons, grenades, bazookas, direct artillery fire, and incendiary obstacles covered by fire are destined to demoralize and destroy his will to fight. This then becomes that supreme moment of test—of steel versus flesh, in which our best leadership, equipment, and training will outdo the enemy. As to the outcome, history gallantly records that self-propelled artillery is best suited for this job. It has the means of victory.

To delineate fact from fiction in the reader's mind, the "Red Devils" of the 92nd Armored Field Artillery Battalion (155-SP-M41) continually employed the above procedure in Korea, where this Battalion won continuous praise in its support of all United States Divisions and five Korean divisions. As direct support artillery for "Task Force Dog" in early December 1950, this battalion occupied treacherous positions at Chinhung-ni in support of the Task Force's mission of keeping the axis Koto-Ri—Chinhung-ni—Sudong-ni—Monjong-dong open for the relief of the gallant Marine and Army units at Chosen Reservoir. In this environment of a numerically superior enemy force and bitter sub-zero weather, this SP artillery unit supported this difficult rear guard action and defended itself to the satisfaction and praise of the Marines and the Army.

Again on 24 April 1951, following the complete collapse of a Korean division, the position of the 92nd's Red Devils was attacked in force at 0515 hours with heavy enemy mortar and automatic weapons fire, and charging grenade-bearing CCF. Through measures outlined herein, this brazen attack was repulsed without loss of equipment and a minimum loss of life. Our comrades who paid the supreme sacrifice did so in outstanding acts of bravery resulting from faith and confidence in their equipment. Possibly faith and confidence may be further illustrated by a group of men with Service Battery, to the rear, who started out—cross-country—to the Battalion's assistance upon hearing of the enemy's attack upon the Battalion position.

The advantages and convincing performance of self-propelled artillery units in Africa, Sicily, Italy, Germany, and now Korea, has been largely based upon "acetylene torch makeshifts" converted from existing tanks. Future SP's will be engineered SP artillery and as such will further enhance the effectiveness of the SP artillery. Campaigns will differ by the mixture of the basic ingredients of enemy, terrain, and force available. But, since our training is geared to an eventual offensive, we must insist that this basic support commodity is highly mobile tactically, flexible by virtue of abundant communications, and compact. Artillery, effectively to support, must be well forward and capable of instant reaction to "on call" fire missions and must be able to secure itself on the march and in position to include instantaneous direct fire. Tactical mobility and fire power must remain foremost if we are to cash in on the type of warfare we are best suited to fight. Self-propelled artillery gives shock action to the greatest supporting arm of the infantry-tank team. Through this insistence we will retain the initiative for the offensive.

In defense the SP battalion offers cannoneers light armor protection from small arms and fragmentation, while the guns maneuver and fire in perimeter support.

The writer is not proposing the complete abolishment of towed artillery. We have a need for towed artillery just as we have a definite need for pack artillery. Had we had pack artillery in Korea to support the Korean divisions in the mountainous sectors devoid of road nets, we could have greatly increased the effective fire power to their front and filled a serious gap; one that the CCF soon recognized and capitalized on. On the other hand, modern warfare involves greater distances, greater dispersion, and greater speed with less time for reaction. An early, well-aimed round amongst enemy personnel in the open is far better than a battalion volley later—when they have logged-in shelters.

For our principal nuclear force, we will not have time for uncoupling—splitting trails, trail logging, and tedious hand shifting. That is where we will need compact, self-contained rolling stock with ammo at the breach, radio within reach and a motor underneath.

Conclusively, self-propelled artillery is superior to towed, by reason of:

- Greater tactical mobility and ability to negotiate rough terrain.
- Greater automatic weapons fire power and light armor, which enables it to better secure itself in position and protect itself on the march.
- More compact rolling stock—assuring immediate fire support within the minute on the march and in position.
- Multiple and flexible means of radio communications insuring fingertip control with all elements.
- More protection for gun squads rendering continued fire support while undergoing attack.
- Ability to fight in the manner of tanks in close defense of the position.
- The shock action it gives to artillery.

Tailored for the offensive by its inherent ability to support well forward, it is likewise better suited to support the rear guard action—when necessary.

The Ground Soldier

In these days of tanks, self-propelled artillery, armored personnel carriers and planes, it is astonishing to hear so much talk in terms of the *foot* soldier. Perhaps this is nothing more than the habit of tradition. What is meant, undoubtedly, is the *ground* soldier.

Much of the reference to the foot soldier has been inspired in the air-versus-ground debate. While most thinking now is properly oriented to the balanced team concept in which all services play their part, many proponents of the Army side insist upon stating their case in the same old way, "You can't do away with the *foot* soldier (or *infantryman* or *rifleman*)!"

This only partially meets the matter. It is an over-identification of the Infantry in a situation that involves the entire Army. If what is meant in these various statements is simply the fact that today we can't fight a war without an *Army*, the pronouncements should be plain in terms of the *ground* soldier. The point may seem casual enough, but it indicates the need for a closer appraisal of the trend in ground armies today.

History, which has brought man a long way beyond his two feet, has done the corresponding thing for the soldier. Developments in weapons, transportation and locomotion have caused a continuing revision of military organization and tactics. Since the foot soldier was the starting point, the trend must obviously be away from him and in favor of later innovations.

While these innovations reach their ultimate in such agencies as Air Force and Armor, they have by no means passed by the Infantry, which has undergone internal revision in keeping with the day. Tanks, personnel carriers, machine guns, bazookas, mortars and recoilless rifles have brought the Infantry its measure of modernity, properly at the expense of the rifle and the rifleman. Review and revision must never cease.

But there is a definite trend within the ground forces which was sparked in World War II. It is the gradual adjustment to a better balance by bringing our potent weapons into the picture. Infantry always has borne the brunt of combat losses. In the effort to relieve her of the distinction of being the casualty branch, we have a definite program for providing strong mobile elements to do the job in these times, units capable of dealing out punishment while sustaining minimum loss. This points up the value of Armor on the modern battlefield.

In speaking of our ground force in terms of the rifleman or the infantryman, we are slighting a major element of our ground team—the Artillery. For while it is true that Infantry suffers the greater losses, it is equally true and a matter of record that Artillery dishes them out. Ask the rifleman what he sweats out on the battlefield. If he mentions rifles it will be after he has listed artillery, tanks and bombs—assuming he has had experience with each.

For those ready to mention Korea at this point and the predominantly Infantry role there—in which Artillery has a tremendous role and Armor a substantial one—it is best to note that here is a special situation that is not the common denominator of war. Our remarks apply more to the general type of warfare obtaining in World War II, wars fought to the limit over all types of terrain and for a military decision . . . wars where Armor serves its ideal purpose—as a primary assault arm in the offensive, in large action for decisive results.

Developments in weapons, including the atom, have increased the need for dispersion. Dispersion connotes speed, mobility, *mounted* forces, or, to carry it out, Armor.

The modern army is a team of ground soldiers, of combined arms. Within that team are the two main tools—the infantry division and the armored division. The long history of a ground army where all elements exist to support the infantry is gradually shifting. As warfare shifts from trenches and Maginot Lines and static and continuous fronts—from holding to moving situations, from defensive to offensive action—Armor comes into play. For in Armor there is a team in which infantry and artillery and engineers and other services, all exist to support the tanks as the main striking element.

What of the men required to take and hold an objective? Increasingly they will be the men of the Armor team—*armored* infantry, who arrived *mounted* on the objective right along with the tanks and self-propelled artillery—men protected to a substantial degree from the number one killer and provided with some solid death-dealing capabilities of their own.

Our Army is a great team today, a team of *ground* soldiers.

FROM THESE PAGES

60 Years Ago

Deductions regarding the future can be drawn only from the lessons of the wars of the past, coupled, of course, with the necessary considerations caused by modern progress in arms, ammunition and material. But the results in the past have been so widely divergent in character that each disputant finds in them material for upholding his own views, and very often condemning as meretricious those of his opponents. The question will probably never be decided to the entire satisfaction of either side, not even by the next great war, since whatever the results every disputant, especially if a theoretical one, will find plenty of authority of some kind for supporting his own especial theories.

And the subject may at present be looked upon as presenting the best possible ground for theories. Although all European nations, and our own as well, are reorganizing their cavalries and drilling them according to new tactics and regulations, yet these regulations have not the positiveness of those for infantry, and there is a view of "if" running through many parts of them which cannot well be avoided. It is difficult to fix with exactness the extent to which the use of mounted troops will be carried in certain directions, and this difficulty is somewhat increased by doubt as to the exact tactical formations for attack, which will be adopted by the infantry against which they may be called upon to operate.

The Tactical Use of Mounted Troops
LT. GEORGE W. VAN DEUSEN

40 Years Ago

In reference to the present discussion concerning the utility of the pistol, it might be well to consider if most of the objections to the arm could not be eliminated before deciding to abolish a weapon distinctively "American" and which has been developed in actual service. The principal objections urged against it are:

1. It is a difficult weapon for the average man to learn to use.
2. In the hands of the average it is not accurate.
3. Instruction in its use takes too much time.

We want, then, a pistol the average trooper can become reasonably proficient with in a short time. I believe this can be accomplished by changing the form of the pistol and the method of target practice.

The pistol is essentially a short range weapon; its target in service is over five feet high and two feet wide. Now, while it may be difficult to teach a man to hit a five-inch bull's eye at fifty yards, it is not so difficult to teach him to hit a man or a horse at ten, either mounted or dismounted, provided he is given a weapon he can handle. To do this the pistol should be used like a shotgun, pointed, not aimed: This was recognized in the old drill regulations and in the old firing regulations, and there is a halfhearted attempt to indicate it in the present book, but we can depend upon the fact that so long as a man's qualifying as a pistol shot depends on his being able to hit a small spot at fifty yards, he will sight his pistol and not point it. We can trace this kind of firing, as well as nearly every weak point in both rifle and pistol, to competitions and competition training.

The Revolver
LT. K. B. EDMUNDS

25 Years Ago

During the annual preliminary training and range practice of the 2d Machine Gun Squadron this year, a new method of "dry shooting" was very successfully used.

The reduction in the allowance of ammunition for machine gun marksmanship training has made it necessary to find some effective way of teaching manipulation and observation simultaneously, without using more ammunition than allowed. The manipulation exercises prescribed in regulations cause the gunner to concentrate his mind entirely on his gun, whereas in actual firing this attention is divided between the gun and the effect of his fire. At the same time the soldier's interest must be maintained if the time spent is really worth while.

The objects in mind were:

1. To decrease the amount of time necessary for range practice.
2. To increase the ability of the individual in mechanical manipulation of the gun.
3. To perfect training in observation of fire without expending ammunition.
4. To keep each man active and interested, when on the firing line, but not at the gun.

In teaching observation and manipulation on the 1000-inch range, the following blackboard method was used:

All men, except the one "dry Firing" and the coach, sat just in the rear of the gun. Or, in case two or more guns were available, the men were divided equally between the guns so that each man could get more actual work on the gun. The officer or "non-com" who conducted the problem stood at the target (placed 1000 inches from the gun). He used a pointer (a small stick with a black spot on the end about one-half inch in diameter) to mark or plot the simulated shots.

As when firing with live ammunition, the sights were set to hit the application and the gun knocked five mils or more off in each direction: time was taken on the command "Commence Firing," and the problem started.

Machine Gun Marksmanship Training
LT. W. P. CAMPBELL

10 Years Ago

Every day we read news commentaries in which, according to the often biased opinion of the writer, the success of a battle is attributed to the superiority of some one particular arm of the victor's forces. This claim might be justifiable in a few specific situations or isolated actions, but the superiority of no single arm in itself wins a war. Decisive victories most often depend upon the coordination and proper use of all of the arms available to the commander of the force. This coordination must be based upon the complete knowledge (by the commander and his staff) of the tactical use of each arm that is a part of his force. The role that each arm must play and the time of its entry into the battle must be thoroughly worked out—each with proper consideration of the capabilities and limitations of the other arms involved.

Coordination
EDITORIAL

An engineer discusses a subject of compelling interest to all tankers

GAS TURBINES FOR TANKS?

by RICHARD M. OGORKIEWICZ

THE success of the gas turbine in the field of aircraft propulsion has inevitably attracted attention to its possible use in other fields, including that of automotive vehicles. Experimental gas turbine units are already running in non-military vehicles and their possible use in tanks has been mentioned on a number of occasions. The question then immediately arises how the gas turbine compares with existing types of power plants and whether, or when, it is likely to replace them.

Before this can be examined, however, it is necessary to make clear a number of more general points, including the reason for the success of the gas turbine in the aircraft field.

Jet Engines and Others

The main reasons for the success of the aircraft gas turbine are briefly two. One is the rapid rise in the power requirements of modern aircraft. This was particularly marked during World War II and produced a demand for units of large power and yet of low weight. The other reason is the equally rapid increase in the operating speeds of aircraft, to speeds at which jet propulsion not only became competitive with, but actually more efficient than the hitherto universally used propeller. The two combined, the simple gas turbine being eminently suitable for producing large power outputs in the form of a high speed jet, and together with the development of high temperature alloys, brought about the development of the aircraft gas turbine. The gas turbine has already replaced the older type of plant in all high speed aircraft and its use is continuously being extended.

At the other end of the scale where the gas turbine is being successfully applied, namely in electric power stations, ship propulsion and locomotives, the position is somewhat different. Here, of course, power is produced not in the form of a high speed jet but in shaft power to drive machinery and the unit is considerably more complicated than the simple aircraft gas turbine. As in the aircraft field, power requirements are generally high but weight and space limitations are less stringent and diesel engines and steam turbines have been able to satisfy the requirements and at the same time operate with high efficiency. For these reasons the relative advantages of the gas turbine are smaller and competition from existing power units much stronger than in the case of aircraft.

For automotive vehicles power requirements are generally much lower than those in any of the above mentioned applications. But, on the other hand, something approaching the simplicity and high power/weight ratio of the aircraft turbine and the operating efficiency of the large, stationary gas turbine are simultaneously demanded. And it must satisfy these demands if it is to be an effective competitor of the existing reciprocating engine. It must also be able to operate efficiently under varying load—part as well as full load.

This is one of the difficulties in the path of the introduction of the gas turbine into the automotive field for its efficiency falls off markedly away from the design conditions and load. Other difficulties, common to all types of gas turbines, are associated with the high operating temperatures and component design and these will be more apparent after a more detailed, though necessarily brief, examination of a gas turbine unit.

Basic Design

A typical gas turbine of the type which is now being tried experimentally is shown in the diagrammatic cut away section. It consists of a number of separate components which collectively perform a cycle of operations corresponding to that in the cylinder of a reciprocating, piston engine.

Following the direction of gas flow, air is sucked into the unit by a centrifugal compressor. The compressor, like a centrifugal pump, imparts energy to the air passing through it and hence increases its pressure. Through ducting, the compressed air is passed to a combustion chamber where fuel is continuously injected in the form of a spray, and burnt. Temperatures of the combustion products are of the order of 1,200°F. to 1,600°F. and these hot gases pass from the combustion chamber, through nozzles, to the turbine. This turbine supplies power necessary to drive the compressor and is generally referred to as the "compressor turbine."

The components so far described form a thermodynamically complete unit which is common to all gas turbine engines and which is basically a gas producer. The aircraft turbo-jet engine is simply that and nothing more. The useful power developed by the engine is the high velocity stream of gases issuing from the compressor turbine and this jet produces the propulsive thrust.

For automotive applications, shaft power, instead of a jet, is required and a power section has to be added to the gas producer. This consists of a second, or "power," turbine, mechanically independent of the compressor turbine and which absorbs energy from the gas stream leaving the latter. The energy or power developed at the turbine is transmitted through a suitable reduction gear to the output shaft. The maximum power developed at the power turbine is at all times determined by the surplus energy available from the gas producer.

Advantages . . .

The fact that the useful power is developed at a turbine wheel, mechanically independent of the compressor turbine and the whole gas producer section, is a great advantage from the automotive point of view, for the separate power turbine performs similarly to a torque converter. In other words, its torque increases as the speed decreases, the stalled torque available at the output shaft being two, or more, times the maximum running torque. The torque characteristics of the gas turbine are thus theoretically ideal for an automotive application, in contrast to the reciprocating, piston-type engine which requires a multi-speed gearbox or a hydro-kinetic torque converter to vary the output according to the ground conditions. And, as in the case of the torque converter, no clutch or coupling is necessary to disconnect the unit at any time from the final drive.

This considerably simplifies many problems since the automotive gas turbine is a self-contained power unit and is fundamentally much simpler than any reciprocating engine and its associated transmission.

It has the further advantage over the latter in that the cycle of operations is continuous, and not intermittent as in the cylinder of a piston engine, and that the motion of its working parts is of a simple rotary type. This means that there is none of the inherent unbalance and fluctuating output of the reciprocating engine. A distinct engineering advantage, quite apart from any aesthetic appeal.

. . . and Disadvantages

Against these advantages must be set off a number of disadvantages, when compared with the reciprocating engine.

One inherent drawback is that the gas turbine, like all fixed blade turbomachines such as torque converters, fixed pitch propellers, etc., loses efficiency when it is not running at its design conditions. In other words, from the point of view of efficient operation, it is inflexible which is a much more serious drawback in an automotive application than in any other since here most of the running is at part load.

Another drawback is that the gas turbine requires a much larger volume of air throughout for any given power than a reciprocating engine. It requires at least five times as much air, or, with the operating temperatures at present practicable, even

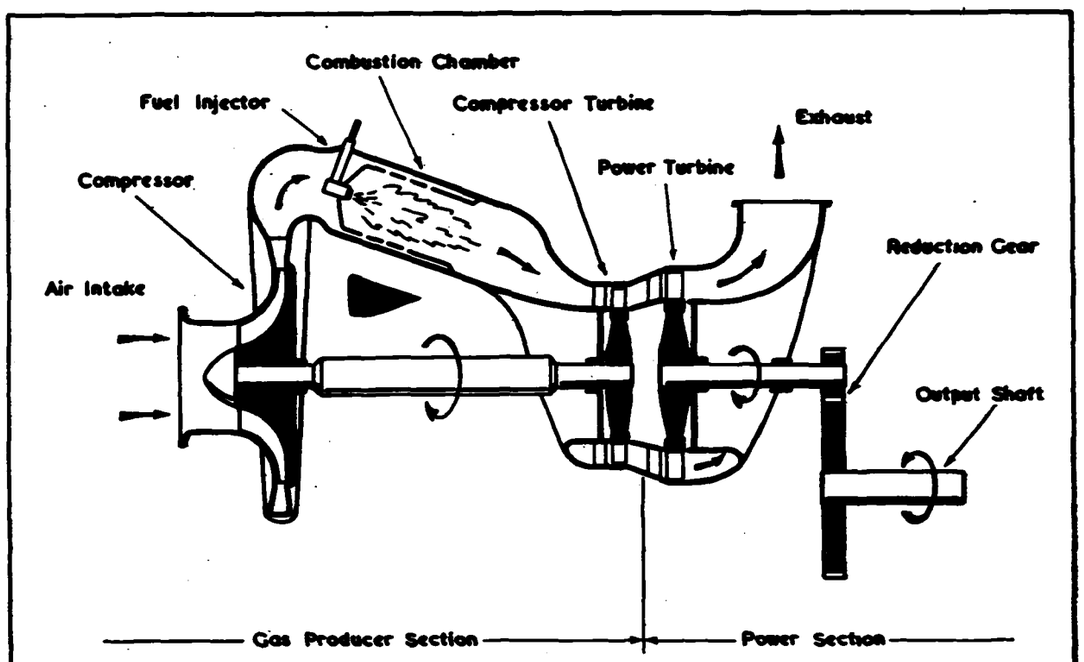


Diagram of a Typical Gas Turbine

RICHARD M. OGORKIEWICZ, an engineer and lecturer at Britain's Imperial College of Science, has been working on gas turbine problems for a number of years. He is a frequent contributor to ARMOR.

around ten times as much. This means that all the problems associated with air intakes, louvres, filters, ducts, etc., are much more severe, particularly in armored vehicles. All these are indispensable yet the volume they occupy is apt to be very easily forgotten when comparisons are made. The large volume of air also means that there is a much larger volume of hot exhaust gases to be disposed of, and noise.

Yet another one is the fact that parts exposed to hot gases are continuously exposed to them. Unlike those in the reciprocating engine, where they are alternately exposed to the cool, fresh charge and the hot combustion products. It means that certain parts of the gas turbine—the turbine blades for instance—are running red hot all the time, while at the same time they are subjected to high stresses due to the high rotational speeds, which are of the order of 40,000 r.p.m. for the smaller units and 15,-20,000 r.p.m. for the larger ones.

Severe as these conditions are, high speeds and high temperatures are essential to attaining a reasonable efficiency. Lowering the temperature would mean a rapid increase in the number of pounds of fuel per horsepower-hour and, ultimately, gallons per mile. As it is, the temperatures which can be used at the moment are not sufficiently high to produce high efficiencies and yet they have only been made possible by the use of very expensive alloy steels for the turbine wheel. The latter, the turbine wheel, is the most critical component of the gas turbine and the efficiency and the working life are very largely a matter of the temperature at which it operates.

Possible Improvements

At the moment efficiencies are poor and although this need not always be so it is a point which will weigh against the gas turbine for some time to come. Improvements can, however, be expected both in the quality and manufacture of alloys for turbines and in the introduction of hollow blades, through which cooling air could pass. It would allow higher operating temperatures and hence better efficiencies.

An immediate way in which the efficiency of an automotive gas turbine can be improved is by the addition of a "heat exchanger" to it. In this, air on its way from the compressor to the combustion chamber is passed through a series of tubes on the outside of which flow the hot exhaust gases from the turbine. In this way heat is drawn from the exhaust gases and less fuel has to be burnt to reach any given operating temperature. Of course, this gain can only be had at a price, namely some reduction in the power available at the turbine. Ultimately this loss becomes much greater than any benefit derived from the heat exchanger. However, well short of that condition a very appreciable saving in fuel, and hence gallons per mile, can be obtained with an efficient heat exchanger. The only trouble which then remains is its cost and volume.

Experimental types

Of the types which have been so far released, none is fitted with a heat exchanger and their efficiencies are correspondingly poor. At their very best the fuel consumption is about twice that of a gasoline engine and three times that of a diesel. But before any hasty conclusions are reached it should be pointed out that maximum efficiencies were not the aim in the design of these gas turbines. Being the first of their kind, the aim very naturally was to obtain satisfactory mechanical operation. Before these units were run there were not a few people very skeptical about the feasibility of the whole project, let alone satisfactory operation.

The first automotive gas turbines were tried in 1950, in a car by the Rover Company, of Birmingham, England, and in a truck by the Kenworth Motor Truck Company, of Seattle (using a Boeing turbine). More recently the Laffly Company in France has produced another experimental gas turbine powered truck. Other units are being developed by several firms.

All three models named are of the basic type already described. They have a single, centrifugal compressor, twin combustion chambers and two, mechanically independent, turbine stages. They develop between 175 and 200 horsepower at maximum speeds of 25,000 to 40,000 r.p.m. and their maximum internal temperatures are around 1,500°F.

They are, as already stated, experimental units in which manufacturing costs and operating efficiencies have been secondary considerations. For that reason, and for others, any comparisons between them and existing reciprocating engines must be very carefully handled. Some hasty conclusions, based on incomplete evidence, seem to have already received a fair amount of circulation.

Weights and Efficiencies

One of the main practical points which has been put forward in favor of the gas turbine is that it is much smaller and lighter for any given horsepower developed. In support of this, comparisons have been drawn between one or other of the experimental gas turbines and a standard commercial engine.

The results, on the face of it, are remarkable. For instance, the gas turbine proves to be only 10 per cent of the weight of a commercial engine of roughly the same horsepower. But if a somewhat different type of engine is taken as the basis of comparison the picture changes: not a commercial, water cooled engine in which robustness, long life and low cost are of primary importance but one of the highly developed air cooled engines. In this case the power/weight and power/volume ratios become comparable. And of course, in the case of the piston engine this is achieved without the use of costly alloys or at the price of a heavy fuel consumption.

The latter is not only a matter of economy but of operations in the field for, other things being equal, the higher the fuel consumption the shorter the distance a vehicle will travel on a given quantity of fuel. As it is, current models of tanks—such as the Patton for instance—are by no means noted for their operating range and the installation of a gas turbine could not fail to make matters worse.

Constant refilling, arising from a short operating radius, is a severe handicap to tank units in the field. Apart from this, heavy fuel consumption means more fuel to be handled in the rear areas and brought up to the front, still larger service echelons and so on. And that this is not a matter affecting only the supply services was

shown clearly in France in 1944, when armored divisions were stopped not by enemy resistance but by the difficulties of fuel supply.

As has been said, efficiencies can be improved by the use of heat exchangers. But, if the fuel consumption then becomes equal to that of a piston engine the volume of the gas turbine unit becomes greater. And it is the volume of the power unit, the space which it occupies within the vehicle, which is more important than its weight. With half, or more, of the whole tank weight being due to the armor envelope it is the volume of the components, such as the engine, transmission, etc., rather than their individual weights which matter.

Simplicity and Cost

The question of simplicity also requires careful examination. It is perfectly true that the gas turbine is basically much simpler than a reciprocating, piston engine and that it has fewer parts. But these advantages are offset partly by the complicated machining required by some of the components and hence high production costs.

It is at high powers that the gas turbine really scores—when developing 1,000 horsepower or more. High output reciprocating engines then start to become complicated while the gas turbine remains basically the same as for units of 200 h.p. At the same time manufacturing problems become relatively easier, particularly in the case of the turbine blades. The use of critical and expensive materials is still, however, necessary.

Against this it has often been said that the higher cost of materials, and the higher fuel consumption, are partly if not largely offset by the ability to burn cheaper fuels—cheaper by comparison with gasoline. And by the lower lubricating oil consumption. That is partly true and the ability to use a variety of fuels with little or no adjustment to the unit has already been demonstrated in practice. But the range of fuels which has so far been used in gas turbines can also be used in the new type of reciprocating engines, with "controlled combustion," whose development has been pioneered by the Texaco Company. So again, the advantages are not quite what they are sometimes made out to be.

Tank Power Plants

Enough has been said to show that the gas turbine, even improved on the existing models, would not solve all the problems which face the automotive power plant engineer and the tank designer. Its advantages are offset by a number of disadvantages, just as they are in the different types of piston engines. That there is no unique solution has been clearly shown in recent years by the number of different developments. In the United States air cooled gasoline engines have been favored for tanks for instance, but in Britain and France water cooled gasoline engines are preferred and in Russia water cooled diesels. The Germans (whose water cooled gasoline engine development has since been taken over and continued by the French) were working intensively on air cooled diesels when the war ended.

The basic requirements for a tank power plant are high power/weight and power/volume ratios—particularly the latter—good fuel economy over its whole operating range and reliability. To this must be added ease of production, which involves cost of materials, manufacturing effort, etc.

Bearing these in mind, it is difficult to see how the gas turbine can offer a better combination of characteristics, on a power unit to power unit basis, for the size of unit at present employed. Improvements are, of course, possible and some have been indicated. But that is almost equally true of the reciprocating engines: only very recently information has been released in England on a new type of diesel engine which has a specific output very considerably higher than that of any engine used to date.

The gas turbine does not require a separate cooling system, like a piston engine (though in the enclosed space within a tank it will probably require some air flow to cool the engine compartment). Neither, in principle, does it require a separate transmission; in practice it needs a fixed reduction gear to bring the speed down from around 20,-30,000 r.p.m. to some lower, acceptable figure and a relatively simple gear box to provide a "high" and "low" speed range and reverse.

The reciprocating engine, on the other hand, does need a separate cooling system and a separate transmission, both of which absorb power and which mean more material, more manufacturing effort and more space taken up in the vehicle. Engine power is absorbed by the fans while oil coolers are a proof of the energy used up in the automatic, torque converter transmissions.

As regards the latter, the hydrodynamic efficiency of the torque converter cannot, in fact, be appreciably better than that of a turbine stage since the two are basically the same type of mechanism. So if the present trend to torque converters continues the gas turbine will be in a much better relative position. Whether that trend is in itself sound has still to be seen: so far at any rate the best torque converter transmissions are those which use the torque converter least. But as long as this trend exists it is to the gas turbine's advantage and it gives it a better chance of becoming competitive, particularly for units of 500 h.p. or more.

Summing up

Summing up all the points in favour and against the automotive gas turbine, it is doubtful if in the more immediate future it is going to show any marked advantages as a tank power plant. For special, high powered vehicles where cost and fuel consumption would be of secondary importance it should show a better power/weight ratio, and perhaps a slightly better power/volume ratio, and greater simplicity. But the very high fuel consumption, and hence a small operating radius, would be unacceptable for general tank use.

Before the gas turbine can become really competitive in the automotive field two things are, above all, necessary: its specific fuel consumption must be considerably reduced and the use of very costly critical alloys must be minimised, or preferably eliminated.

These are serious problems. But it does not mean that they cannot, in time, be solved. Much has already been accomplished in the field of automotive gas turbines, in the space of only a few years. New developments are on the way and further progress should be watched with interest and a degree of confidence.

Sum & Substance

A regular feature in ARMOR, where you may express your views in approximately 500 choice words—the effective medium between the letter and the article. This section is open to all on any subject within the bounds of propriety. Name and address must accompany all submissions. Name will be withheld upon request. No pseudonyms.

It costs a tremendous amount of money to build a tank and to train the man who will drive it. The end in view is a combination that will produce success on the battlefield. ARMOR turns to Korea and that ultimate combination—the man, the tank and the battlefield—for the translation of a compelling subject in which the man is the hinge—COMBAT TANK DRIVING.—THE EDITOR.

The writer of the following began his training in Camp Cooke, California, on an M4A3E8, continued it in Japan, and has been handling an M46 in Korea. He has been a tank driver in Company B of the 140th Tank Battalion for the past 22 months, on missions in all kinds of weather, from below-zero cold to broiling summer heat.

Combat tank driving consists mostly of maintenance and good judgment.

I drove an M4 tank for 10 months before switching to an M46. Though there still are bugs in the cooler fan system, the M46 is a fine tank.

But you cannot "cowboy" the M46. That's one thing a driver has to remember. Some men try it, to their sorrow. I do my best to save my tank and try to help others to do the same.

The tank is there to fight. Proper steering and shifting are two important operations for drivers in combat. It's not hard to throw a track here in Korea's tough terrain. And in the hills, a driver has to be careful to select the right gear.

Some men have the idea of shifting from low into high and then from high into low. That's as bad on a tank as it is on your civilian automobile. It is liable to get you into trouble.

Experience is the big thing here. It's what we draw on in training new men.

Mines are one of the big headaches of a tank driver. We have to be watching at every moment. Of course, some of the mines can't be seen. But there is one enemy trick I've noticed. Sometimes the Reds have placed mines in the tracks where our tanks have gone before. I have found that when they do this, they just throw a little pile of dirt over the buried mine. If you're careful, you can spot them and go around the area.

I have never thrown a track by hitting a mine. But I have thrown them by turning on a steep hill. And another time some ice in a river gave me trouble. Big rocks also are a problem. A small drop-off gives the M46 a rough ride due to the fact that it rocks so easily.

It's a good idea to hurry in and hurry out of a tight spot, but not with speed—if you know what I mean. A fast driver makes too many mistakes.

Always keep your tank ready to run. You might be called on at any hour during the day or night.

Give your tank a complete check right after each mission, and you'll be ready to go when they need you.

SGT. MELVIN R. COLLINS

Sgt. Melvin R. Collins

The writer of the following joined Company C of the 140th Tank Battalion after entering the service, and has been with the same unit ever since. He took his basic training at Camp Cooke, California, and has been a tank driver for the past 19 months. On two of his combat missions his tank has hit mines, but he was not hurt.

The M46 is an excellent tank to drive. It will take a pretty good beating. From what I've found, I'd say it can hold up in almost any terrain.

It is pretty slow on climbing hills, but I must admit it has climbed any I've tried. On flat ground the M46 is a fast tank and easy to maneuver.

The roads here in Korea are in sad shape. In many places creeks are used for roads. The creek beds are rocky and you have to be careful not to throw a track—especially on turns.

Every driver has to watch out for mines. The mines here are funny. The first time I hit a mine, I was the second tank to cross it before it exploded. The second time I was the seventh tank to roll over the mine before it exploded.

It is most important that you keep up the condition of your tank by performing maintenance immediately after returning from a misison.

Check the oil in both the crankcase and transmission. Tighten track connectors and grease the road wheels and idlers. Keep the right tension in your tracks. If you let a track get too loose, you'll throw it. These may seem like obvious things and pretty basic things, but you know they count out here.

Compared with the M4, the M46 is a much better tank for the driver. They are very sensitive, especially in steering. The one stick for shifting and steering just about takes all of the work out of driving.

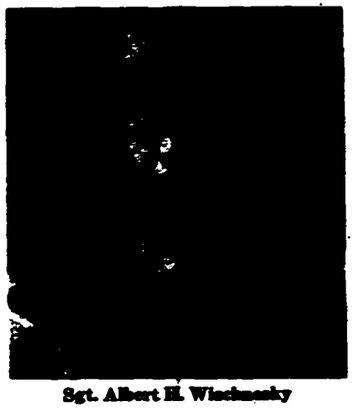
From the driver's point of view, I also like the new cross-drive transmission. It's certainly easier to operate than the old M4's regular transmission with the clutch and the two laterals for steering.

An important thing to remember, especially in combat, is to shift the M46 carefully. Before going from high to low gear, the tank should be slowed to at least 11 miles per hour. And it certainly should be brought to a complete halt before shifting to reverse.

I haven't seen the newer tanks yet, of course, but one thing I'd like to see on them would be an escape hatch with a bigger lid on it, to keep it from being blown inside the tank. We use old drive sprockets welded to them now, as an expedient, but new ones would be much better, designed for the purpose.

About all I have to say on combat tank driving is: Keep your tank in good shape, drive it carefully, and it won't let you down in a tough situation.

SGT. ALBERT H. WISCHNESKY



Sgt. Albert H. Wischnesky

The 140th Tank Battalion, which arrived in Korea with the 40th Infantry Division in January of this year, so far has not been involved in any large-scale tank-vs-tank battles. Although many traps have been baited for Russian-made T-34's, most of the actions have been "tank shoots" directed against enemy personnel and weapons positions.

Nevertheless, the 140th has struck some punishing blows in supporting the 40th's infantrymen. In a recent operation, for example, elements of the 140th rolled right up to fortified emplacements and blasted 193 bunkers, 14 buildings, 6 machine gun nests, 3 communication trenches, and a dug-in 76mm gun.

A good deal of the credit for the battalion's smooth teamwork and exceptionally low deadline rate goes to the tank drivers.

The writer of the following has been in the Army since October of 1950. He has served as a tank driver in the 140th Tank Battalion during all of that time. He is presently assigned to Company B, and has taken part in a number of tank shoots with the unit. Several near-misses have bracketed his tank, but it hasn't been hit.

I am a driver on an M46 tank. However, I took basic training with the M4A3E8, and did not receive any training on the M46 before arriving in Korea. I learned the M46 from experience—which they say is the best teacher.

Driving the M46 in combat after training in an M4 is like stepping from a Model-T Ford into a new Cadillac.

Maintenance is quite a problem over here in Korea. Parts were hard to get when we arrived, and we really had to baby our tanks along. You can't cowboy tanks in this terrain, or you'll make a lot of extra work for yourself and the maintenance crew.

I like the joystick in the M46. You can drive easily. The controls are very sensitive and react to your slightest pressure. For that reason, it's fairly simple to catch on to driving, but maintenance still is your big problem.

When a fellow goes on these tank shoots, he becomes kind of jumpy when he reaches the forward assembly area. But as soon as you get rolling again you cool off and think no more about it. And you really get a big thrill out of seeing those Red bunkers fly after you've maneuvered your tank into position.

What a driver should do when going into firing position is to follow tank tracks that have been made before, if possible, but be very careful and watch for where tracks have been messed up. That probably means there's a mine there. We have had instances where the enemy buried a 50-gallon drum of TNT and then put a mine on top of it to set it off.

Of course you should always be paying attention to your bow gunner and tank commander too. You are only one of a crew, and in combat the big thing is teamwork—in your tank and in the unit.

When driving in enemy territory, I think it's best not to use your neutral steering. In some spots there's soft ground, and in others too many rocks, and you can throw a track very easily.

Also, don't forget to watch those warning lights closely. They help you to check immediately when something's wrong.

I think the M46 is a dream to drive compared with the old M4. You can drive all day and not become tired. And that means a lot when you have long missions over rough terrain and need to be on your toes in enemy action or watching for mines.

In conclusion, I'd like to say that there's no reason for our drivers not to have confidence in their equipment. They've got the best in the world.

SGT. DALE J. MILLER

Sgt. Dale J. Miller

The writer of the following joined the 140th Tank Battalion in August, 1951, when it was serving on occupation duty in Japan. After six months of training as an M4 driver, he moved to Korea in January of this year. Now driving an M46, he has completed all of the eleven combat missions assigned to Company C of the 140th.

I've driven an M46 for seven months here in Korea—through mud, over rocks, and up and down hills. That tank surely will take a beating. But just because it will, there isn't any reason to handle it roughly.

Handle it carefully and you won't have any trouble. It drives and rides about as smoothly as a car.

Naturally, you have to keep up your maintenance on it. When you get back off a mission, check your tank over good. Here's a few things I always check. I make sure the cooler fan's running O.K. and that the tracks are tight. Also, the oil in the motor and transmission has to be kept clean.

Good care means good operation out on a mission. If the enemy's throwing stuff in on you, you want to be able to move that tank out in a hurry when your platoon leader gives you the order.

When we move into firing positions out on the line, I always try to pick a place with room enough to turn around, because I don't want to be cramped for space when the going is rough. But that doesn't mean I do a lot of unnecessary running around.

I think the cross-drive is fine, but there's an awful lot of soft ground over here. For that reason, I don't use my cross-drive unless I have to, because there's a good chance of throwing a track if you try to use it in soft dirt.

If your tank is ever disabled out on a mission, and you have to dismount, stay by it if you can until another tank can pick you up.

The enemy once knocked out a couple of our tanks with AT guns and bazookas. Some of the crew took cover some distance away, while two men stayed by their tanks. We were able to pick up the men by the tanks, but couldn't get to the others because of rough terrain and they couldn't come to either, because the Reds were throwing in too much stuff.

A driver should always stick by his tank as long as possible, not only to help evacuate the tank, but to save his own life.

Boiled down, tank driving means you should keep your tank in good running condition, use common sense when driving, and stick by your equipment when you're in trouble.

SGT. CONRAD J. ROTH

• • •

The writer of the following had fifteen months of experience in a tank maintenance section before arriving in Korea some eight months ago. For the past six months he has been a combat tank driver with Company A of the 146th Tank Battalion, taking part in several tank shoots. His tank was hit once beneath the bow machine gun, but was not seriously damaged.

I think good maintenance is the most important thing in combat tank driving.

When you're going on a mission, you should check your tank before you leave your bivouac, and at every road break on the way.

During operation the eye should catch the warning lights on the instrument panel. The alert driver will know how his tank is operating and will spot trouble at once if a light goes on.

The M46 has special problems, different from an M4 in driving. You just can't jerk the driving controls the way you can on an M4 or you will probably break the final drives. And when you are shifting from high to low, you have to be careful not to put it in reverse and tear up the transmission.

The terrain in Korea is rocky, muddy, and hilly. You have to turn cautiously or you'll throw a track. In driving on tank shoots you are usually buttoned up, and the country here keeps you on your toes.

When you are going through a mine field you should follow in the tank tracks of the tank ahead of you. If you are the first tank, you've got to look out for fresh or loose dirt in the road, which often means mines.

We've learned not to bunch up, or get too close together when we're firing from a stationary position.

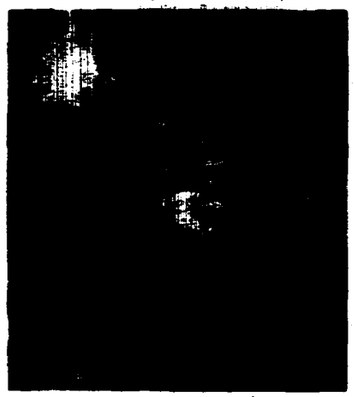
If you have some room to move around in, you aren't as likely to be hit. Routes into and out of a position and a good alternate position are as important as the manual says they are.

The M46 is the best all-around tank we have here. It will take a lot of punishment, but the driver has to know quite a bit about the tank before he should drive it.

I think maintenance is still the most important thing. The cooler fan, engine oil, transmission, etc., should be checked often. The tank should be greased after each run, and care must be taken to keep the fuel clean and free of water.

If a man takes care of his tank, he will have confidence in it. That means he'll go out on a shoot with more self-confidence and he'll be holding up his end in the tank crew. Here in combat we know the importance of crew teamwork.

SGT. THOMAS G. FAIT



Sgt. Conrad J. Roth

Sgt. Thomas G. Fait

The writer of the following has been with the 140th Tank Battalion since he entered the service 22 months ago. As a Company A tank driver, he has been in several shoots out in No Man's Land, and his tank also has been used for infantry support and stationary fire missions. On one mission his tank struck a mine, but he was not injured.

Sgt. John N. Cogswell

I believe that maintenance is the first thing to look after in combat tank driving.

A driver should be mechanically inclined. He needs top training before combat. He should have a good idea of what is wrong if something causes trouble in combat. That's where experience counts. He may be able to fix it himself. But if he isn't able to, at least he can tell his company maintenance so they can repair it as quickly as possible.

One thing that should always be checked before and after a mission is your track suspension. That's especially true here in Korea where there is so much poor terrain. Your tracks have got to be tight at all times.

In our sector of the front, we have to ford streams and small rivers constantly, and that's hard on lubricants. After each mission our tanks are greased thoroughly. In the kind of hot weather we're having now, air cleaners must be cleaned after each shoot because of the dust.

On a tank shoot a driver should keep changing his position, so the enemy will not get a chance to zero in on him. If he knows his business he will have his routes all selected, and will have several good positions ready. And he knows the importance of dispersal.

The Reds, of course, make full use of mines for antitank purposes, and we must look sharp all the time. Mines can be tricky. For instance, on one occasion I was the third tank in column, following in the same tracks the others had made, when my tank set off a mine.

Some of the enemy mines vary in the amount of pressure it takes to set them off. From what I've seen, I don't think the enemy in our sector uses any certain pattern for mine fields. It's just a matter of being wide-awake at all times.

To some, a tank may seem to be a big steel monster. But just like anything else, it isn't made to go forever. The M46 is a fine tank and it will give you good service if you treat it right.

In summing up, I'd say once more that maintenance is the driver's most important job. Sometimes you can't tell when you'll run over a mine, and sometimes you can't tell when you'll be shot at. But if your tank's in good shape, your chances of coming through are much higher.

SGT. JOHN N. COGSWELL

"Every tanker in the battalion rode to the attack
in 68 Shermans loaded with HE and hypershot
and carrying extra ammo for the infantry battalion
marching along to nail the antitank squads"

Tankers at HEARTBREAK

by CAPTAIN SAM FREEDMAN

GIVEN the right time and place, the tank battalion, in support of the regimental combat team, can do wonders in a tight situation, depending on the intrepidity of the tank crews, the ingenuity of the planners, and the degree of coordination of the combined army team. Of the latter, much remains to be brought to light for the consideration of future tactical planners. It has been shown in Korea, where everything has been done under extreme difficulties of supply and terrain, that no single element of modern combat is so important as the proper functioning of all component parts that go to make up the combined arms team.

Thus far, the most striking phase of tank warfare in Korea is probably that of trafficability, for surely in combat annals have tankers been required to work in territory seemingly so poorly adapted to tanks. But quite often we find that adverse circumstances can be turned to advantage. For despite the heartbreaking struggle to move tanks over seemingly impenetrable barriers of trackless mountain wasteland, American and British tankers have shown conclusively that the tank is a versatile weapon that can be put to good use in any situation or terrain where another gun will do some good. The swift mobility of the modern American tank, with its greatly revved-up fire power and protection from small-arms fire makes a powerful weapon.

Since the beginning of the Korean campaign the comment has been oft repeated that "Korea is not tank country." The question might well be asked: Just what is tank country?

Tanks Are Versatile

There are those who assume that ideal tank country is broad, rolling terrain, where masses of tanks can roam at will, searching out enemy tanks and clashing with them head on. That, of course, is a fallacious idea of tank warfare. We, as tankers, know that tanks must be properly used to get the best out of them. To hide a tank at the edge of a woods and lie in wait for an enemy tank column, is good employment of tanks. To catch an enemy supply column at close quarters and to rake it from stem to stern with small arms and high explosive fire, is also highly effectual. To bring up tanks to blast out enemy bunkers and other fortifications, is to use tanks with good effect. Put them in defilade at night, and you have fine artillery.

Tanks can be employed in many spectacular and highly effectual ways. They are being so used in Korea. In fact, the manner in which tanks have been employed in Korea is to an important extent changing the concept of tank tactics and capabilities. Korean experience has taught planners to enlarge the scope of tank activities in their projected tactics. Wherever infantry is employed, tanks are in support when any avenue of approach is available. The role of the tank in this regard must never be overlooked. The tank is a close-support weapon of incalculable value, giving momentum to the infantry assault to keep it rolling in the right direction. The doughboy likes the tank to move forward with him, and his trusty rifle is a guarantee against attempts by enemy antitank squads to knock out that tank. It takes hard shot, usually, to knock out a tank. In Korea the enemy has not always been lucky enough to have a self-propelled gun handy with solid rounds. It's hardly cricket to move in on them when all they're slinging at you is HE, but in such a situation the enemy is taught the awful reality of what Sherman said. Even in such situations, however, we've lost some men through a dislike for "buttoning up" in action. Mortar rounds are known to have fallen into open hatches—pure luck rather than superb marksmanship. Tanks should be buttoned up in the impact area.

While it is true that employment of tanks in Korea has been considerably hampered on the mountain front north of the 38th parallel, the ingenuity of aggressive planners who won't take "no" for an answer has resulted in the discovery of means to bring up tanks for swift and telling strokes that have broken the back of enemy resistance in strategic places like Bloody Ridge, Heartbreak Ridge, and the Punchbowl. In such actions, the regimental tank companies and the divisional tank battalions have proven their worth by disrupting enemy strongpoints, destroying communications lines, and slaughtering thousands by machine guns and shelling.

Korean combat has proved conclusively that the tank, with its powerful main armament, mobility and protection from small-arms projectiles, is a potent adjunct of the regimental combat team. Planners find great tactical latitude when tanks are available in mass for employment in the attack or defense.

Infantry moves forward to the attack with spirit and confidence and a more marked willingness to "give 'em hell" when tanks are moving with them. If enemy tanks appear they do not have the effect of slowing an advance. Friendly tanks take them on, and the advance can go on to the swift conclusion desired. Enemy emplacements, pillboxes and bunkers are quickly neutralized by powerful tank guns, when troops in such instances might otherwise be pinned down.

A judicious appraisal of terrain and tactics in Korea, and what has been done by proper reconnaissance and tactical utilization of tanks leads to the conclusion that there are distinct advantages in terrain where trafficability is reduced to the minimum by mountain barriers and lack of roads. In Korea we learned to utilize stream beds, mountain passes and ravines with substantial and favorable results.

Tank Surprise

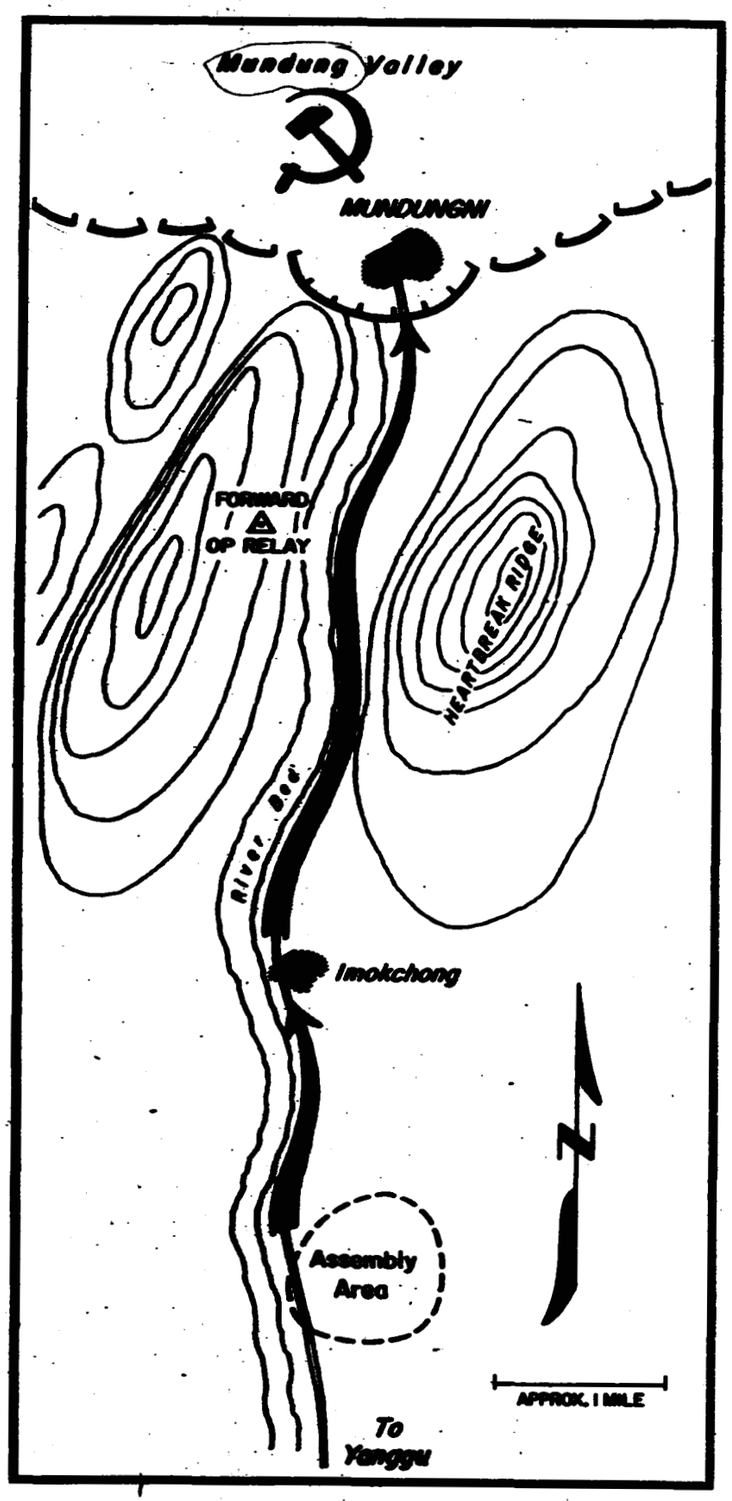
There have been times when the enemy has been caught off his guard by swarms of tanks appearing as though out of the earth itself, when the enemy could see no avenue of approach. An enemy that is not expecting attack is always a prime target. For this reason the best time for a tank thrust is after a lull, when the enemy expects no attack. Such moments must be carefully timed and the operations executed deftly and with daring. This type of operation in Korea has been highly successful in most instances. In fact, there is good reason to believe that enemy initiative has been discouraged at critical times by the appearance of our tanks in mass at places the enemy believed inaccessible to armor. In one such instance, a platoon of tanks detached from the 72d Tank Battalion in the Sataeri valley so surprised enemy infantry at close quarters that the Chinese Reds stood behind their emplacements too paralyzed with amazement to fire their weapons. Many actually stood there grinning in bewilderment as the tank gunners opened up with machine guns and mowed them down with scythe-like effect. Some of the tankers, their first time in combat, clambered out of their tanks and took rifles engraved with the hammer and sickle from the hands of the Reds they had just slain.

The repulse of a powerful tank attack calls for the mustering of powerful weapons, and daring, well-trained antitank squads. We found in Korea that substantial infantry cover is required in any tank foray, for the daring of enemy antitank squads has been proved beyond doubt. They are rendered ineffectual, however, by rifle fire from infantry following the tanks beyond the bursting radius of artillery and mortar shellfire which tanks invariably draw in the assault. Forward observers and communications relay teams must choose their locations away from the avenue of tank approach, as enemy artillery and mortar fire is likely to be heavy as the tanks move up.

Tank attacks in Korea have come off successfully with comparatively few losses for the simple reason, in many cases, that the enemy had little or no "hard stuff," and were using such powerful weapons as self-propelled guns firing high explosive which did little or no damage to the tanks. Another important factor has been the inability of the enemy's aggressive antitank squads to penetrate infantry covering forces, sometimes battalion and larger, in the big thrusts.

The operations of the 72d Tank

CAPTAIN SAM FREEDMAN served with the 72d Tank Battalion on the X Corps mountain front, and later on the staff of X Corps. Stricken with a heart ailment while at Heartbreak Ridge, he was hospitalized. Discharged recently from Walter Reed Hospital and retired for disability, he has returned to journalism and his former post with the Los Angeles Examiner.



Battalion, which aided in shortening the campaign for the high ridges on the X Corps mountain front, must go down as classics of armored offensive tactics, under almost insuperable difficulties of terrain. Yet, it was precisely because the enemy believed his positions beyond Heartbreak Ridge to be unapproachable to tanks that the operation met so marked a success.

The tank tactics at Heartbreak Ridge offer a case in point. The major tank attack was "Operation Touchdown," so named because it involved a long end-run around the left flank of the enemy at Heartbreak to strangle his line of communications which had its apex at the northern entrance to the Mundung valley. It was a vigorous, penetrating thrust, brilliantly planned and daringly executed. Every tanker in the battalion rode to the attack in 68 Shermans loaded with HE and hypershot, and carrying extra ammunition for the battalion of the 38th Infantry marching along to nail the antitank squads.

The big thrust, which took place on October 10, 1951, marked the finish of enemy action at Heartbreak Ridge. Any plans the Reds may have had to counterattack again for that prized ridge, were rendered "kaput" by the 72d's tankers. The troops of the 38th, 23d and 9th Infantry regiments, aided by United Nations battalions, had finally shattered enemy resistance on that blood-drenched mountain. The tankers had finally broken through, after heroic work by the 2nd Engineers to prepare the way for them through a winding creek bed of the Han River.

The attack itself came at a most opportune time. It caught the Reds completely off stride. The results were all that had been intended. Alert 2nd Division and X Corps Intelligence were aware that approximately a division of fresh Chinese troops, hastily recruited and trained at Tientsin, was to replace the decimated North Korean Red forces at Mundungni, about six miles north of Heartbreak Ridge.

The tank column took off at 0600 on a split-second schedule, guided from an OP far to the front, where two 72d Tank Battalion staff officers had set up a radio relay station. From this point the officers could observe the floor of the Mundung valley, report the presence of enemy forces, guide the tanks into action, and bring down supporting fires as needed.

A tank is just the place for a man who likes hard slugging. You've got a good, big gun, and can move it handily where it will do the most good. The hardy lads of the 72d, enjoying the action after their long wait while the Division engineers were smoothing down the route, virtually stuck those tubes down the throats of the Reds and made them say "ah."

Team Coordination

While the Chinese Reds are notorious antitankers, showing fanatical daring and skill in disabling tanks, the 72d on this occasion had little to worry about on this score. So close was the coordination of tanks and infantry, that more than a battalion of infantrymen covered the tanks with rifle and automatic weapons. Not a satchel charge was thrown. And few mines were encountered along the approaches to Mundungni—another indication of the overconfidence of the Reds.

Enemy artillery opened up on the tanks at long range, and the valley floor was dotted with the white puffs of mortar bursts. The enemy threw everything it had but its chow-mein-laden wheelbarrows. It was high explosive, thus had little effect against the armor of the tanks. The doughboys, battle-wise, steered clear of the tanks which drew the fire, but alert to oblige any Reds overeager to join their ancestors.

It may appear singular that the tanks were able to maneuver freely through a critical battle area devoid of the mines which so often plagued them elsewhere. But again there is pointed up the fact that few mines had been planted hereabouts by the Reds, so confident were they that the American tanks could not negotiate the mountain passes.

The one road through the Hongchong, Imokchong and Paem passes leading to the Mundung valley had been virtually obliterated by an elaborate pattern of cratering done with the avowed purpose of blocking a tank thrust. It was the final action of the Reds in the withdrawal from their costly defeat at Heartbreak Ridge.

That the 68 Shermans of the 72d Tank Battalion made this run from below Hongchong—a distance of some eight miles, was a triumph of ground reconnaissance, aerial observation, engineering skill, and infantry coordination. To this may be added the judicious staff planning and coordination at division and corps levels.

The action didn't attract much attention in the press at the time, because the war correspondents that day were over at the 1st Marine Division covering something the PIO there had cooked up.

There isn't any doubt that the presence of armor en masse, battering through the Red "Gibraltar," had a salutary effect in quieting down this sector and resulted in the taking of several lesser ridges skirting Heartbreak Ridge. The enemy not only was aware of the presence of powerful armored opposition, but it had been convincingly demonstrated that Eighth Army commanders knew how to employ that armor. It was quite evident that the enemy was mystified that the tanks could get through at all despite the condition of the passes.

How then is it possible to bring up 68 tanks with the only road through the mountain passes smashed to smithereens by hundreds of tons of explosives? It was all quite simple. The Reds, with typical Communist stupidity and abysmal failure to perceive enemy capabilities, had overlooked the rocky gorge of the Han as an avenue of approach. True, the boulder-strewn bottom of the gorge didn't even remotely resemble the smooth fairways at Fort Knox, but to the reconnoitering tankers they had spelled "avenue of approach." They called up the engineers after careful study of the route by days of reconnaissance virtually within the enemy field of fire.

It was determined that the roadbed from Imokchong to the Mundung valley would be smoothed down to the trafficability required.

The 2nd Engineers lost several officers and men while working under fire on that project, but on the appointed day, the job was done.

It was a triumphal procession through the river gorge. Tank after tank negotiated that winding labyrinth of rock, sand and water. As the lead tank emerged into the sun-washed Mundung valley, the first of the enemy mortars exploded. From then on, it was a noisy and spectacular affair, with tanks in line rolling on to the objective—the enemy stronghold at Mundungni. Not a tank halted until the goal was reached.

What targets rose to the view of the keen-eyed young gunners as they came within gunshot of the town! The Reds took terrible punishment that morning, fleeing in panic as the 72d's armor rolled through the town and a couple of miles beyond.

One tank was lost that day—the lead tank, which was firing rapidly as it rolled, with a hatch open. One mortar round—pure chance—dropped into the hatch and exploded, killing three men.

The tanks returned the next day, and for two more days after that, repeated their performance, thoroughly reducing the town and causing the Reds to withdraw.

The operation clearly indicates that the presence of powerful armored forces in a strategic area will have a deterring effect on enemy intentions, and tend toward neutralizing the area in general, at least in the type of warfare typical of Korea, a kind of warfare dictated by the terrain.

Experience Teaches

The books and the schools have much to offer the tanker in preparation for his triumphs on the battlefield, but there isn't a doubt in the world that experience is the best teacher in tank warfare as in so many other fields. All in all, the lessons of tank combat in Korea will make it possible to round out still further the training of future tankers. Those lessons must be utilized so that student tankers may gain from the combat experience of others.

Successful actions, like the one described in the foregoing, have their roots in proper planning, coordination and teamwork. Technical skill must utilize these for its ultimate triumph. These are the elements that must be emphasized. The lessons of Korea will help win battles again, if it is necessary to fight another war. Armor is better than ever, and its contribution to success of the regimental combat team has once more been proved.

Preventive Maintenance—

*A COMMAND RESPONSIBILITY**

by MAJOR GENERAL I. D. WHITE

IF there were an oracle who could inform the world that real peace is around the corner, this article would probably never be published. Preventive maintenance of equipment about to be relegated to the scrap heap for conversion to ploughshares would be false economy. But, no one of any responsibility can predict total demobilization in the near future and our equipment will continue to cry for Preventive Maintenance with the voices of every ungreased spring and unoiled bearing.

Preventive maintenance is not a modern invention. Commanders have always been charged with insuring that all the elements of their commands, human and material, be ready and able to accomplish an assigned task. This can be done in only one way—by everlasting interest of every member of the chain of command—in short, by recognizing that maintenance is not the job of the technician, important as he may be, but the job of the commander. Preventive maintenance is a command responsibility.

As the foundation of our maintenance system rests on the first and second echelons, this article will be limited to a discussion of organizational maintenance and the five factors which I believe are essential to successful maintenance: (1) Command responsibility; (2) Supply, to include proper supply procedures and unit basic loads; (3) Training of users, specialists and commanders; (4) Planned preventive maintenance programs, and (5) Continuous supervision through staff visits, command inspections and command action.

All Command Levels

The title of this article reminds us that the key to preventive maintenance is command responsibility. Every member of the chain of command must know that he is responsible for the preventive maintenance of his entire command. The weak links in the chain of command so far as preventive maintenance is concerned are in the lower echelons. The junior officers and non-commissioned officers must realize that maintenance is their direct command responsibility. Corporals, sergeants and lieutenants are the commanders in direct charge of the tanks, radios, weapons, equipment and men who must be welded into a successful fighting team.

Many commanders recognize their responsibility for maintenance, yet they do not know what to do about it.

They remind me of the young and inexperienced MP who was posted at the entrance of a large headquarters with instructions to allow no one to enter without a special identification card. He got along fine until a General drove up who had forgotten his special card and who became exasperated at his inability to talk his way in. Finally the General said to the driver, "Don't pay any attention to this fellow—drive on in!" With that, the MP drew his pistol and said, "General, I'm kind of new at this sort of thing—who do I shoot—you or the driver?"

Many commanders, like the MP, do not know whom to shoot in order to get good maintenance. Frequently they *aim* at the wrong man—the technician, instead of the commander. Armorers, supply sergeants and motor sergeants are technicians whose command functions are limited to their own technical sections. Motor sergeants are *not* in charge of drivers or driver maintenance. Armorers should *not* be charged with responsibility for the cleanliness and care of weapons assigned to using crews or individuals. In like manner, supply sergeants are *not* responsible for unreported shortages in individual equipment.

When the chain of command from top to bottom is held fully responsible for the completeness and maintenance of equipment, you will find little opportunity for misunderstanding due to divided authority.

I have found that the weakest link in the chain of command is the link next above the individual rifleman, crewman, or driver. This applies not only to maintenance but to all military matters including discipline, conduct, appearance, individual equipment and, of course, the proper care and use of equipment. If this initial link is held responsible for proper performance of his duties, an organization is well on its way to success in all its operations.

Do not be tempted by short cuts in the chain of command. It may appear easier and quicker to have the motor sergeant inspect driver maintenance, but in the long run it impairs the effectiveness of our non-commissioned and junior officers. Too often such short cuts are taken because commanders lack confidence in their subordinates. Teach them how to inspect. They will become enthusiastic when they gain confidence—the confidence of knowing what is wanted.

The second factor in good maintenance is supply. The days when American ingenuity aided by a little baling wire could keep anything running are long past. Today a mulitude of spare parts and tools are required to keep our modern equipment functioning. The best trained and organized mechanics are helpless without tools and supplies to do their job.

Supply availability is a fluctuating thing—at times it is better than at others. We must be realists and recognize that the supply agency, civilian or military, that always has a hundred per cent stock to fill your needs either doesn't exist or is hoarding and not serving its customers. We must base our plans on minimum supply availability and then utilize our supply resources to the maximum.

Commanders at every level must go to the very end of the supply pipe line to search for the solution of supply problems. Far too frequently the commander of the unit with a high deadline rate is found complacently blaming his troubles on tool and part shortages. Such shortages *may* be a factor. But more often than not essential parts have not been properly requested. When supply shortages are claimed as the excuse for poor maintenance, I suggest that requirements be carefully checked against validated requisitions. In many cases it will be found that required parts have never been asked for.

I use the phrase "validated requisitions" advisedly. We are not looking for mere copies of property issue slips. A valid requisition is one that has been received and understood by the expected source of supply. Most technical services return a copy of the requisition marked with a credit voucher number or CV number. It is well to remember that a requisition with a CV number indicates that the needs of a unit are known to the person whose job it is to supply them.

Approved and tested supply procedures are explained in elaborate detail in technical manuals and other literature. The vast world-wide military supply system is based on requests from the user—a requisition—for frequently needed items. To do this requires proper administrative procedures and stock record cards at the unit level.

Supply and maintenance must be tied closely together and looked upon as two sides of the same street. A supply failure frequently indicates an excessive demand which may, in turn, be traced to poor maintenance. Like the taxpaying business man, a good unit commander must keep himself informed as to the consumption rate of spare parts and supplies in his command. Preventive maintenance is supply economy and lessens the demand on supply sources.

The Basic Load

When dealing with supply as an aspect of preventive maintenance, we cannot overlook the unit basic load. At home we would consider it the height of folly to make a daily trip to the drug store to buy one razor blade. To obviate the need for such a wasteful practice, we usually establish at the user level a "basic load" of razor blades—also soaps, cleansers, and other daily necessities for the household.

That common sense practice is equally applicable in the military unit. When the housewife observes that the basic load of razor blades is not being used because her husband now uses an electric razor, what does she do? If she is not thrifty and observant, she allows the blades to remain in the medicine cabinet until they are rusty and useless—then throws them out as a total loss. If she is thrifty she disposes of them and the now unneeded razor to charity or more likely, to some indigent relative of hers to whom she gives her husband's old suits.

Like the thrifty housewife, the military commander must guard against the accumulation of excesses—items that are frequently accumulated in pack rat fashion when no real need exists for them or are retained when there is no further requirement for them. The early disposal of excesses is an important phase in "cost consciousness" and "supply economy."

In supply matters, command interest and responsibility are necessary if complete results are to be achieved. Frequent and aggressive follow-up through command channels is necessary to insure prompt supply. Two-way liaison must be established between the user and the supplier. The supplier, who should be instilled with the same concepts of customer-dealer relations as are held by successful mercantile firms, will assist in the simple solution of many problems when he knows of them.

How are we going to use the supplies of spare parts and tools we receive? Here is where limited technical skills are required—the skills of the user, the organizational mechanics and the supervisor. Maintenance skills are acquired by experience and training. But maintenance training is not in a water-tight compartment. Preventive maintenance must be an attitude that permeates all training. Training time must be provided for maintenance. The skilled gunner whose ignorance of cleaning and lubrication procedures results in a deadlined or inaccurate gun is of little value to the fighting team. Whatever equipment is used, instruction and time to maintain that equipment should be concurrently scheduled.

"By the numbers" training of crews and users is an effective way to conduct elementary training. Such training can be repeated on occasion during scheduled "Daily Maintenance Stables" in much the same manner as "Standing Gun Drill." The 3rd Armored Division at The Armored Center has adopted a complete and precise system for "by the numbers" training in tank maintenance. It is bringing good results, not only with trainees, but with cadremen as well.

The bulk of our specialist training is done in service schools. However, rapid turnover of personnel requires much specialist training at the unit level, which is usually of the "on-the-job" type.

American industry leads the world in effective on-the-job training, because that training is planned and supervised—planned to include all knowledge and experience required by the student craftsman and supervised for completeness and quality. On-the-job training programs that lack supervision and planning often

---

*This article is based on General White's recent address to the AFF Commanders' PM Course at Aberdeen Proving Ground, Maryland.

MAJOR GENERAL I. D. WHITE, until recently commander of The Armored Center, Fort Knox, Kentucky, is now Commanding General of our X Corps in Korea.

degenerate into the feudal apprentice system intended to furnish cheap labor. Any training received by the apprentice under such a system is usually incidental, depending on luck or the ability of the craftsman teacher. As often as not the apprentice learns the poor practices of his teacher. Putting a couple of men on duty with the motor sergeant will not insure that they will become good mechanics. Good on-the-job training requires planning and supervision.

In my discussion of training I have purposely left to the last the one phase of training that can be the key to the success of the entire maintenance program—that is the training of supervisors, training the chain of command, the non-commissioned officers and junior officers, upon whom we must rely for success.

As with the average American soldier, junior officers and non-commissioned officers are usually willing, even anxious, to do a creditable job if they only know what is wanted and how to achieve it. When faced with the supervision of maintenance, these young commanders too frequently hide their ignorance by pleading that maintenance is technical, requiring technically trained supervisors. Nothing could be further from the truth. Preventive maintenance is simply hard work—hard work in cleaning and lubrication, in tightening and simple adjustment, in the replacement of minor accessories and assemblies.

Involved technical skills beyond the common-sense know-how of any man worthy of the command of military equipment are seldom, if ever, required. A sanitary engineer is not needed to supervise and inspect a latrine, nor is a hotel chef necessary to supervise a mess. But in both cases, as with all maintenance activities, the immediate commander must know what is desired and how to inspect for it. To do this requires a simple training program for the chain of command. If officers and non-commissioned officers are taught the standards to be attained, and simple inspection techniques, they will soon achieve these standards. A simple title for this training is "How to Inspect."

I have discussed command interest and responsibility, supply procedures and basic loads, and training of users, specialists and supervisors. How can we tie these into a smooth preventive maintenance team? If there is a simple answer to that question, it is "Command Responsibility and Supervision." Success in preventive maintenance, as in all other military fields, springs from the personal interest and enthusiasm of the commander—be that commander a corporal or a general.

As a means to inspire that interest and enthusiasm throughout the chain of command, the US Constabulary put on an all-out preventive maintenance campaign. It borrowed much of the ballyhoo of advertising in the business world. As with good advertising, it was simple and repetitive. The catch phrase, capitalizing on radio advertising, was—PM/MFP—Preventive Maintenance Means Fine Performance. For each of the twelve weeks of the campaign a single theme was selected—one week, cleaning; another, lubrication; a third, tire care. The point of emphasis was everlastingly confronting every member of the command. This was done with singing commercials, comic strips, colorful posters, training programs and special "inside dope" to company commanders on how to inspect for improvement.

Although such a campaign is spectacular, it will not in itself improve maintenance without continued command action and interest through normal supply channels.

The everlasting interest of the chain of command, using command channels, is the framework upon which all maintenance programs must be built. While those whose extra efforts result in success should be commended, commendation should not exclude condemnation. A subordinate commander who cannot maintain his equipment, even though he may be successful in other phases of his mission (which is seldom the case) should be relieved. Such action should be taken only when he has been given all necessary help, from all levels, to which he is entitled.

I do not mean that such help should include performing work that is rightfully his responsibility and for which he is provided with adequate means. Too frequently commanders call on higher echelons to perform work that is an organizational function. I prefer the attitude of pride in a unit's ability to keep its own equipment in satisfactory operation.

A means that expresses my ideas on commanders' responsibility, which was used with some success in the US Constabulary, was a letter individually addressed to commanders of each battalion and larger unit. The command letter was backed by a circular prescribing action to be taken when a unit was rated "Unsatisfactory." I quote part of this circular, which was considered most effective.

"When a unit receives an 'Unsatisfactory' rating on a command maintenance inspection, it is an indication of improper use of time allotted to maintenance or improper supervision by the chain of command or both. The correction of the conditions which result in the rating of 'Unsatisfactory' will be accomplished, insofar as is practicable, immediately after the inspection, during non-training time after regular working hours, and under the active supervision of all members of the chain of command.

"In the event that any unit is found to be unsatisfactory in any phase of any command maintenance inspection, that portion of the inspection team concerned and the team captain will remain with the unit until existing deficiencies are corrected to the fullest possible extent. This corrective action will start immediately after a finding of unsatisfactory and will continue on *non-training time* until deficiencies are corrected and a re-inspection performed. During this corrective period all members of the chain of command will attend and actively participate as well as supervise action taken.

"The instruction and command maintenance team will assist during this corrective period in an instructional and advisory capacity."

(Editor's Note: The concept of requiring inspectors to instruct inspected units, which was published in the quoted form in early 1950, has since been incorporated in official doctrine, setting up an instructor-inspector service by the technical services in their relations with using organizations.)

What did we accomplish with this all-out drive on maintenance in the Constabulary? First, every member of the chain of command began to realize that preventive maintenance was a soldier's job and not a job to push off on a hired German. Second, average vehicular and weapon deficiencies were cut in half within six months and continued to decline. Deadlined equipment rates were reduced as much as two-thirds and the unsatisfactory units were raised to a more acceptable standard.

The US Constabulary preventive maintenance program was based on command responsibility, proper supply procedures and basic loads, and training of users and commanders. It was a planned preventive maintenance program backed by frequent staff visits and topped with personal command supervision at all levels to cultivate the essential ingredients of good maintenance—command responsibility and command interest.

At The Armored Center at Fort Knox we are faced with a maintenance situation that is complicated by the ever-changing personnel of a training installation. This army-wide problem is not unlike the situation we all must face in event of mobilization. Instructors and cadremen are selected and trained but before they reach maximum effect in training students and trainees they either leave the service or are levied for other assignments. Yet the trainee load continues on schedule.

Meeting this challenging training problem requires the most vigilant command supervision at all levels. To assist squad, platoon and company commanders a PM campaign is being put on at The Armored Center that is intended to cultivate the minds of all at Fort Knox with the only solution to good maintenance—preventive maintenance—a command responsibility.

The military is merely one strong muscle of America's might. As a tax-supported army we must come to our fellow citizens with clean hands, able to point to an austerity program recognizing the facts of economic life. Mineral deposits go down just so far, people produce just so much before the end is reached. "Infinite" is no longer a safe word to use in connection with natural or industrial resources. Victory will go to those armies whose commanders back up the courage of their trained men with tools of war kept sharp by preventive maintenance.

Arms and Men

by WALTER MILLIS

The following appeared as a feature editorial column in a recent issue of the New York Herald Tribune *and is reprinted with the kind permission of that paper.* —Ed.

Labor Day is by no means an inappropriate moment to consider one now rather large class of labor—most of it highly skilled and specialized—which has no union organization but which often works very hard indeed and to which this country owes a great deal.

One can find out something about it in the service magazines—a small group of modest periodicals which might profitably be read by a much wider audience than they usually achieve. The service magazines are the trade journals of war. Few Americans think of war as a trade, despite the fact that over three and a half million of their sons, brothers, fathers and cousins, plus a few sisters and aunts, are at present engaged full time in this occupation. Yet a trade it is, in some ways like any other.

In the more stately examples of these publications, such as "Ordnance" or "Aviation Week"—both produced more for the industry than the uniformed forces—or "Naval Institute Proceedings" one does not quite catch the flavor. But in such slimmer, if authoritative, magazines as "Combat Forces Journal," "Marine Corps Gazette," "Air Force," or "Armor" (successor to the old "Cavalry Journal") one comes up against something rather disturbingly real and impressive.

Here is the technical literature of war, the trade journals of men who have been, are or may soon be confronting some life or death crisis on a Korean hillside or eight miles above an air training base. They are much like other journals of the kind—some personalities, a bit of humor, discussions of technical ideas and innovations, letters to the editor, suggestions as to how to meet shop problems and how to get ahead in one's profession. There is only one marked difference. The shop problem is apt to be of such a kind that if it is not mastered the workman will be dead within a few seconds; getting ahead in the profession often means physically advancing (and staying alive) over some mortar-swept terrain or getting a first shot into an enemy tank before the enemy has a chance to get one into yours. These are peculiar and rather awesome skills.

* * *

Suppose yourself, for example, in command of a tank platoon in Korea; a mine blows half the wheels and track supports off one side of one of your vehicles. What do you do? The answer, according to "Armor," is that you break the track, hook up a shortened section of it around the remaining wheels and tow the vehicle off. If "time is a major factor" (which means if you are being shot at) you use quarter-pound blocks of TNT to break the track. From "Combat Forces Journal's" notes and articles one can learn a lot about the way battles are actually fought—not the big, impersonal battles that show up as broad arrows on the newspaper war maps, but the company and platoon size scraps and firefights out of which the big campaigns are made. "Air Force" will discuss the problems and something of the technics of combat at 40,000 feet. And so on for all arms and services.

Modern combat in all its many forms is a highly skilled and technical as well as a deadly trade. It has its power tools—machine guns, artillery, vehicles—and its problems of management, discipline, worker psychology, like any other industry, but they are all grimly specialized against its own unique background of death and wounds. It is true that probably a large majority of those now wearing the uniform are unlikely to go through combat; but many have done so and many more are likely to in the coming years, while all must be trained to the business.

* * *

We have to accept the trade of war as one of the normal occupations of our times for doubtless a long period to come. It seems certain, at least, that we must maintain large standing military forces indefinitely; and it is not unlikely that we shall have to be prepared to use them in "little" wars from time to time, if their influence is to be effective in preventing the global war. This is a new situation for this country. It raises all kinds of questions as to obligations, duties, the allotment of risk and reward, the psychology of battle and the politics of power which are at best still only dimly seen. But one cannot read the service journals without sensing their presence in our affairs.

An LVT(A)(5) of the 747th rides a wave crest during its dash to the beaches.

Amphibious Tanks comprise the first w[illegible]phi[illegible]ous assault on a hostile shore, providing direct fire on the landing beaches d[illegible]-to-[illegible]ore movement, furnishing direct tank support ashore to assault infantry, and p[illegible]till[illegible]y support ashore to assault infantry until such time as the direct support [illegible] bee[illegible] landed and can assume the mission.

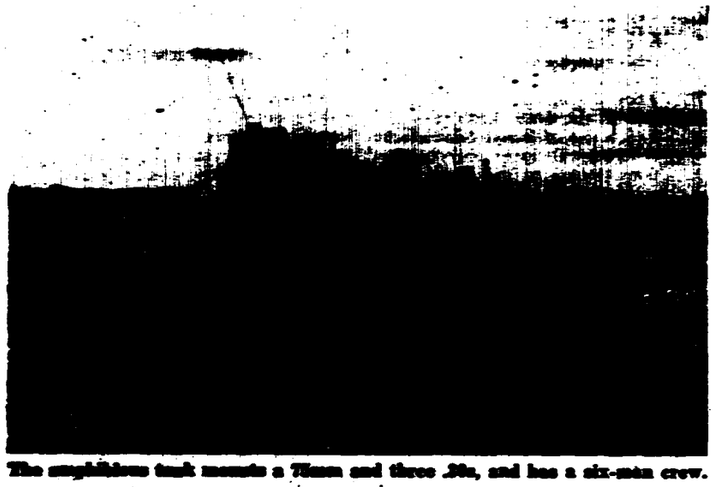
At Camp Cooke the 747th Tank and Tractor Battalion has ideal "terrain" handy.

ARMOR'S AMP[illegible]OUS MOBILITY

As the instrument of mobility in ground [illegible]oday, the tank has been developed with all dimensions in mind. General ground [illegible] been supplemented by special purpose evolution in the air transport and amphi[illegible]s. The latter is represented in the picture story on these pages covering the activiti[illegible]747th Amphibious Tank and Tractor Battalion. This battalion is a composite u[illegible]n with a Headquarters, a Headquarters Company, a Service Company, two Am[illegible] Tank Companies and two Amphibious Tractor Companies. The 747th was acti[illegible]a tank battalion in Texas during World War II. It served in the ETO and was [illegible] to an amphibious tank battalion in the latter part of the war. A reserve unit, it [illegible]led into active service from the State of Florida, and has been stationed on the [illegible]st, where it has trained a large number of officers and enlisted personnel in amp[illegible]erations

U.S. Army Photos

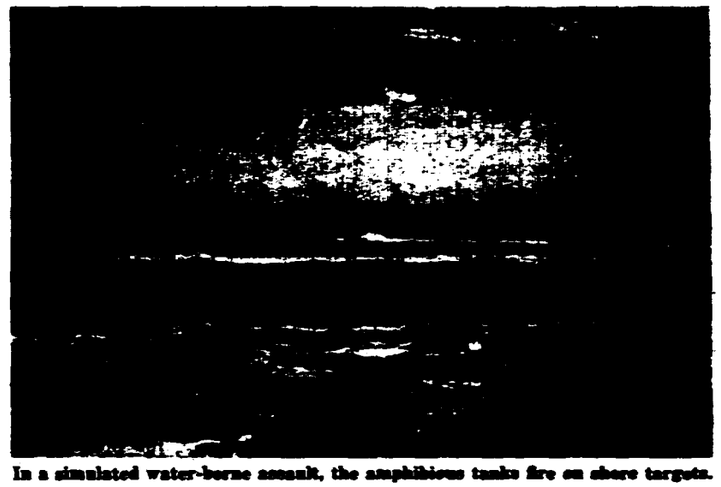
Touching bottom, the tank moves out of the water to assume its role on land.



The amphibious tank mounts a 76mm and three .30s, and has a six-man crew.

Amphibious Tractors comprise the second [illegible]quent waves in an amphibious assault on a hostile shore, transporting and landing a[illegible]ents of the landing force, and providing landing vehicles to transport personnel, eq[illegible]d supplies from ship to shore during the selective unloading of the build-up phase [illegible]phibious operation. They are unarmored.

A group of LVT(A)(5)s moving into the surf for a session of water maneuvers.



In a simulated water-borne assault, the amphibious tanks fire on shore targets.

Task Force HAZEL to CH'UNCH'ON

by MAJOR JACK G. BROWN

ARMORED task forces have achieved impressive results in Korea in spite of mountainous terrain and narrow roads. An armored breakthrough followed by exploitation in the enemy rear can be particularly effective against Chinese Communist Forces because of their limited radio warning facilities and lack of mobile reserves.

Task Force Hazel to Ch'unch'on in May 1951 shows the flexibility with which armored reconnaissance units can be employed, and their ability to surprise, rout, and destroy hostile forces by roving deep in the enemy's rear. This operation demonstrates that every opportunity should be taken to use armor, regardless of the size of the unit, for even tank platoons are capable of meritorious service if communication and supply is maintained.

* * * *

The CCF launched the fifth phase of its offensive on the IX Corps front in Korea the night of 15-16 May 1951. Four days later this effort crumbled and IX Corps began a counteroffensive.

By 23 May, the key objective for IX Corps was the Ch'unch'on basin with its tactically important road net. Seizure of this objective would deny the enemy the use of primary roads north and east of Ch'unch'on, cutting off one of the CCF's most important escape routes north from X Corps on the right. A rapid advance in the IX Corps zone would prevent the CCF from reorganizing, and would hamper resupply and withdrawal of enemy units in the eastern portion of the Eighth Army front. In addition, it might cut off certain hostile groups and lead to their annihilation.

To pave the way for the division attack, the Commanding General, IX Corps, directed the 7th Division to send an armored spearhead to Ch'unch'on via the Hongch'on-Ch'unch'on axis. U. S. Marine patrols had probed Ch'unch'on several days before and had encountered no resistance. So mines, and the possiblity that the enemy would block the defiles, appeared to be the only danger to an armored force.

The 32nd Infantry Regiment was ordered by the division commander to organize a task force. The objective of the force was to locate enemy troop dispositions and harass and destroy them, reconnoiter for river crossing sites, and to assist if possible in the liberation of American prisoners of war. The 7th Reconnaissance Company was attached for the mission.

The CO of the 7th Recon Co was instructed the evening of 23 May to command the force—Task Force Hazel. In addition to his own company, he was given the 4th platoon of the tank company, 32d Infantry (six tanks, including a tank dozer), and a squad from Company B, 13th Engineer Combat Battalion, was attached for mine detection. Strength, disposition and tactical use of the force were left to the commander.

Task Force Hazel was ordered to cross friendly lines at Pusawon-ni simultaneously with a planned infantry jump-off 24 May at 0700. Because the 7th Recon encountered no opposition during a screening mission 23 May, the task force commander decided to take along his entire command. He figured that if resistance was light, he'd be able to get all elements to Ch'unch'on and would have a strong force at his objective. Since the artillery planned to give support as far as possible, the task force commander took along a forward observer from the 48th FA Battalion.

One-half hour and about three miles after crossing the line of departure, the column encountered a ditch five feet wide and two and a half feet deep, dug half way across the road. The engineers checked for mines with sweepers and probing sticks, but found nothing. The tanks had no trouble crossing the ditch and jeeps and half tracks ran around it. One mile farther the unit encountered another ditch three feet deep and seven yards wide. The engineers checked this one for mines, and finding none, the lead tanks crossed and outposted the ditch. Then the tank dozer made a hasty fill and the rest of the vehicles moved forward.

As the lead elements reached Sinjom-ni, they were harassed by enemy small arms and machine gun fire. The noise of the tank motors and shooting made it difficult to judge the amount of hostile fire and the location of enemy troops, but possible enemy positions on the hills were sprayed by machine guns. The task force commander calculated that enemy fire was heavy enough to prevent the unarmored vehicles from continuing, and reported this to the CO of the 32d Infantry.

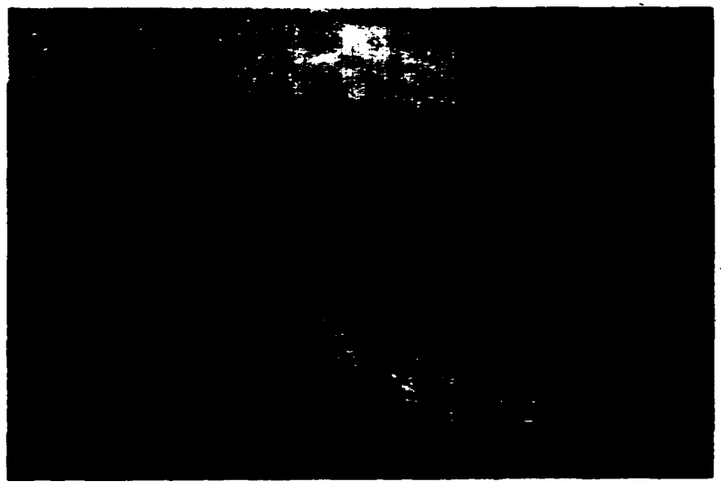
The main source of enemy fire was suspected as coming from Hill 545 even though four Corsair planes had raked the hill with napalm and machine gun fire 30 minutes before. After trying in vain to have artillery fire placed on this hill, the task force commander ordered the column to withdraw out of range of the hostile fire. The tanks covered the light vehicles and the force backed up several hundred yards.

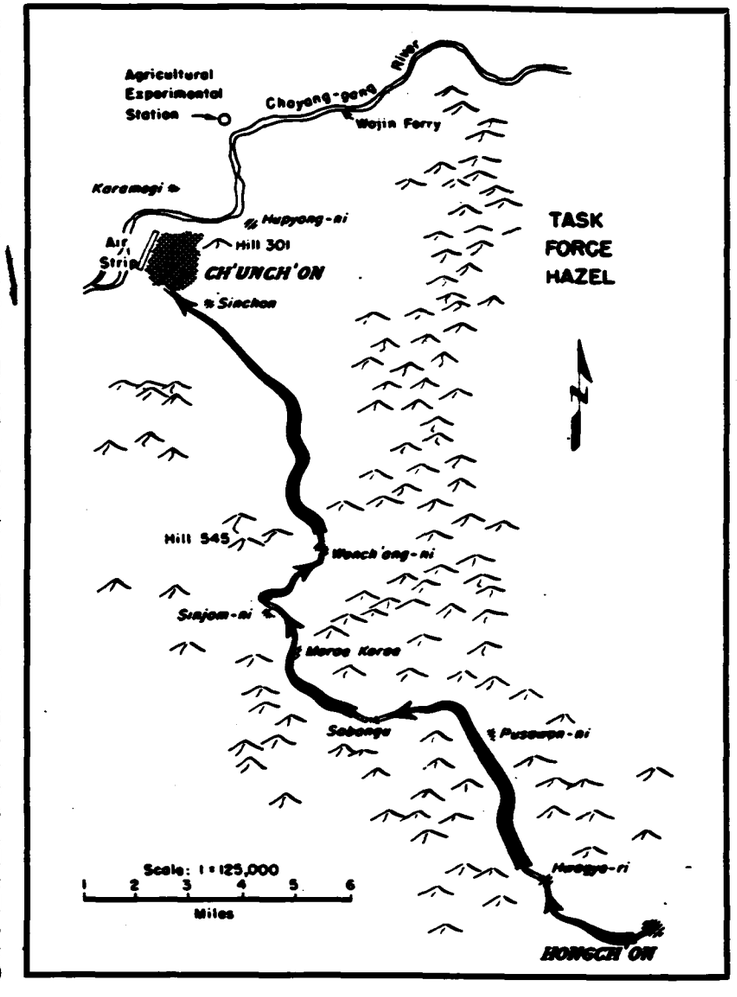
The CO of the 32d Infantry ordered the task force commander to continue if he was receiving only small arms and automatic weapons fire, but not to over-extend his force or let it be completely cut off. So Task Force Hazel was revamped as a column of 11 tanks. Maneuver was difficult because the narrow road wound through rugged, mountainous terrain, and considerable time was required for reorganization. But at 1315 hours the depleted task force started toward Ch'unch'on. The unarmored elements of the 7th Recon, and the engineers, were left behind.

The tanks edged through Sinjom-ni under a hail of small arms and automatic weapons fire. Sharp turns and dust made driving difficult, though the surface of the road was good. Banks and shoulders tended to cave in when the tanks traveled too close to the edge of the five-meter road. Beyond the pass north of Wonchang-ni the tanks deployed in a valley and opened up with their weapons to feel out the enemy's fire power. It wasn't very impressive, so the column returned to the road and advanced rapidly into the Ch'unch'on basin.

When the task force reached the outskirts of Ch'unch'on at 1715 hours, the CO warned the tankers to be on the lookout for mines and enemy troops that might be on Hill 301. The tanks lumbered to the center of town. Their commanders were told to check the houses carefully. The leader of the 4th Platoon was ordered to take his tanks to the bridge north of town, block enemy escape, and reconnoiter the river for a crossing site. The task force commander took three tanks and covered the road junction in the northwestern part of town.

The pilot of a light plane overhead reported that 500 Chinese were running from Hill 301 to the east and north to Hupyong-ni. The 4th Platoon was ordered to move east along the river bed and mop up the enemy troops as they came toward it. The task force commander did not know the exact location of the platoon because of communication difficulties, but he figured that it had a 900-yard field of fire and could inflict heavy casualties on the Chinese. He also called the two-tank section he thought was at the school, and ordered it to move east then north to Hupyong-ni to drive the scattering enemy into the tanks of the 4th Platoon. But the two-tank section had become lost on the outskirts of Ch'unch'on. The radios in both tanks had failed suddenly, and when the commanders realized that they were alone with no other tanks in sight, they turned around and followed the other tank tracks into town. The task force commander later reflected that an additional 200





MAJOR JACK G. BROWN is a member of the Editorial Group at The Artillery School, Fort Sill, Okla., where this article was prepared from combat historical reports.

enemy troops could have been caught if these tanks had made the planned run.

Overhead the light plane pilot reported Chinese escaping on all trails leading out of the area. The task force had apparently surprised the CCF in Ch'unch'on, and the enemy's immediate reaction was to scramble madly out of town.

During this action, the six tanks of the 4th Platoon rumbled through town toward the river. Civilians came into the streets and seemed happy to see the tanks. They pointed out houses where Chinese were hiding and shouted "many, many." The platoon worked cautiously through Ch'unch'on, firing at houses that civilians indicated were sheltering Communist soldiers. One ran out of a house and was shot. Two who were washing their clothes at the riverbank started to run when they saw the tanks and were cut down. The platoon forded the river, and the leader reported that it was three feet deep at that point and suitable for jeep and truck crossing.

While two two-tank sections of the platoon turned east along the sandy river bank toward the bridge, a third section moved northwest to Karamegi. One tank discovered some gasoline drums and blew them up with a round of HE. It then turned and followed the platoon leader along the river.

Ranging Around

Two tanks arrived at the bridge and reported seeing nothing, so the platoon leader told them to continue farther up the river. When the tanks arrived 650 yards beyond the bridge, the section leader saw 200 to 250 Chinese running single file some 1200 yards away. The lead tank fired several rounds of 76mm HE at the formation. Chinese in the rear of the column hit the ground, and a gunner reported seeing bodies fly through the air. These tanks then returned to the river crossing site and met the second section, and the four tanks traveled back to Ch'unch'on to look for the platoon leader. They found the task force commander instead, and he radioed the platoon leader to come back to town and join the force.

The platoon leader and another tank were trying to outflank the escaping Chinese by running north along the road past the Agricultural Experimental Station then east to the Choyang-gang. Fifteen hundred Chinese were running off the hills 2000 yards across the river to the east. The tanks burned up their machine gun barrels firing at the fleeing enemy. One tank commander estimated that his 76mm gunner killed at least 200. The Communists did not return fire. They were throwing away their packs, canteens, and anything else that would lighten them for a faster getaway. After firing as much ammunition as could be spared the two tanks returned to the airstrip.

Light Aviation Helps Out

About 1830 the light airplane pilot relayed a message to the task force commander.

"You might have to stay in town," said the pilot.

The executive officer of the 7th Recon, who was relaying messages to and from Task Force Hazel, was informed by the S3 of the 32d Infantry that the task force would remain in Ch'unch'on for the night. Reinforcements of one platoon of the tank company, 32d Infantry, to be followed later by another platoon of the same company, would soon be on their way. He relayed this message to the light airplane pilot.

"You will stay," radioed the pilot to the task force commander, reporting that reinforcements were being sent.

The task force commander was leery about keeping 11 tanks without infantry protection in a position where he didn't know the enemy's strength. Gasoline and ammunition supplies were low. But the commander ordered all tanks to assemble at the airstrip, which afforded good fields of fire, form a tight perimeter, and set out trip flares.

Back at the regimental area, the executive of the tank company had returned to his command post to secure rations, POL, and ammunition to be carried to the task force by the reinforcements. While arranging for the supplies, he received a radio message from G3, 7th Division, directing that Task Force Hazel return to friendly lines immediately. The company executive went to the regimental CP to check this order. Regiment confirmed the change, and these instructions were relayed to the task force at its forward position.

It was 2025 when the task force commander received the division order to return to friendly lines. He checked to confirm it, and then asked the light plane pilot how much longer he could fly cover. The pilot replied "an hour." The commander asked him to stick around as long as possible on the return trip. Then he ordered the tanks to start rolling.

The tank column had traveled five miles without difficulty when the leader of the 4th Platoon radioed that one of his tanks was out of gasoline. The task force commander instructed him to tow the tank but if he could not tow it he was to destroy and abandon it. The platoon leader replied that he would tow the tank as long as he could.

At a small settlement in the valley north of Wonchang-ni the column received intense enemy small arms fire. The tankers buttoned up their hatches, and the plane overhead was called to look for the source of the hostile fire. After searching, the pilot replied that he could not see where the fire was coming from.

Night Column

Through the night, made darker by dust and the absence of a moon, the column rolled on with large distances between the tanks. Before nightfall the tanks ran at 20 mph, but now they crawled along at 5 mph over the narrow, twisting road. Only the lead tank had its lights on, and the tank commander was instructed to go into blackout when the enemy fired. The leader of the 4th Platoon reported that he could not tow the tank that was out of gas any farther and was going to destroy it. The task force commander gave his approval.

As the tank column rounded a bend in the road south of Wonchang-ni, it was raked by enemy small arms fire from Hill 545. By this time the task force commander received orders from the 32d Infantry to halt in place and set up a perimeter for the night. On the left of the road loomed a cliff, and on the right the ground fell off into a gorge. The task force commander halted the column and told the regiment that he could not turn around, his tanks were receiving intense small arms fire, and were low on gasoline and ammunition. Regiment then ordered that the task force

establish a perimeter in an area about 2000 meters south of Ch'unch'on, which was about eight miles north of its present location. Apparently regiment did not know where Task Force Hazel was.

The commander informed regiment of the task force's location and predicament, and finally he was instructed to continue toward friendly lines until he found a suitable area for a perimeter for the night. The task force commander found an area north of Sinjom-ni in which he could assemble his tanks, but five minutes after establishing a perimeter he was ordered to move his tanks to the valley west of Sabangu and report personally to regimental headquarters.

Resupply and Return

Gasoline and ammunition were waiting at Morae-Kogae. At 2300, while the tanks resupplied, the absence of the 4th Platoon leader was discovered. The task force commander reported to regimental headquarters near Pusawon-ni on 25 May at 0130. There he was ordered to take Task Force Hazel back to Ch'unch'on that morning, leaving friendly lines at 0600. Three platoons of the 32d Infantry Tank Company were attached for the operation. On its way back to Ch'unch'on, the task force found the missing tank wrecked in a gulley north of Wonchang-ni. The platoon leader was dead; a tank in the rear of the column picked up the survivors.

The tanks arrived in Ch'unch'on without opposition at 0830. The task force commander outposted all sides of the town and awaited orders. His gunner destroyed several houses with 76mm shells when sniper fire was received from the direction of Hill 301, and the sniping stopped. A message said that the 3d Battalion, 17th Infantry Regiment, was en route to Ch'unch'on and the task force commander should meet the infantry south of the town.

A platoon leader brought in a Korean boy with a note requesting that the tanks rescue 19 American prisoners. The task force commander was skeptical. Near Sinchon, however, a light plane buzzed the tanks and dropped a message stating that Americans who had been prisoners of the Chinese had laid out a panel asking to be rescued. The pilot said that he would lead tanks to these men. So three tanks were dispatched and the rescue was made.

The three platoons of the tank company were ordered to deploy in the northwestern part of town and the 7th Recon tanks were told to cover the area south of Ch'unch'on. One tank, proceeding to the southeastern part of town, struck a mine at the road junction. One man was killed. One platoon of the tank company en route to the Wonjin Ferry knocked out the four- or five-man crew of an anti-tank gun and five more Chinese in a nearby house.

Meanwhile, the first platoon set up a roadblock north of the river at the ferry. A light airplane dropped a note stating that 30 to 40 enemy were in trenches 500 yards to the north. The platoon advanced in line formation across the field shooting and running over Communist troops. On a ridge near the ferry the other platoon destroyed a 57mm recoilless rifle carried by four Chinese, and during the afternoon, fired on groups of one to eight Chinese trying to escape 800 to 1000 yards away.

Elements of the 17th Infantry arrived in Ch'unch'on in trucks between 1100 and noon without meeting any opposition. Numerous planes began to land on the Ch'unch'on airstrip, and traffic in town became heavy. Task Force Hazel was dissolved early in the afternoon.

* * * *

Although handicapped by inadequate means to block the escape of the entire enemy force, Task Force Hazel broke the back of enemy resistance in the Ch'unch'on area. The strength of the task force was insufficient for the job given it. A stronger armored force, supported by artillery and air, would have had the advantage of being self-sufficient after arriving in Ch'unch'on and would have been able to exploit more quickly the disorganized condition of the enemy.

The lack of overhead protection on the half tracks required the task force commander to leave his unarmored elements behind since they could not run the gauntlet of enemy small arms fire. A fully covered armored personnel carrier that can go anywhere that tanks can would have been useful. The experiences of Task Force Hazel demonstrate that deep penetrations by armor, where organized enemy positions must be by-passed, require tanks, armored infantry, armored engineers, and armored artillery. If any of the components of the team are unarmored, then the whole operation is handicapped.

Since armor protection was not available for all elements of the command, a stronger force of tanks might have been used to better advantage. Two tank companies from the division along with the tank elements of the 7th Recon would have been able to fight a self-sufficient action after getting through to Ch'unch'on. In the meantime an infantry force and the remaining regimental tank company could have secured the passes and held open the route for motorized infantry to move in quickly to join the tanks in Ch'unch'on. If the task force had been reinforced in Ch'unch'on instead of withdrawn, the bag of enemy kills and prisoners would have been greater.

Communications—Key to Control

Task Force Hazel was considerably helped by the observation and communication provided by the light airplane. It was hampered, however, by the lack of continuous communication both with higher headquarters and between elements of its own unit. Communication between an armored task force and the headquarters under which it operates should be direct and ample. The numerous relays of messages during this operation resulted in garbled orders and confusion. Though radio relay will serve in a pinch, special training is a prerequisite for making it work effectively. The failure of radios in some of the tanks contributed to the escape of many enemy troops.

The division reconnaissance force exists to feel out and develop the enemy situation. Its size and matériel should be adequate not only to accomplish the missions given it but also to exploit any opportunity to annihilate the enemy or hold an objective. The use of a reinforced armored reconnaissance company developed the enemy situation at Ch'unch'on, made the enemy's plight known to the division staff, and routed the Communist troops. But Task Force Hazel could have struck a crippling blow to the CCF if it had had the communication and strength to exploit immediately its initial success.

Whether in combat in Korea, on the alert in Europe, or on tap in the States, the tank unit commander is looking for well-trained replacements to fill out his organization. Here is reassurance from a primary training source as seen by a junior officer who has had occasion to serve at both ends of the line.

Training the Tank Crew Replacement

by FIRST LIEUTENANT ROBERT L. BURNS

"I NEVER learned a thing back in basic training!" Although this is a pretty broad and flat statement, it was the complaint voiced by many a new replacement arriving in a tank platoon in Korea. The individual soldier, faced with the prospect of actual combat, requires the support and confidence of high training. Many assumed that previous training had been inadequate preparation for the payoff assignment.

For example a man now finds himself occupying the position of bow gunner or loader—almost invariably replacements with little experience were assigned one or the other. The tank commander and the other crew members are now his instructors, and his training, though informal, is intense. He cleans cannon and machine guns and works on the tracks, under careful supervision.

Within a few days this "untrained" replacement is performing efficiently as a tank crewman, enjoying the confidence of the other crew members. He still insists that he has "learned more during one week in the platoon than during the whole period of basic!"

At this point, however, we must take exception with the man. It is difficult to believe that such progress could have been attained if the man upon his arrival did not already possess a good background of military knowledge. What has been learned and forgotten can be easily relearned. Without constant refreshing and practice, military skills and knowledge are soon lost. The first few days in the platoon serve as a refresher. The successful performance of the replacement under combat conditions speaks well for the training program that has produced him.

Room for Improvement

As with everything else, however, there was room for improvement in the training given to the trainees in the States. It was found that the average replacement was lacking a thorough knowledge in the following subjects:

1. COMMUNICATIONS
   operation and maintenance of radio equipment, radio procedure
2. CREW DUTIES & RESPONSIBILITIES
   especially maintenance of the suspension system
3. MACHINE GUNS
   assembly, disassembly and headspace adjustment of cal. .30 and cal. .50 weapons

It was thought that greater emphasis should be placed on these subjects in order to eliminate these deficiencies. A soldier cannot be a successful tanker until he has mastered these skills.

The trainee in the Third Armored Division at Fort Knox undergoes 16 weeks of training. Upon completion of this period, the trainee is qualified to take his place in a tactical unit in Korea or anywhere else in the world. During his earlier weeks, he receives training in driving, maintenance, gunnery, communications, and various other necessary subjects. The training is conducted by committees. He spends his 13th and 14th weeks in bivouac, where he undergoes field problems under the direction of the "Tactics Committee." During this period, all of the skills that he has learned (and maybe has forgotten) are put into use. Many deficiencies of previous training are corrected at this stage. The men train as members of tank crews—each man must "produce" in the presence of the other crew members. The tactical problems include: Tank Platoon in the Attack, Tank Platoon in the Defense, Night Tank Attack, Tank Platoon in the Delaying Action and other platoon exercises. The purpose of this phase of training is not to give a detailed knowledge of platoon tactics as required for a platoon leader. The emphasis is placed, instead, on the part that the individual tank crewman plays in these operations. Problems are made very simple, as indeed most actual combat problems are simple—success or failure depending on the manner of execution.

The Tank Platoon in the Attack problem will serve as an illustration. The eight-hour class is divided as follows:

I. INTRODUCTORY LECTURE (1 hour)

II. PREPARATION FOR THE ATTACK (Assembly area) (3 hours)
   1. Before-operation maintenance
   2. Check and stowage of OVM (On Vehicle Material)

III. CONDUCT OF THE ATTACK (3 hours)
   1. Movement to the attack position
   2. Final preparation and coordination at the attack position
   3. Seizure and occupation of the objective
   4. Reorganization on the objective
   5. Critique

IV. MAINTENANCE (1 hour)

The various stages will now be explained in detail.

I. INTRODUCTORY LECTURE

A brief discussion of the characteristics of armor offensive action is followed by a detailed explanation of the duties of the individual tank crewman in the assembly area, in the attack position, and during the actual assault on the objective. Emphasis is placed on the fact that success of armor action depends on the performance of the individual crewman acting as part of a team. It is pointed out that the crewman has practically the same duties whether his platoon is attacking, defending, withdrawing, etc. The simple tactical situation is presented. The company is then broken down into platoons which are sent off to the tanks in the assembly area.

II. PREPARATION FOR THE ATTACK

Arriving at their tanks, the trainees are told that they are in the assembly area where they are to make the detailed preparations for the attack. Before-operation maintenance is performed; each man performs the duties of his crew position under the supervision of the assistant instructor. There is an instructor for each platoon, and an assistant instructor for each tank. All OVM is removed and placed on the tarpaulin in front of the tank. Machine guns are cleaned and headspace is adjusted. Radio equipment is checked for completeness and operation. The assistant instructor questions the trainees on the uses of the various articles of OVM, and makes explanations and demonstrations whenever necessary. The OVM is then stowed in the proper manner—the necessity for proper stowage is explained. The fact that a large number of assistant instructors are available means smaller training groups and individual attention. In previous instruction in OVM stowage that the trainee has received, the classes were much larger. Radio communication is established between the tanks and the platoon is ready to move out.

III. CONDUCT OF THE ATTACK

The movement to the attack position, located nearby, takes only a few minutes. The purpose of the attack position, and the duties of the individual crewman at this stage are again explained by the assistant instructor. Final coordination and preparations are made. The instructor points out the line of departure and again reviews briefly how the actual attack is to be carried out. One section is assigned as the base of fire and takes up a defiladed position to cover the objective. The other section, the maneuvering force, crosses the line of departure and closes rapidly on the objective. The actual time consumed between the crossing of the line of departure and the overrunning of the objective is not more than ten minutes. When the objective has been secured, the platoon reorganizes and takes up defensive positions to repel enemy counterattack. A detailed critique is held immediately, covering the entire problem from the assembly area to the reorganization on the objective. The part that infantry would have played, if it had been available, is stressed.

IV. MAINTENANCE (1 hour)

After-operation maintenance is performed after every problem. Each man performs the duties of his crew position, under the guidance of the assistant instructor.

The other field problems are carried out in the same manner. The exercises are made simple and actual movement is kept to a minimum in order to stress the duties and importance of the individual during the operation, especially during the preparation stages. Maintenance and stowage of OVM (including use of all articles of OVM) are covered in every problem. Crew drill, including evacuation of wounded crew members and dismounting to fight on foot is practiced often during the two weeks in the field.

This article has been written so that the platoon leader in Korea, or elsewhere, may get an idea of the training that replacements have received before their arrival in the tactical unit. Steps are constantly being taken to improve the quality of training that is given the 16-week cycle. Criticisms have been solicited from tactical tank battalion commanders, and their suggestions have been studied and acted upon.

Of course, there will always be room for improvements. There are those who would devote a greater period of training to field expedients—what to do when a tank throws a track on a hillside where another tank cannot approach it, etc. For a replacement arriving in Korea, where terrain is probably a greater factor in hindering the operation of our armor than enemy action, previous training of this sort would be invaluable. In that peninsula, mired vehicles, loss of tracks, etc., are everyday occurrences in the platoon that operates away from the roads.

Replacement to Veteran

The training of replacements has improved, and will continue to improve as time goes by. The replacements of the past, upon whom the rotation program in Korea has depended, have performed admirably. They are the veteran tankers of today. In the author's platoon, a private soldier replacement arriving in the platoon in April '51 became the platoon sergeant in July '51. Others who had arrived later were serving as tank commanders in a few months. Based upon the program now being carried out in the training division, the replacement arriving today in Korea or Europe will prove himself a well trained man of value to your platoon.

FIRST LIEUTENANT ROBERT L. BURNS was commissioned upon graduation from the University of Massachusetts in 1950. He served as a platoon leader with the 70th Tank Battalion in Korea and is now a member of the Tactics Committee of the 3d Armored Division, Fort Knox, Kentucky.

A well-known political scientist continues his appraisal of

upset Europe in the germinating period of a second world war

AUSTRO-FRANKENSTEIN

by DR. ROGER SHAW

AUSTRIA was never quite the same after her twin civil wars of 1934. The socialists had been crushed and virtually extinguished, and the Nazis seemingly were down and out, save as troublesome groups of irresponsible gangsters. The church and the Schuschnigg "Fatherland Front," with its crutch-cross, ruled supreme, backed by a more or less efficient police organized on the historic "Metternich" model.

But although the Nazis had been driven underground after the death of Dollfuss, a Committee of Seven controlled their activities, and kept closely in touch with the Nazis of Germany. Captain Joseph Leopold was now the real leader of Austrian Nazidom, and with him on the Committee of Seven were Arthur Seyss-Inquart, Hugo Jury, Joseph Mannlicher, Oswald Menghin, and Leopold Tavs. Their headquarters were in Vienna, at No. 4 Theinfaltstrasse, and some of the members had considerable paradoxical influence in government circles.

The Committee did everything possible to promote illicit Nazi activities, and saw to it that the government bureaucracy, police, and university students were honeycombed with secret brownshirts. Leopold was in and out of hot water with the Schuschnigg regime, and the Committee hatched some rather extraordinary plots to bring about German intervention, and eventual annexation. Heinrich Himmler, chief of the German secret police, a Bavarian "neo-pagan" with alleged Buchmanite sympathies, the Committee found especially sympathetic. Himmler, terror of the Nazi concentration camps, wore pince-nez and had a remarkably scholarly look. His agents knew the inner workings of the Austrian situation better than anyone else; better even than the Austrians themselves.

DR. ROGER SHAW, Professor of International Relations at Trinity College in Hartford, Conn., is a regular contributor to ARMOR.

But although the German Nazis were strongly in favor of armed intervention in Austria, the Prussian army leaders were lukewarm to invasion. General Werner Fritsch, field-commander at Berlin, was conservative, not a Nazi, and feared a major European war. He considered Germany unprepared for another 1914, cautious as he was, and he disliked the German meddling in Spain, which had begun in 1936. With Fritsch stood most of the Prussian generals, and these stiff-necked Junkers, whose ancestors had once defied the Hohenzollerns in the mark of Brandenburg, were still an influential group. In some cases, the Nazis feared them.

Fritsch held the opinion that Schuschnigg Austria was already coordinated with Germany in military matters, and indeed the Prussian and Austrian general staffs had an arrangement whereby Austria agreed never to fight Germany, and Germany undertook to respect Austrian independence in wartime. The annexation of the Austrians, said the Prussians, would lengthen the German frontier by some hundreds of miles, increase the problems of defense, and give Germany additional frontiers bounding Italy, Jugoslavia, and Hungary—when the Germans already faced France, Belgium, Holland, Denmark, Lithuania, Poland, Czechoslovakia, Luxemburg, and Switzerland. In case of a major conflict, said the Fritsch School of Thought, an Austria observing benevolent neutrality might prove more useful than an Austria annexed to Germany. These were weighty enough reasons, which the Nazi party completely disagreed with.

Things came to a head in Germany when the pro-Nazi Minister of War, old General Werner Blomberg, married his young secretary, a lady of supposedly humble origins. Apparently this outraged the exclusive corps of Junker officers, monocles and all, but behind the scenes the point of friction was not the new Frau Blomberg, but the Austrian question. Fritsch and his school ranged themselves against Blomberg and the Nazis, backed by a Prussian army minority. Blomberg resigned, supposedly because of his marriage, and went off to the Isle of Capri on his honeymoon. He was genial, "human," a lover of fine opera, and an historical authority—a pleasanter person than the ramrod Fritsch. Hitler and Goering both had been witnesses at his "unfortunate" wedding. Then things began to move in Germany:

It was a bloodless "blood-purge." Fritsch and his followers were forced out of the Prussian army in considerable numbers, Goering was promoted to field-marshal, and General William Keitel took the places both of Fritsch and Blomberg. Hitler himself became War Minister, and old-style conservatives simultaneously were removed from the Foreign Office and diplomatic service. Goering and Himmler both were eager for the supreme Prussian army command, but they were overruled in favor of the diminutive, politically reliable Keitel. With the change of leadership, the attitude of the Prussian army toward Austria changed materially. Nor were Nordic theories allowed to stand in the way of army efficiency at a critical period, for the new German air-chief was General Erhard Milch, supposedly Jewish. And back of Milch stood another alleged Jew, Dr. Robert Ley, boss of the Nazi Labor Front.

Franz Papen, a former German Catholic Chancellor and millionaire man-about-town, was the ambassador to Austria. He had been expelled from Washington during the World War, at first was Vice-Chancellor under Hitler, but narrowly escaped the Nazi blood-purge which carried off so many "gentleman" monarchists on June 30, 1934. Papen really was safer in Austria than in Germany, where he was a potash king, and had been the especial favorite of the late President Hindenburg. Papen was a cross between a clown and a Metternich.

Papen suggested to Hitler that the recalcitrant Schuschnigg be invited to rustic Berchtesgaden, Hitler's mountain "Potsdam" in alpine Bavaria. Hitler agreed to this meeting, to iron out tangled Austro-German affairs, and Schuschnigg duly accepted and made the trip over the frontier. He left Vienna by automobile on February 11, 1934, with his Foreign Minister, Dr. Guido Schmidt. He brought along half a dozen Austrian detectives, but they were stopped at the German frontier, although previously Mussolini had taken 2,000 of them with him on a visit to Berlin. Instead of the detectives, elite Nazi police took charge of the anti-Nazi Schuschnigg. They were led by an Austrian deserter, as an added straw to break the camel's back.

The Cause of Germanity

At Berchtesgaden, Hitler was none too polite to Schuschnigg, and told him that he was a traitor to the cause of "all" Germanity. It was perhaps true that Schuschnigg was more clerical than Germanic in feeling, but the Austrian dictator of Germany may have acted the part of a bully. The Prussian generals present also treated Schuschnigg to threats and disrespect *a la militaire*. Meals at Berchtesgaden became an ordeal to the badgered visitor.

Hitler demanded that Dr. Seyss-Inquart, of the Committee of Seven, be appointed Austrian Minister of Interior, in charge of the police. This would be a tactical deathblow to the dictatorial Schuschnigg regime; but when the Austrian Chancellor refused, Hitler threatened him with a Prussian army invasion. ("General Keitel, tell Dr. Schuschnigg about our troops assembled on the Austrian frontier," etc.) Unquestionably, a great deal of bartering went on at Berchtesgaden between Schuschnigg and the Hitler entourage, and Schuschnigg agreed to work for the "suicidal" appointment of Seyss-Inquart to the Austrian cabinet.

By February 15, Seyss-Inquart became Minister of Interior. The reluctant Schuschnigg attempted to undermine his hold on the police by reservations, and phoned Mussolini for help without avail. Italian troops were away in Spain or Ethiopia, and the Italic dictator needed German help in his international projects. The shaky, jerrybuilt "Fatherland Front" was falling to pieces, and the Austro-Nazis were vastly encouraged by the elevation of a member of the Committee of Seven to so strategic a position. Rustic President Miklas of Austria found himself in violent opposition to Seyss-Inquart, heightening the tension to the snapping point.

The unaffiliated mobs in the chief cities of the country were turning into Nazis, and buying up cartloads of swastika badges. At Graz, in Nazi Styria, some 10,000 storm-troopers paraded openly in honor of a visit by Seyss-Inquart. Motorized Austrian regulars and aircraft had to be sent down late in February, to prevent the Styrians from marching triumphantly on Vienna and ousting Schuschnigg. There were similar disorders at Linz, in Upper Austria, and elsewhere in the provinces. Jews began to tremble, "Prussian" residents of Austria swelled with pride, and even in the Austrian army there were pro-German murmurs and anti-clerical mutterings.

Schuschnigg, in desperation, played his trump-card against Austro-German union: he decided to hold a Popular Referendum as the storm clouds gathered. Seyss-Inquart, as soon as he had been made Minister of Interior, had gone to Berlin to hobnob with the Nazi leaders there, and was virtually taking his orders from Herr Policemaster Himmler—certainly not from Doctors Schuschnigg and Miklas. The Austrian Chancellor feared that the Minister of Interior might *himself* hold an Austrian Nazi referendum, with Himmler's aid and German gold, and thought it best to forestall him at once. Schuschnigg even made overtures to the still "pink" Vienna workers, whom Dollfuss had crushed so mercilessly in February, 1934, and it was estimated that the Chancellor might win two-thirds of the people on his referendum if he manipulated it properly.

This Schuschnigg sought to do. His ballot cards only carried "Yes" (that is, *pro*-Schuschnigg) on them, and Nazi voters would have to supply their own "No" slips, which could not help but attract the attention of watchful anti-Nazi polling-place officials. This clever arrange-

ment promised anything except a secret vote, and it might well have scared off many of the Nazi voters, substantially reducing the total of the brownshirt opposition. Nearly 3 million Austrian men and women were eligible to participate in the Schuschnigg referendum under the eagle eye of Herr Guido Zernatto, secretary of the "Fatherland Front." What the Vienna workers would do, hating as they did both clericals and Nazis, nobody could tell. Many critics expected the ex-socialists to split.

The Austrian Nazis were enraged by the Schuschnigg voting arrangements, and decided to boycott the referendum. They were quite sure that they would lose it, as they were intended to. Hitler was brooding at his Berchtesgaden retreat, and his Viennese lieutenants were exceedingly flustered by Schuschnigg's quick move. There were Nazi riots at Graz, Linz, Innsbruck, and Salzburg, and the suddenly popular socialists bickered among themselves in Vienna. Their former burgomaster, Dr. Seitz, though himself ousted by the clericals in '34, was inclined to support them in '38 against the Nazis. The Jewish vote was solidly for the Catholic Schuschnigg. But much of the Catholic vote was for the "neopagan" Hitler.

Then, Berlin delivered an ultimatum. The Schuschnigg referendum would have to be called off. This was at noon on March 11. The Austrian Chancellor again appealed to Mussolini, and as before it was in vain. The modern Machiavelli had other things to think about, and said so. Schuschnigg was worn out by stress and strain, continuing *Sturm und Drang*, and gave in. On March 11, at seven-fifty P.M., he announced his resignation over the radio, adding dramatically: *"God help Austria."*

He told his Austrian listeners that he was handing over the government to that horn-rimmed lawyer, Dr. Arthur Seyss-Inquart; that the Prussian army was coming into Austria as a force of occupation; and that the Austrian General Schilhavsky had orders to fall back peacefully before the invaders, to avoid any "inter-German" bloodshed. In a sense, it was a very gallant speech by a brave man!

That same day the "crack" Nazi storm-troop of Vienna, Standard Ninety-Nine, occupied the Austrian Chancellery—that building which Nazi Standard Eighty-Nine had seized, murdering Dollfuss, four years before. This time the Nazis were there to stay.

Wealthy Jews and the leaders of the now extinct "Fatherland Front" began to flee in all directions. Some 2,000 Schuschnigg men were jailed. The Vienna Nazis and mobsmen rioted in an orgy of anti-Semitism. At Schoenbrunn, with its 1,500 rooms, erstwhile summer palace of the Imperial Family, the Hapsburg tradition was definitely a thing of the past. Dr. Schuschnigg was placed under detention, consumed with love (they said) for the divorced Countess Vera Fugger Babenhausen, born a high and mighty Czernin, beautiful blonde, 34, and a former insurance agent. Romance was sprouting even under the heel of the Prussian boot. But the ex-Chancellor's 11-year-old son achieved the adventurous position of a political hostage, clad in a fancy sailor-suit.

The Final Effort

One of Schuschnigg's ministers, his propaganda expert, washed dishes in a prison. Vienna Burgomaster Schmitz, unpopular as ever, was charged with treason to Hitler. Hans Schneider, a dark Jew who was the world's most popular ski-instructor up in Vorarlberg, a really splendid outdoor man, was jailed at the instigation of a rival Nazi ski-teacher. Baron Louis Rothschild, hated since the Credit Anstalt Banking collapse of 1931, was held for trial. Jewish Bruno Walter, driven from Germany by the Nazis in 1933, lost his position as director of the Vienna Opera. A famous ear-surgeon, Dr. Heinrich Neumann, was taken into custody, despite the "heated protests" of one of his best patients, the Duke of Windsor. The liberal Austrian freemasons found themselves "attended to" because of their "international" affiliations and "Hebrew" lore. Dr. Sigmund Freud, afterward to leave Austria, was too sick at the time to be seriously molested. Five Vienna newspapers, and the immense Jewish Zwieback department-store, were confiscated.

Vienna saw many suicides, and half a dozen leading doctors poisoned themselves with their own prescriptions. One was a Nobel Prize winner, it was rumored. "Hop the twig, Judah!" roared the lynch-minded Vienna proletariat as they roughhoused with frightened Jews in the Leopoldstadt ghetto section. Babies born in the city hospitals were being named *Adolf*. The neglected grave of *Otto Planetta*, the man who in '34 shot Dollfuss, was profusely decorated. Hapsburg archdukes they jailed, and the extensive Hapsburg properties were confiscated, for good and all. The Viennese medical authorities declared: "Only Nordic corpses may be used in dissecting." Only *one man* abashed the rampant Austro-Nazis—a veteran Austrian Jewish general, in full and honorable regalia. In short, it was a Revolution.

Seyss-Inquart came originally from Bohemia, and had gone to school with the lonely Schuschnigg whom he was supplanting. Although an avowed admirer of Hitler, the incoming Austrian Chancellor was still on good terms with the outgoing one. Seyss-Inquart was shortsighted, blond and sandy, and a devout Catholic although a Nazi. Youngish-looking, he was little known, and had a limp. His brother was the confessing-priest to the former Empress Zita, hardly a friend of Seyss-Inquart in politics.

The new "dopey-dupey" Nazi Chancellor of Austria promptly formed a cabinet, following the retiring radio words of Schuschnigg: "We have yielded only to brute force." He included in the new ministry Dr. Franz Huber, Goering's Austrian brother-in-law, and gave him the title of Minister of Justice. Meanwhile, the Prussian widow of the murdered Chancellor Dollfuss was barely escaping across the line into Hungary.

No sooner had Seyss-Inquart formed his Austro-Nazi ministry than he wired to Hitler at Berlin: "I appeal to the German government for the earliest possible dispatch of troops, to assist in the prevention of bloodshed." This was the starting signal. The reorganized Prussian army, held in readiness on the Austrian frontier, began its epic march on Vienna.

On March 12 it streamed in at half a dozen points: Scharnitz, Passau, Kufstein, Salzburg, and elsewhere. It came motorized and mechanized, by trucks, police cars, motorcycles and light and heavy tanks, touring-

cars, armored cars, and swift cross-country six-wheelers. It came also by air, from the nearby Bavarian flying-bases. No time had been lost: Schuschnigg resigned at suppertime. The Seyss-Inquart cabinet had been formed by midnight. The Prussian army invaded Austria before breakfast. The fieldgray troops first crossed the boundary at five-forty A.M.

Perhaps 300,000 German troops, all told, entered Austria. Many of them were 35-year-old reservists, others were Elite police and storm-troop formations. Three-hundred bombing-planes landed 3,000 troops at the Vienna airport in a sensational flying feat. The new four-lane Bavarian auto-parkways proved themselves a great asset in the Wehrmacht mobilization, and 65,000 Germans entered Austria the first day, covered by pursuit planes, and encumbered by lines of motor vehicles miles long. There was a great deal of tactical and mechanical trouble with the tanks, in transit! They were supposed to proceed to Vienna under their own power in orderly columns, but they kept stalling and breaking down, and the narrow Austrian roads were seriously clogged. The high command became alarmed by such patent inefficiency, and Hitler himself was disgusted. Synthetic oil and rubber did not add to the peace of mind of the Prussian tankmasters.

The *Schuetzengrabenvernichtigungsautomobil*, or tank, was something new to the Prussian General Staff. It had employed very few of them in the First World War—perhaps fifty to an Allied 5,000—and tanks had been forbidden to Germany by the Versailles Treaty. When the Nazi rearmament boom took place, the postwar tanks had been built in a hurry, on improvised plans, and with inferior material. There were very few, if any, tank experts in the Prussian army, and German tanks sent to the Spanish civil war failed to perform very well. This weakness in mechanization showed itself even more disastrously in the march on Vienna. Finally, to alleviate the chaos on the Austrian roads, railway flatcars were run up, the tanks were loaded aboard, and the German advance continued more easily.

Hitler followed the army in a big six-wheel Mercedes-Benz: now in America. He stopped at Linz, capital of his native Upper Austria, and received a tumultuous reception. He made a speech from the City Hall, and called his trip to Vienna a "divine mission I have fulfilled." Braunau, his birthplace, Hitler visited for the first time in a quarter of a century. His eyes filled with tears. Meanwhile, Himmler and six carloads of his fiercesome German police stationed themselves in the Austrian Chancellery, along with Nazi "Standard" Ninety-Nine. These German police soon began to relieve the Austrian police of many of their duties. The Austrian police were relieved of their hard-rubber clubs, which they had used so often to beat Vienna's Nazis.

Triumphant Entry

On March 14, at five in the afternoon, Hitler entered Vienna at the head of a thirty-five-car motorcade. That day he had toured leisurely over from Linz, a hundred miles, and he was uproariously received by half a million Viennese, as bells pealed and the burghers went wild with contagious enthusiasm. He proceeded to the Imperial Hotel, and from a balcony declared to the multitude:

"An oath was sworn today by Germans from Cologne to Koenigsberg, from the Rhine to far East Prussia, from Hamburg to Vienna . . . Some 74 million people in one united Empire swear that *no* menace, *no* force, no necessity can ever break it up. This is my oath!"

Next day the Prussian army put on a monster military demonstration in Vienna, after Hitler had breakfasted on chocolate, prunes, and a roll. Some 25,000 German troops goosestepped down the Heroes Square, while hundreds of their airplanes droned above the vivid scene. Big guns and tanks paraded, and the gala-garbed Austro-Nazis were there in full force. Cried Nazi No. 1: "I declare to history the entrance of my native land into the German Empire." Meanwhile, incidents of friction were reported between high Austrian staff-officers, ever courteous, and the traditionally rough German military police. Nevertheless, General Keitel (small as ever) and the studious Himmler stood with four "polite" Austrian generals on a low, improvised reviewing-stand to salute the parade. Keitel kept on his steel-helmet. Four hours later, happy Hitler returned to Berlin.

Seyss-Inquart, who had been Austrian Chancellor for three days, now became a mere Austrian governor, or viceroy, like General Epp in Bavaria and the other Nazi district leaders. Joseph Buerckel, hard-looking, highly efficient Nazi boss of the Rhenish Saar area, was imported to supervise Dr. Seyss, and Buerckel made a special effort to win over the ex-socialist workers of Vienna. He gave 25,000 of them free seven-day vacations in Germany and said to them: "I do not demand that you declare yourselves Nazis at once, but when you get back to Austria I want you to look me straight in the eye and say: 'I have tried to understand.'"

Meanwhile, the Austrian Fifteenth Infantry visited Berlin, and *Deutschmeister Regiment Nummer Vier* had a good look at Munich. The *Deutschmeister* received German uniforms, and Germany's navy took over Austria's single Danube gunboat, of *Monitor* design. In Vienna, the Prussian army field-kitchens handed out free meals to the municipal unemployed, and the mark supplanted the schilling. In many cases the "virtuous" German invaders defended Austrian Jews from Austrian Nazis.

Some 2 million Berliners—more than equal in numbers to the total population of Vienna, now the "second city" of the Empire—welcomed Hitler on his return. They stretched solidly from the Tempelhof airport to the German Chancellery. They cheered and waved flags, and they kept perfect Prussian order. They were in a good mood. At last they had beaten Austria, led by an Austrian. It had taken them a little less than two and a half centuries.

* * * * *

For some eighteen years, Austria's ambassador to England had been a pompous, stiff-necked aristocrat, "more British, you know, really, than Viennese." This Herr Baron renounced now his race, became a Windsor subject, and was duly knighted. Above all things, he hated the gulping maw of the Prussian Monster, it seemed. And his actual name, by curious fatalistic coincidence, was Frankenstein—*Austro-Frankenstein*.

NEWS NOTES

Tankers Solve a Problem

WITH THE 3D INFANTRY DIV. IN KOREA—When a 65th (Puerto Rican) Infantry Regiment tank section was ordered to support Greek troops recently in Korea, a problem arose.

The problem was that of communications. None of the Puerto Rican tankers could speak Greek and the Greeks could speak neither English or Spanish. The orders, however, called for immediate coordinated action.

Then, a quick thinking American lieutenant came up with an answer to the problem. Remembering how easily one of the Korean boys with his unit had learned English, he sent the boy over to find out if any Koreans with the Greek unit had learned to speak Greek. One was found.

Then, the orders were given in English to the Korean boy, who in turn gave them in Korean to the other boy. The second Korean boy then translated the orders into Greek.

The operation was a complete success.

Alco to Produce T48 Tank

American Locomotive Company has announced the receipt of an order amounting to approximately 200 million dollars for T48 tanks and spare parts, and said that this newest Army medium tank would be coming off assembly lines at its Schenectady tank plant in the first half of 1953.

Duncan W. Fraser, chairman and president of American Locomotive, said that the new order raised the company's total backlog of defense work to approximately 950 million dollars. Alco already has substantial orders for the Army's M47 tank, which it is turning out at volume production.

New Jersey National Guard Given M47 Tank Demonstration

Members of the 50th Armored Division of the New Jersey National Guard, in summer field training at Camp Drum, New York, witnessed demonstrations of the M47 improved Patton tank.

The demonstrations are in line with Army policy of keeping units of the Reserve components informed of the latest developments and advances in military equipment and techniques.

An experienced team from the 44th Medium Tank Battalion of the 82nd Airborne Division at Fort Bragg, North Carolina, manned five tanks sent to the training site from the American Locomotive Company at Schenectady, New York. The team remained with the National Guard unit during its stay at Camp Drum.

The 50th Armored Division, under command of Major General Donald W. McGowan, had its field training from June 28 to July 12.

U.S. Army

Not quite a baseball team, but a top tank crew are the Parrisome quadruplets of Tucson, Ariz. Parrisome is proud of her Armor team. Left to right are Bernard, Carl, Donald and Anthony. They are in Korea with 73d Tank Battalion.

School at Fort Knox Named After War Hero

A school building at Fort Knox, Ky., has been named after a Washington soldier who was killed crossing the Rhine River in World War II.

Corporal Townsend Woodhill Crittenberger, son of Lt. Gen. and Mrs. Willis Crittenberger, formerly of Washington, was memorialized in the dedication ceremonies at the school for dependents of military personnel. Senator Henry Cabot Lodge, of Massachusetts, delivered the eulogy.

Gen. Crittenberger's son, a tank gunner, was killed shortly after his tank crossed the Rhine River in the Remagen bridgehead area in March, 1945. He was posthumously awarded the Bronze Star and the Purple Heart Medals. He is buried in Arlington Cemetery.

New Tank Manufacturing Facilities

The Army Ordnance Corps has acquired manufacturing facilities at Pittsburg, Cal., which, Ordnance spokesmen say, will be used to make large tank castings. Prior to its transfer to the Ordnance Corps the plant was in the custody of the General Services Administration. It is to be operated by the Columbia-Geneva Steel Division of the United States Steel Company.

Rehabilitation and conversion of the facility is expected to cost approximately $9,500,000 and require several months for completion.

Britain to Send Swiss Two Tanks For Trial

The British government is sending two British Centurion tanks to the Swiss army for a three-month trial, the Swiss Defense Department announces.

The department is seeking to purchase several hundred tanks and the two Centurions are to be tested for their suitability in Swiss conditions. A Swiss military mission is in the United States to test American tanks which might be available for sale.

Armor Association Supported by Armored Division Associations

The U. S. Armor Association has received strong support from a number of Armored Associations. These organizations, which have been meeting in annual convention in various cities around the country during the summer months, have notified the Armor Associaiton of a gratifying action taken in its behalf.

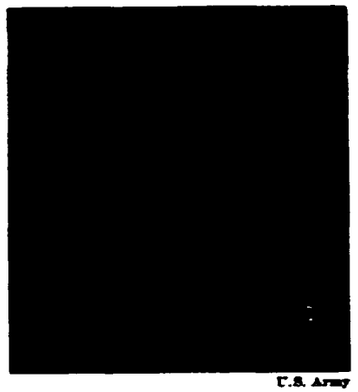
The 1st Armored Division Association meeting in Pittsburgh; the 6th Armored Division Association meeting in Washington, D. C.,; the 10th Armored Division Association meeting in New York City; and the 11th Armored Division Associaiton meeting in Washington, D. C.; these organizations have passed resolutions expressing their support of the Armor Association and its publication ARMOR, and stressing the value of an organization devoted to mobile warfare.

Many veterans of Armor from the World War II days have continued their interest in their former branch through membership in the Armor Association. They are regular subscribers to ARMOR.

Armor Association Will Move Into New Quarters In October

With the September-October issue of ARMOR off the press and on its way to member-subscribers around the world, the headquarters of the Association and the editorial office will move to other quarters.

The move is necessitated by a chronic Washington disease—"parkinglotitis."



U.S. Army

So many people have cars these days that city landowners can pull down more profit out of a vacant lot than they can with a building, especially a building as old as the one which has housed the Association over the past twenty years or so.

The details of the move were in the planning stage as ARMOR went to press. More word will be forthcoming in the November-December issue. It is probable that the move will be to an adjoining building, thus limiting the change of address to only several digits.

Brig. Gen. Arthur G. Trudeau has assumed command of 1st Cavalry Division in Japan, replacing Maj. Gen. Thomas L. Harrold, who has taken over the Japan Logistical Command.

AN OLYMPIC EQUESTRIAN REPORT

PRIX DES NATIONS
(August 3, 1952)

In this tremendous test the U. S. Team led the field over the morning rounds in the Olympic Stadium. In the afternoon rounds our great 19 year old veteran "DEMOCRAT" faulted just enough to drop our Team to third with results as follows:

1. Great Britain	40.25 faults	8. Portugal	65.0 faults
2. Chile	45.75 faults	9. Mexico	65.75 faults
3. United States	52.25 faults	10. Spain	67.25 faults
4. Brazil	56.5 faults	11. Sweden	80 faults
5. France	59 faults	12. Egypt	80.25 faults
6. Germany	60 faults	13. Romania	180.25 faults
7. Argentine	60.75 faults	14. Russia	198 faults

(Italy and Finland Teams eliminated)

OUR INDIVIDUAL SCORES

PLACE	RIDER	HORSE	FAULTS
11	William Steinkraus	Hollandia	13.25
13	Arthur McCashin	Miss Budweiser	16
14	John Russell	Democrat	23

THREE DAY EVENT
(July 30-August 2)

Here was the supreme test with our young riders competing against the field of 59 of the world's best. Of this number 25 were eliminated.

OUR INDIVIDUAL SCORES
Training Phase—Endurance Phase—Jumping Phase

PLACE	RIDER	HORSE	PENALTY FAULTS
9	Charles Hough	Craigwood Park	70.66
18	Walter Staley	Cassivellannus	168.5
31	John E. B. Wofford	Benny Grimes	348

Our Team finished third with the Teams of Sweden and Germany in front and Portugal, Denmark and Ireland behind. The combined ages of our horses and riders was 80 years.

TEAMS ELIMINATED: Italy, Finland, France, Argentine, Switzerland, Great Britain, Holland, Russia, Chile, Romania, Bulgaria, Canada, Spain.

INDIVIDUAL DRESSAGE
(July 28-29)

Here was an invasion of the hallowed field of a strictly European art. Our three riders performed well and with distinction and were placed as follows:

OUR INDIVIDUAL SCORES

PLACE	RIDER	HORSE	CREDITS
11	Robert Borg	Bill Biddle	498
17	Marjorie Haines	The Flying Dutchman	446
27	Hartmann Pauley	Reno Overdo	315

TEAM SCORES

1, Sweden, 1,592.5 points; 2, Switzerland, 1,575; 3, Germany, 1,501; 4, France, 1,423; 5, Chile, 1,340.5; 6, United States, 1,259.5; 7, Russia, 1,210; 8, Portugal, 1,198.5.

Maneuvers—and a story of how the Army saved money . . . and civilian good will

COWBOYS IN KHAKI

by FIRST LIEUTENANT WILLIAM J. BREISKY

DURING the most feverish moments of Exercise Long Horn, when the 1st Armored Division of the United States force had punched a breakthrough past the line held by the friendly 31st Infantry, those at the reins had their hands full keeping their units moving at a constant speed.

Major General Bruce C. Clarke's "Old Ironsides" division was a galloping, mile-wide steamroller, forcing the hapless Aggressor to up-end and scatter like a stepped-on tube of shaving cream. Judicious umpires were calling the balls and strikes, and inning by inning they made detailed pencil notes on the errors.

It was in this period particularly, often within range of the simulated artillery fire, that small bands of men labored at projects that were to make this "war game" slightly less realistic, greatly less expensive.

In teams of five, soldiers of the 1st Armored were shoeing cattle and hammering fences. Property damage in the barren central Texas area was being made right even before the landowner knew his land had been molested.

A lesson of the 1941 Louisiana maneuvers had been learned well. Of that operation, a magazine writer* once noted, "There wasn't time to be polite . . . There wasn't time to consider property losses. There wasn't even time to train an armored division, because Hitler had taken France, and his armies were on the channel."

Now there was time—time to protect the taxpayer and his government. This time, property rights would be respected. And Uncle would not be called upon to pay the price of a black Angus when one of his medium tanks trampled a fleeing field mouse.

Operation Fence came into being as a project of the division G-4 and the division damage control officer. The responsibility for fence repair training fell to Lt. Col. Ralph N. Hale's 16th Armored Engineer Battalion.

Twenty-eight "fence units" from the division's major commands, tank battalions, armored infantry battalions, artillery battalions, reconnaissance battalion and G-4 section attended the fence repair classes given by the 16th a week before the "Go" sign was signaled for Long Horn. Forty engineer squads were trained to act as reserve teams.

Lessons in the eight-hour course were simple and practical: setting and re-setting wooden posts; tightening and stapling wire; construction of the farmer's gate and swing gate; building of H-type and knee-type end posts. At the completion of the course, each fence unit was issued a set of tools along with a supply of nails, posts and wire.

When the maneuver got under way, fence teams were riding at their unit's elbows, ready to cut a fence, then stay with it and repair it. The mission of the teams was to repair any gate or fence, destroyed or damaged, within eight hours after the damage occurred.

Sometimes these OD ranch hands found themselves playing sentry to discourage a herd of grazing roasts of beef from making for a hole in a fence. When fence units were not available to make a break in a fence, units left guards at the trampled section to stand by until a repair team arrived.

Army-caused damage was never left unguarded—with one exception. The 82nd Airborne's Aggressor force didn't grant tactical immunity to the good will hammer-and-nail men; so "Vamoose" became the felicitous order of the moment whenever a row of green helmets appeared on the horizon.

Once a fence unit took over a break, it was responsible for guarding it until repaired. In the event that a break in a fence was to be re-used many times, a gate was constructed and a guard posted.

The fence unit consisted of a driver, an NCO or private first class and three privates. These men carried their tools with them on a 2½-ton truck. They were supplied by their units with "C" or 10-in-1 rations as needed. In addition to their set of tools and basic load of fence repair material, the teams were re-supplied from the division engineer supply officer's stock of expendable repair material items.

Teams were given no additional duties during the maneuver period, but remained "on call" at all hours.

"Fence team forward" was a familiar call during the maneuver when a tank battalion was forced to by-pass a bridge of insufficient capacity or a pipe cattle guard . . . when an infantry unit had to breach a fence to reach its assembly area . . . when a combat command was spanning a wide, fenced-in range area in carrying out an offensive operation.

Sometimes the small teams ran into an area with more breaks than standing fence. Reserve teams from the 16th trotted to the scene at those times and an immediate report was made to the division damage control officer over G-4 channels from major command headquarters.

In these areas of extensive damage or where time permitted only temporary restoration, breaks were checked and repaired further if necessary by division or a Long Horn agency.

The spring's heavy rains had teamed up with the Army's heavy armor to result in a lot of chewed-up road and pasture land. Without a foresighted damage control program, the actual claims total would have climbed much higher.

In an effort to hold down complaints, a full-scale restoration program got under way literally as soon as the last Long Horn shot was fired.

The fence teams, reinforced with more men and more supplies, returned to the maneuver area with a simple mission: to make good all Army-caused property damage. Nearly all complaints were rapidly serviced by fence teams that had been well-trained and were now well-practiced in their art.

The 46th and 61st Engineer Construction Battalions participated in the post-maneuver work. But the wind-up fell to the 16th.

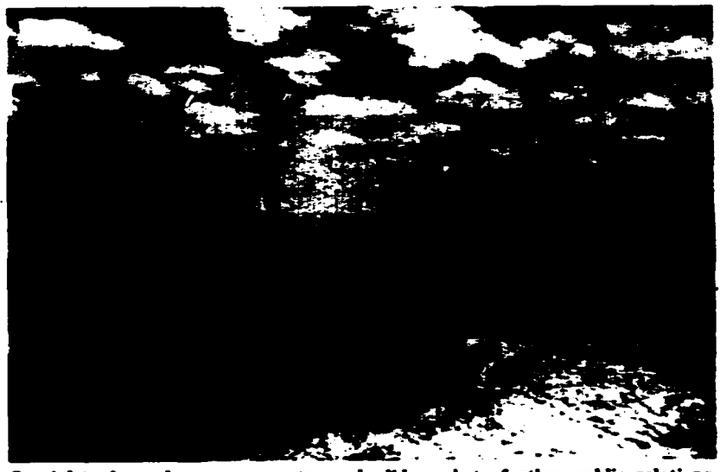
In late summer, General Clarke wrote through the new battalion commander, Lt. Col. William L. Starnes, Jr., a letter of appreciation to 1st Lt. Thomas R. Cox, "A" Company Commander, for "the splendid work in completing the rehabilitation of the maneuver area." He added: "I've heard nothing but good reports and many expressions of satisfaction from the civilians whose property was damaged."

The small group of soldiers who had played roles in the sub-maneuver, "Operation Fence," knew that their work had had something to do with the successful close of Exercise Long Horn and with the good neighbor feeling born of attention to property rights.

Most of these war game cowboys, however, welcomed a change in pace. "Don't Fence Me In" was to be their marching song . . . at least until the next maneuver.

A typical "fence unit" and its equipment as used during Exercise Long Horn.

The engineer battalion gave a practical course in fencing, in old ranch style.



Special tank tracks across county roads did much to further public relations.

*Roger P. Flaherty in the April 6, 1946, *Saturday Evening Post* article, "First of the Many."

LIEUTENANT WILLIAM J. BREISKY is a member of Company C, 16th Armored Engineer Battalion, 1st Armored Division, Fort Hood, Texas.

HOW WOULD YOU DO IT?

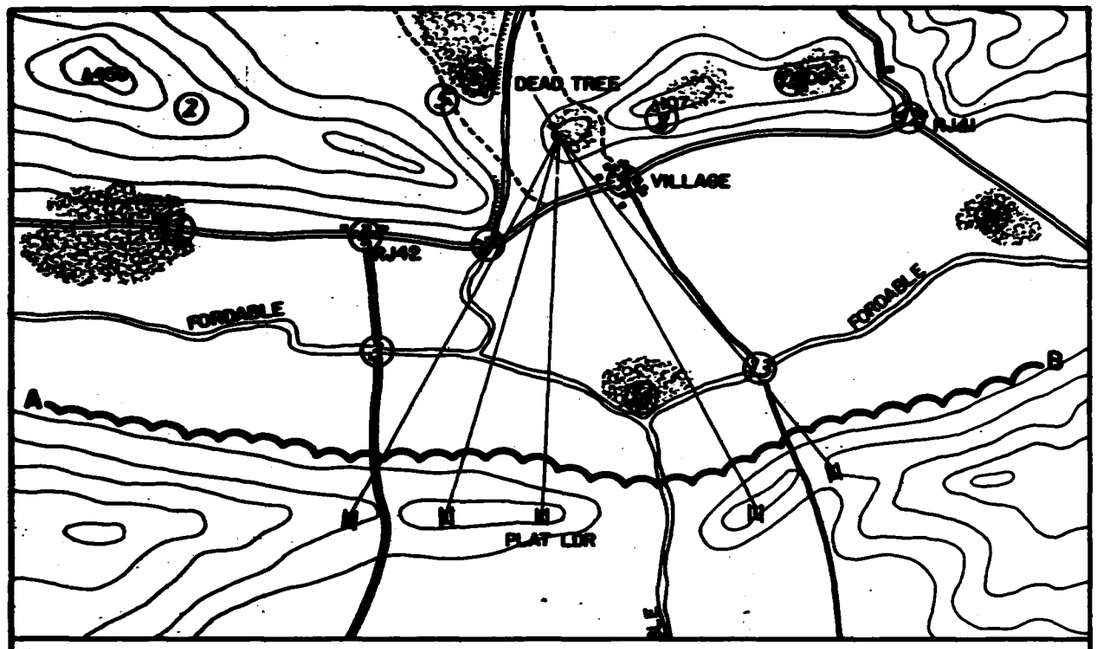
AN ARMORED SCHOOL PRESENTATION AUTHOR: MAJ R M [illegible] ARTIST: M SGT W M CONN

GENERAL. An important mission of armored units organic to the infantry division is reinforcing the fires of the infantry. Tanks must be prepared to render these reinforcing fires during the hours of darkness as well as daylight. This presents a problem to the tanks, but by using the auxiliary fire control equipment, accurate and effective fire may be placed on targets and likely avenues of approach at night.

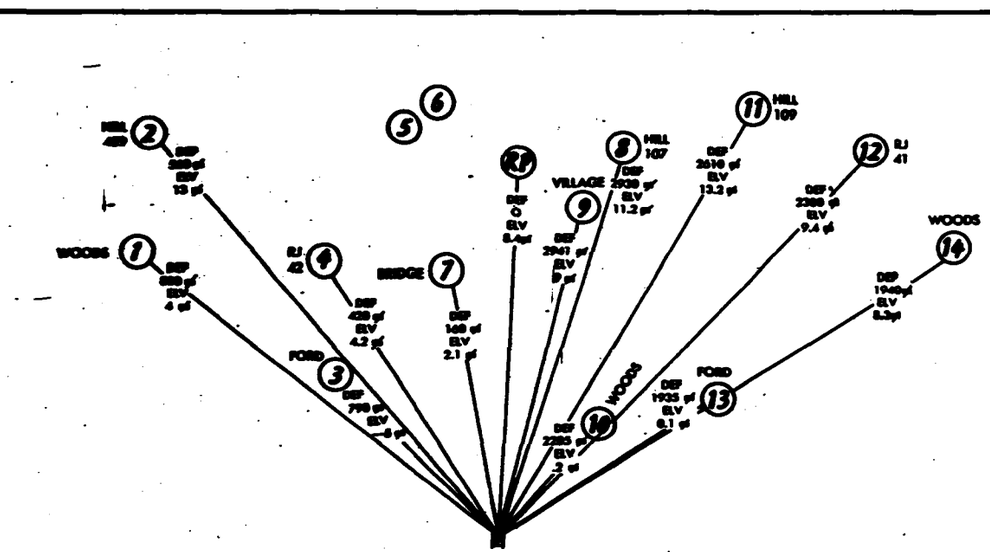
SITUATION. You are platoon leader of 1st Platoon, Tank Company, 1st Infantry. You have been attached to the 2d Battalion for an offensive operation. During the first day of the attack, the 2d Battalion secured its objective and is now preparing night defensive positions along the line A-B. The battalion commander tells you that your platoon will remain under battalion control. He also informs you that your platoon must be prepared to fire and reinforce fires on likely avenues of enemy approach throughout the night from your present position. (See sketch.)

1. What specific targets would you designate?
2. What method would you use to prepare necessary data to place fire upon these targets?

NOTE: Your platoon is equipped with the 90-mm Gun Tank, M47.



SOLUTION. The platoon leader selected a reference point. All tanks layed on this reference point with their direct fire sights and then zeroed the azimuth indicator. The platoon leader selected and numbered targets to cover all likely avenues of approach for enemy armor or infantry (see above). Each tank then prepared a range card (below) showing the target number, type of target, deflection (as recorded from azimuth indicator), and quadrant elevation necessary to hit each target. In the event of enemy attack, the platoon leader may designate a zone of responsibility to each tank by assigning each tank a block of targets. Even when lack of time and ammunition or danger of disclosing your position makes registration on each target undesirable, accurate fires can be planned by using the T41 range finder, elevation quadrant, and azimuth indicator.



Discipline is the sine qua non *of military life. Its existence depends upon a number of things such as leadership, personality, morale, training. One of the more tangible tools in the picture is military justice. The application of corrective measures at the small unit level is an important "stitch in time" phase*

Non-Judicial Punishment for Minor Offenses

by COLONEL DEAN E. RYMAN

"TAKE us the foxes, the little foxes that spoil the vines," counselled the monarch who chose wisdom—"an understanding heart to rule this people"—rather than riches or honors. Every leader of an armed forces' smaller-unit, tempted to be a little blind to the faults of men with whom he has direct contacts daily—faults commonly called "minor offenses," is urged to heed that admonition. For each such commander, those shortcomings are "the little foxes that spoil the vines": discipline and military efficiency disappear, and his own failure is not far off, when misdeeds which seem relatively unimportant at the moment are habitually not punished.

For taking those little foxes, the President has directed free but intelligent employment of Article 15 in the Uniform Code of Military Justice, entitled "Non-judicial punishment." Each commander, in doing so, is expected to comply with the regulations that are found in Chapter XXVI of the 1951 Manual for Courts-Martial. The cited law, thus implemented, replaces "Company punishment" formerly used by the Army and the Air Force, as well as the Navy and Coast Guard device known as "Captain's mast." This new authorization for summarily ordered penalties differs substantially from those now obsolete sanctions. Be alert!

Minor Offenses

Congress has limited non-judicial punishment to "minor offenses," an undefined term commonly believed to refer to those unaggravated instances of misconduct, primarily prejudicial to good order and discipline rather than criminal, for which a summary court-martial trial would be appropriate. The Commander-in-Chief has confidence in the ability of each smaller-unit leader to determine whether a particular misdeed is one of that sort. Senior commanders rarely interfere, unless the act non-judicially punished is one for which a punitive Article of the new code authorizes the execution of the offender, or unless that act could be punished under a Federal statute by confinement for one year or more, or unless it is tainted with moral turpitude. The President has flatly forbidden that sort of penalization in all such instances, no matter how weak the proof or how great the known extenuation.

The punitive Articles that denounce capital offenses are: 85, 90, 94, 99-102, 104, 106, 110, 113, 118, and 120. All are adequately explained in Chapter XXVIII of the current Manual for Courts-Martial. Most officers can easily avoid violating the first prohibition by reading these Articles about once every six months. As to some of them, which can be committed only during a time of war, it is advisable to read the cited explanations also; but each forbids action readily recognizable as a grave felony rather than a minor offense. All the other punitive Articles, except 86, 87, and 89—AWOL and disrespect, condemn misdeeds punishable by confinement for one year or more, though some of them also forbid behavior not subject to such severe retribution. Get familiar with all—I mean *all*—the facts of the misconduct under scrutiny, select the Article you deem violated—usually No. 134 (AW 96) when non-judicial punishment is likely to be permissible, and then turn to page 224 of the Manual (Table of Maximum Punishments) where you can easily see whether the second prohibition prevents the course you contemplate. If either execution or confinement for one year or more is possible—however *improbable*, non-judicial punishment is forbidden.

Larceny, passing bad checks, forgery, and maiming have been declared by the President to be tainted with moral turpitude. Respectable authority can also be found for so considering all misdeeds in the committing of which there is fraud, as well as most sexual offenses, libel or

---

DEAN E. RYMAN, Colonel AUS, Retired, is legal adviser in the office of Transportation Division, Headquarters United States Army Europe. He has written several articles for ARMOR on the subject of military justice.

slander, aggravated misappropriation less than theft, unauthorized distribution (or even unsanctioned possession) of habit forming drugs, false swearing—in or out of court, spreading subversive propaganda orally or otherwise, and in fact any misconduct which discloses the culprit to be base, vile, or depraved.

A commanding officer has some discretion to decide whether moral turpitude taints an act under his scrutiny. The culprit's intent is often controlling. Thus, careless handling of a fund—there being no effort to obtain a personal gain—reveals no moral turpitude and is punishable summarily; but the mere act of presenting an unwarranted pecuniary claim against the government, there being neither ignorance nor mistake, does show that quality and must be penalized (if at all) by a court-martial. The commander's discretion ends when he has observed moral turpitude in the act under examination or should have recognized its presence there. His non-judicial punishment order issued afterwards (like one in a capital case or where a full year's confinement is possible) will be totally void, not merely subject to correction on a timely complaint.

Per se vs Prohibitum

Behavior which is objectionable only because competent authority has forbidden such an act, either generally or at certain times or in stated places, is often non-judicially punishable as a minor offense. Consider the effect of the conduct under review upon the discipline or reputation of the unit. Give due weight to its nature, to when and where it happened, as well as to the persons by whom the act was committed and against whom it was directed. But be sure that what the suspect has done is not wrong for some other reason than because "there's a law against it." Rarely is an act which people usually consider inherently evil (malum per se, as the lawyers say) punishable non-judicially; but those actions which folks quite generally treat as mere peccadillos (that is, malum prohibitum) usually can be so penalized.

Escape, willful disobedience, interference with a sentinel on his post, and protracted absence without leave are presumptively not punishable non-judicially. Being drunk and disorderly can often be so considered, and so may many assaults whereby no real physical harm occurs. Whether the misconduct is a military offense—one which directly tends to hamper or disrupt the orderly operation or administration of a military unit, or a civilian offense—one which is a threat to the peace or welfare of the community, is of little importance. Apply the rules and principles I have mentioned with respect to minor offenses: then, if not sure of your decision, here is the way to test it.

First, be certain you have all the relevant facts, because a lawful though inadvisable order directing a non-judicial punishment (if enforced) bars a subsequent trial by a court-martial for the same offense, and it warrants mitigation of such a tribunal's sentence for another offense involved in the same incident. Then turn to the Table of Maximum Punishments, and withhold such an order when more than sixty days of confinement (disregarding the Table of Equivalents) is possible for the misbehavior shown by the facts you gathered. Unless, of course, there is exceptionally strong extenuation thus disclosed; though one should ordinarily then punish non-judicially for a lesser offense involved in the incident. This constitutes but a rule-of-thumb, without legal sanction; but it works. The result of using it generally satisfies a superior who has shown an interest in what you did with a particular case.

Procedure

None but the uniformed members of a command (its military personnel, that is) may be non-judicially punished. The law is now in accord with long usage. Penalties that may be summarily imposed on convicted persons, prisoners of war, and others —particularly by the Captain of a ship at sea—are lawful because of other authority than that found in Article 15 UCMJ.

Every non-judicial punishment order must be given by a person between whom and the culprit there is a command relationship at the moment the order is spoken, regardless of a different status earlier or later; and as a matter of policy, by the authorized officer most immediately in command over the accused who is not prevented therefrom by any regulation or by an order of a superior. In all the armed forces, such an order is normally given by a commissioned officer, or in the Navy or Coast Guard by a commissioned warrant officer; but it has been semiofficially declared that by virtue of Article 15 *b, c* UCMJ a noncommissioned or petty officer (if designated by the Secretary as an officer-in-charge) may non-judicially punish: a questionable conclusion, methinks. That the imposer of the penalty and the offender belong to different armed forces has no legal significance, if they are actually in a commander and follower relationship to each other for disciplinary and administrative purposes; but a glance at the regulations for reciprocal court-martial jurisdiction is an eloquent warning that use of non-judicial punishment in such a case is likely to be frowned upon. A staff officer (as such) cannot summarily punish anyone lawfully.

Immediate Action!

It is immaterial where the offense was committed. The date of the misconduct, if within the culprit's current period of service and not over two years before the non-judicial punishment order is given, has no legal significance; but a clear-thinking commander rarely penalizes summarily for misbehavior of which he has had notice more than a week. Immediate action is of the essence of success in such matters.

The punishing commander must personally decide whether a non-judicial punishment is warranted; and if so, he must order the retribution himself, preferably in the presence of the culprit. All other actions in accomplishing such a penalization may be done for him by other persons; but a smart commander will do as much as possible for himself. He knows that enlisted men will not long remain mistaken as to who actually punishes or rewards them, and he cannot afford to give them any basis for thinking it is anyone other than himself.

Each non-judicial punishment order in the Army or Air Force has five prerequisites. There must first be a thorough and impartial investigation —usually conducted informally and without the accused present until the last, if at all. Then a notice must be given to the culprit (written, if he is an officer or warrant officer) that his commander intends such a penalization, and for what offense; which second requisite calls for the third one—an express or necessarily implied waiver of trial by a court-martial, after a reminder of that right and a reasonable time to consider the choice. The fourth step (optional with the accused) is a submission of facts "in mitigation, extenuation, or defense"—an indorsement on the original notice when that is written, otherwise oral or written as the accused may choose. The fifth and final requirement is an inquiry by the commander concerning what is thus submitted, unless the latter already knows those facts to be true and so informs the accused.

Navy Procedure

In the Navy or Coast Guard, a non-judicial punishment order may be issued upon reading the report and approved findings of a court of inquiry or a board of investigation, when the accused has had a chance to present his side of the incident to such court or board. In other cases, the accused is notified—orally or in writing—to present himself "at the mast" or he is conducted there. Upon arrival he is told what misbehavior by him is of immediate concern to the commander, who is then bound to conduct a thorough and impartial inquiry with the accused present, which inquiry must include whatever facts "in mitigation, extenuation, or defense" the latter chooses to assert. If the suspect is an officer and no court or board proceedings are being used, a written notice of intent and that officer's written response, as in the Army or Air Force, but done in accord with Navy or Coast Guard correspondence directives, is lawful. There may be an actual hearing "at the mast" instead of such action, or to supplement the same, in the discretion of the punishing officer; and there is likely to be one if the accused does not admit the asserted misbehavior or when he asserts facts "in mitigation, extenuation, or defense" which the commander does not concede to be true.

All questioning of the accused is to be in conformity to Article 31 UCMJ: that is, there is to be none at all unless he is warned of his rights thereunder and then answers voluntarily. Note, however, in this connection and with respect to other procedural matters, that no relief from a commander's improper action is possible in the absence of clear proof of an injury to a culprit's substantial right which was neither expressly nor impliedly waived by him.

Punishment Orders

Unless the original notice was written, the punishment order is oral: in those other cases, it is written as required by departmental correspondence directives. All oral orders, and such of the others as the immediate commander of the accused wishes, are to be registered in accord with paragraph 135*b*, and appendix 3*a*, MCM '51; but (in practice) there is no penalty for not doing so, or for carelessly complying, or for losing the record—all of which often happen. The plan is a mere memory-jogger for one who already knows of the case: it is substantially valueless to a successor, or to a superior who seeks to learn how the culprit's immediate commander has habitually used his power.

Enforcement is the immediate commanding officer's responsibility, but most of the necessary action is taken by his noncommissioned subordinates. The culprit has two ways to avoid the punishment—an appeal or a request for clemency—neither of which will ordinarily be successful or even stop immediate action to put the penalty into effect. He must be told of the first—an appeal—when he is informed what the punishment order requires; but the other is one of which he learns the best way he can.

An Appeal is a military letter to "the next superior" of the officer who made the order. It is handed to the offender's immediate commander who must forthwith forward it with such an indorsement as he deems appropriate. Nothing can be urged in such a letter but that the penalty is too severe; and a prompt decision by the officer addressed is mandatory. His ruling is final, but he can grant no relief other than suspension, mitigation, or remission of unexecuted portions of the order.

The offender's request for clemency, also a military letter, is addressed to the officer who imposed the punishment, or to his successor, or to any superior rather than "the next superior," at the option of the applicant. It normally goes to the immediate commanding officer first and is ordinarily forwarded—unless obviously without merit, which no commander will hastily conclude—until it reaches a commanding officer who has access to a staff judge advocate and usually has general court-martial jurisdiction also, though any intermediate commander may take action thereon. By such a letter any commonly known basis for clemency —including serious procedural errors and even a reasonable doubt of guilt —may be urged. Action is discretionary thereon, and when taken it is final except for a possible use of Article 138 UCMJ—Complaint of wrongs; but it may include restoration of any right or property (say, forfeited pay) affected by the non-judicial punishment order.

Permitted Penalties

Seven sorts of non-judicial punishment are sanctioned: first, withholding of privileges; second, restriction to certain specified limits; third, forfeiture of the pay of an officer or warrant officer; fourth, extra duties; fifth, reduction in grade; sixth, confinement—when on a ship; and seventh, admonition or reprimand. As heretofore, the seventh may be combined with any other one; but contrary to the former rule, only one of the six may be used for a single offense: pro-rating several within the authorized period is not allowed.

Each of the permitted penalties had a counterpart (identical or closely akin) in one or more of the armed forces, but none had them all. Probably some other punishment "similar in nature" to one of these is lawful, as it was under the 104th Article of War; but I have found no record of any commander having devised such a penalty and having gotten official approval for it as one "similar in nature." Better not attempt to do so. All "cruel and unusual" penalties are forbidden.

Whatever the grade or rank of the offender, any one of the privileges he ordinarily enjoys—but not several of them, either at the same moment or seriatim—may be withheld for as long as "two consecutive weeks." It is not unlawful, however, to order a par-

ticular privilege withheld just because enforcing that order will have the practical effect of denying the culprit enjoyment of some other privilege.

The words "two consecutive weeks" mean fourteen days one after the other with no interruption, the first being the day on which the order is issued, or on which the culprit learns of its provisions when that is on a different day. A fraction of a day must be counted as a full day; and each of the fourteen (or less) days ends at 2400 hours, unless the punishment order otherwise provides without exceeding the maximum period. Treating the first Reveille after the directed number of days as the end of the punishment, and having each day end at Retreat or Taps, must now be expressly ordered and be capable of enforcement without using more than the allowed time, if that sort of computation is desired.

Rights or Privileges?

Rights must not be withheld as non-judicial punishment: but to distinguish a right from a privilege is not always easy. Most folks treat as a privilege any optional action allowed to all well-behaved military personnel as a matter of normal procedure, with or without a request or pass though often only in accord with a plan stated in some directive. A right, on the other hand, is an optional action which has accrued to a particular person by reason of his having accomplished extra tasks or because he has performed his ordinary duty exceptionally well—for the previously declared purpose of enjoying that action, after having been told on what terms it would be available to him.

Before using this penalty, ascertain which privileges a particular culprit values: then deny him the one likely to cause him the most discomfort. Blindly forbidding him to do something his fellows can do, without knowing whether he especially wishes to join them, is not showing good sense: such an order may have no corrective power at all. Your non-commissioned officers should know his habits; and so should you in a short time, if you really want to succeed.

That suggestion is particularly pertinent when withholding the privilege of leaving the post—a deprivation which the law calls "restriction to certain specified limits" and unduly dignifies as a separate non-judicial punishment. Learn where the offender would probably go (on or off the post) if he were free to proceed where he may desire; and then order him to stay in some other place of such size and location as may be appropriate to his guilt. Describe the place so carefully that he cannot unintentionally cross the bounds, else you may have trouble should a trial for breach of the restriction become necessary. Provide for his messing, bathing, exercise, and use of latrines: these must not be heedlessly or entirely denied.

Lest a restriction prove a welcome relief from current drudgery, enforcement only during "off-duty" hours should be directed. That long-established practice is now clearly authorized. What (if anything) has happened to the presumption that when a commander did not mention the subject a restriction prevented all duty outside the specified limits is not stated. A suspension from duty will usually make the punishment smart less—not more; for such a direction plainly does not affect the culprit's pay. A ruling to the contrary would mean several things which ought not to rest on inference alone. It would mean that an enlisted man's pay could be forfeited indirectly but not openly; that a commander not authorized to forfeit the pay of an officer or a warrant officer could do just that in defiance of the statute; and that in any case the restriction would be two penalties, though the law says plainly that only one may be used.

Arrest or Confinement?

Arrest in quarters is not "similar in nature."

Enforcement of a restriction by locked doors or a special guard makes it confinement, which is permitted only on shipboard and must be selected as the penalty at the outset.

No military personnel could be summarily deprived of pay as punishment before March in 1917. Thereafter, for 32 years, that could happen to Lieutenants and Captains "in time of war or grave public emergency." Then during twenty-eight inglorious months after the first of February 1949 we tried (with little success, I hope) to turn all officers below Brigadier General, and all warrant officers, into toadies or scoff-laws by the day-in and day-out forfeiture provision enacted in 1948. Under the UCMJ (still as a routine practice, not as a war or emergency measure) it will be permissible to take one-half a month's pay from any officer (Generals and Admirals included), or from any warrant officer, as punishment for a minor offense, when the order is given by an officer having general court-martial jurisdiction—who will presumably have enough judgment to use the power only on rare occasions.

With Absolution

The mere existence every day, for all the armed forces, of a substantially painless way to avoid well-deserved consequences augurs ill for our ancient policy of requiring officers to conduct themselves in conformity to a stricter standard than others were required to meet. Its effect can scarcely be other than that of a Police Violations Bureau, where offenders may pay a relatively small sum and depart with absolution: a scheme tolerable in a civil community only when lawlessness in small matters is so common the courts cannot cope with it. When that situation, coupled with the widespread lack of self-discipline which always fathers it, strikes a military command, real trouble for its leader, from the people who have put that command into uniform and are paying its cost, is not far ahead.

"Extra duties"—an undefined term—"for a period not to exceed two consecutive weeks, and not to exceed two hours per day, holidays included" is the new code's authorization for compulsory labor as a summarily imposed punishment. It can be used only for enlisted offenders. Labor which serves no useful purpose toward accomplishing the command's current mission must not be ordered. Noncommissioned and petty officers cannot be ordered to perform any duty other than one of those ordinarily undertaken by such persons who have conducted themselves properly. In lieu of flatly forbidding (as heretofore) the imposition of "military duties" as a punishment, the current prohibition is limited to "formal military duties" and to those "requiring the exercise of a high sense of responsibility"; but every wise commander will be hesitant to thus utilize any duty that is distinctive of the ancient and honorable profession of arms. As in the past, furthermore, a culprit's ordinary duties—particularly those of a clearly military nature—must have precedence over his performance of labor as a punishment.

Familiar practices of the Army and the Air Force with respect to enforcing "extra fatigue" and "hard labor without confinement" are obsolete. The daily maximum of two hours will usually rule out even such tasks as kitchen police and escort for the rose wagon, as well as others wherein physical exertion is the chief ingredient: one just cannot get such jobs finished so promptly. I've talked to officers of the Navy and the Coast Guard, the Services which previously had this summary penalty: they all seem remarkably unfamiliar with the limitations I have cited—especially the daily maximum. Any smaller-unit commander in any of the armed forces who uses this penalty effectively, having a due regard for the rules and principles applicable, should be hailed "A Daniel come to judgment! Yea, a Daniel! O wise young judge how I do honor thee!"

Reduction

"Reduction to the next inferior grade," a penalty said to work well in the Navy, is now available for punishing enlisted men in the other armed forces. It looks remarkably like a servant the Army discharged without a "character" many decades ago, because of a very general observation that an experienced soldier who has lost his stripes is usually a serious liability. Little can be said for this punishment as a morale and discipline builder which cannot also be said with respect to paying the installments on an engagement ring after the girl has married a rival.

Paragraph 131*b* (2) (c), (3) (c) MCM '51, with the aid of undisclosed departmental regulations—probably because too subject to change, indicates (consistently with Article 15*a* (2) (D) UCMJ, I hope) which commanding officers can use this non-judicial punishment power in a particular case. Never employ it without a current review of the directives of your own armed force concerning how a member thereof may be raised to the grade then held by the culprit you plan to "bust"; and if you are in the Army, you must have a place in its hierarchy above that of Captain, when the culprit is an NCO. Be cautious: though the voice is Jacob's the hands are those of Esau. You are neither old nor have your eyes grown dim—since you are still on active duty; but can one say as much for the Congress which voted this penalty (tantamount to a stinging forfeiture of pay) after having repeatedly—even when enacting the UCMJ—rejected unqualifiedly an open and above-board forfeiture of the pay of enlisted persons?

Confinement

Confinement, heretofore unknown to the Army or the Air Force as a summarily imposable punishment for "minor offenses," is now authorized in two forms for that purpose, in deference to the Navy, when the culprit is an enlisted man "attached to or embarked in a vessel" but is neither a noncommissioned nor petty officer. It may be ordered—presumably with hard labor but full rations—for not to exceed seven consecutive days, or "on bread and water or diminished rations"—which (in pratice) must mean solitary confinement in order to be effective—for not to exceed three consecutive days. A fraction of a day at the beginning or end of a period must be counted a whole day; and each day within a specified punishment term ends at 2400 hours, unless otherwise specifically ordered.

Some commanding officers of the Army and the Air Force, en route overseas by a protracted zig-zag course with twice as many enlisted men aboard as could either be decently accommodated or kept busy, have fervently (albeit irreverently) expressed desires for a much larger brig than can be found in any transport. But when again safely ashore, they have easily been re-convinced that neither of these forms of confinement will really be needed for "minor offenses," especially the latter which we have long deemed appropriate only for hardened recalcitrants.

Undoubtedly, most of you have encountered commanders who admonish with more vigor and sharpness than characterize reprimands by others: there is no sure way to tell these punishments apart, no particular language being required for either. Wise commanding officers administer them both orally and in private, even when the censure must also be written and sent through channels; else these penalties lose much of their immediate corrective force. Such commanders will eschew terms that are equally applicable to any misbehavior; their comments will fit both the misconduct and the culprits; they will avoid repeating remarks recently uttered—especially, if published also—in criticism of actions by other offenders; and of course, they must never stoop to profanity or vulgarity, whatever the mentality of the offender then being disciplined. Abusive remarks will not be permitted.

Unless a particular commander's enlisted subordinates respect and trust him far more than is customary, these penalties are useless against them. Best not to ever consider admonition or reprimand for persons below the first three enlisted grades, and as to the latter only rarely. Be cautious also as to officers and warrant officers, with respect to whom the punishments must be written, for admonitions and reprimands may appear years later in a personnel file, to adversely affect a well-earned promotion or a desired assignment, long after the relatively inconsequential incident that brought them into existence has faded from memory.

A Man's Place . . .

All these seven punishments are intended only to promptly discourage troublesome but not wicked misbehavior by those who cannot (or will not) take a man's place in the activities of their unit, or who yield frequently to an inclination for prohibited action which is not inherently evil. Such penalties are designed to take the little foxes that spoil the vines, and should not be expected to do more; nor should there be resort to them for controlling the same man, more often than once a month or thrice in any calendar year, even when a superior will permit so much employment of non-judicial punishment. If that amount does not suffice, a court-martial or a separation board is probably needed—if not a new commanding officer for the outfit.

You Need Tanks to Train Tankers!

by CAPTAIN ROBERT S. CUTHERELL

THE title chosen for this article states a basic truth known to all experienced personnel responsible for any part of the training of tank crewmen. There are the two extreme positions to be taken concerning tank availability in an armored unit during its infancy. The first, and obviously unsatisfactory position, is to try to train an armored unit without tanks. The opposite position is to train with all the tanks authorized under a particular TO&E. This, too, is unsatisfactory because during the earlier stages of training, the majority of personnel normally assigned are not capable of performing adequate maintenance. Such an authorization would also detract from the normal training mission, if imposed at an incorrect time. The position in between these two extremes is the area that is often the most perplexing when tied in with the training mission and consequently necessitates the greatest study and analysis.

The Army Training Program (ATP) under which advanced individual training is currently conducted in an armored division is ATP 17-201 (Mobilization) (Tentative). This eight-week training program of 384 hours has been chosen for analytical treatment, due primarily to the fact that during this period fillers are trained to perform assigned tasks as tank crewmen. Inasmuch as tankers completing this phase of training may be designated as cadremen for the formation of other armored divisions or as replacement personnel for all types of armored units, it is obvious that this period is of importance under a rapid mobilization, aside from considerations of providing tank crewmen for duty within the eventually developed parent armored division.

It seems axiomatic to state that each S-3 charged with the supervision of training under ATP 17-201 should make a detailed, and perhaps weekly, analysis of this program and inform his commanders accordingly. The first and basic problem and one which is not readily apparent, is the question of the number of "tank-hours" instruction time the ATP directs. (The term "tank-hours" is used to signify the number of hours instruction on a topic requiring the physical presence of a tank. It is determined by multiplying the instructional hours in any one topic requiring tanks by the desired tank strength in the units.) *This question has not been answered by the ATP!* The S-3 will search in vain for an equipment authorization linked with and correlated to this ATP. In the absence of a standard, commanders must formulate their own in order to achieve the assigned training mission.

A negative approach will perhaps best illustrate the difficulty the commander can expect if his S-3 is so unwary as to fail to find a solution to the problems of correlation between vehicular (primarily tank) status and training analysis.

The ATP specifies 384 hours of instruction during an 8-week period. For planning purposes, the accompanying Master Training Schedule indicates the assignment of subjects by week utilized by units under CC "A," 1st Armored Division, during the Advanced Individual Training period.

For the purpose of the desired analysis, it is pertinent to note that each of the 384 hours may be divided *primarily* into one or more of three categories, the first two according to vehicles (primarily tanks) and the third according to time:

I. Instruction requiring tanks (*i.e.*, Driving Instruction, Operation and Maintenance of Tank Guns, etc.).

II. Instruction *not requiring* tanks (*i.e.*, Scouting and Patrolling, Binoculars and Mil formula) and capable of being shifted from one week to another and earlier week, without harm to orderly instruction or to the training mission. (*i.e.*, There are 59 such hours in ATP 17-201 or 15% of the time allotted to ATP 17-201.) For the purpose of this analysis this type of instruction will be referred to as "Fluid Subjects."

III. Instruction required within any one assigned week. (*i.e.*, Troop Information Program, now termed Command Conference Hour, Physical Training, etc.) For the purpose of this analysis, this type of instruction will be referred to as "Anchored Subjects."

The realization of these three categories of subjects provides the groundwork for an analytical technique which will enable the alert S-3 to keep his commander currently and adequately informed.

During the first week of Advanced Individual Training, 26 hours may normally be expected to be devoted to instruction requiring tanks and 22 hours of "Fluid" and "Anchored" subjects would complete the 48-hour training week. For this discussion I have assumed that a given battalion has an assigned tank strength of 25% of the TO&E, and 10-15% are inoperative during Advanced Individual Training. Chart I is helpful in illustrating an armored division's tank availability during Advanced Individual Training.

Experience has shown that 30% of the TO&E is desirable at this stage of training. To accomplish the mission, therefore, it is apparent that 574 "tank-hours" of instruction are required. (Twenty-two–30% of the TO&E–tanks multiplied by 26 hours of instruction for the first week equals 574 tank-hours.) With an average of only 7 tanks per battalion it becomes apparent that to achieve the same training, 82 hours (7 tanks

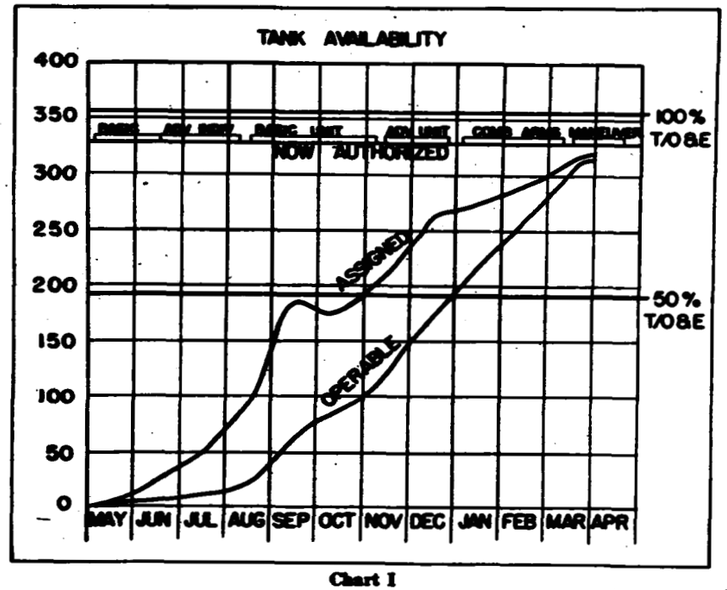


Chart I

MASTER TRAINING SCHEDULE
ADVANCED INDIVIDUAL TNG ATP 17-201*

SUBJECT	TOTAL	1	2	3	4	5	6	7	8
GENERAL SUBJECTS									
Dismounted Drill and Ceremonies	4			1				1	2
First Aid	1						1		
Map and Aerial Photo Reading	5			2	3				
Scouting and Patrolling	2				2				
Intelligence Training	3						3		
Marches and Bivouacs	2								2
Mine Warfare	5						3		2
Concealment, Cover and Camouflage	1								1
Inspections	8	1	1	1	1	1	1	1	1
Physical Training	20	2	2	2	3	2	3	3	3
Achievements Tests	2								2
Troop Information Program	8	1	1	1	1	1.	1	1	1
Recognition Enemy Armored Veh	1				1				
Hasty Fortifications	5								5
WEAPONS INSTRUCTIONS									
Turret Familiarization	3		3						
Disassembly and Assembly of the tank Gun	4	4							
Operation and Maintenance of the Tank Gun	4	2	2						
Power Traverse	3		3						
Gyrostabilizer	3		3						
Ammo Identification & Inspection	4	1	2		1				
Binocular and Mil Formula	2		2						
Direct Fire Sights	3		3						
Auxiliary Fire Control Instruments	3		3						
Crew Drill	4			4					
Gunners Preliminary Examination	16					16			
Range Determination	3			3					
Conduct of Fire	7			3	4				
Crew Non-firing Exercise	6			4	2				
Subcaliber Firing Manipulation and Shot Adjustments at Stationary Targets	8				8				
Subcaliber, Firing HE Miniature	6					6			
Service Firing w/Coaxial M6 while Tank is Moving	6						6		
Service Firing HE and Shot Adjustments	6						6		
Service Firing at Moving Targets	6						6		
Familiarization SMG	4							4	
Familiarization, MG Cal. .50	6							6	
Familiarization, Pistol Cal. .45	6							6	
DRIVING AND MAINTENANCE									
Preliminary Instruction	24	16	8						
Driving Instruction	48	6	6	6	6	6	6	6	6
Crew Maintenance	32	4	4	4	4	4	4	4	4
Weekly Maintenance Service	32	4	4	4	4	4	4	4	4
Night Driving	18							9	9
COMMUNICATION INSTRUCTION									
Radio Telephone Procedure	6		2	2	2				
Operation and Maintenance of Radio	8	1	2	2		3			
Radio Nets	1	1							
Operation of Tank Interphone Systems	1	1							
Field Messages	2	1				1			
Wire Communication	2				2				
Commanders Time	30	3	3	3	4	4	4	3	6
TOTALS	384	48	48	48	48	48	48	48	48

*(Note: This Master Training Schedule was used for planning purposes in CC "A," 1st AD, but was adjusted as required by the availability of ranges, training areas, etc.)

CAPTAIN ROBERT S. CUTHERELL is a Reserve officer who has just completed a two-year active tour, most of which was as S3 of CCA, First Armored Division, Fort Hood, Tex.

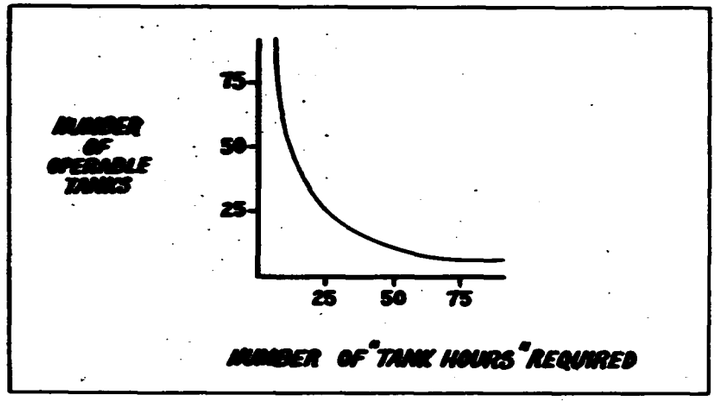


Chart III

times 82 hours equals 574 "tank-hours" of instruction) must be utilized with the available tank strength to produce the desired training result.

To accomplish this training during the first week plus 22 hours of "Anchored Subjects" (all hours other than these requiring tanks in the first week are considered as "Anchored" due to the definition "that they are capable of being shifted to an earlier time *only* during the 8-week period) is obviously impossible. Therefore a decision must be made as to what part of the tank training is to be accomplished during the first week, and what part deferred until a later date.

To utilize the tanks assigned and operable on a basis reasonably calculated to produce trained tankers, it then appears desirable to allocate approximately 6 hours' instruction requiring tanks during the first week and assign 20 hours of "Fluid Subjects" (borrowed from their normally assigned places in the later phases of training). This, combined with 22 hours of "Anchored Subjects," would then constitute the first week of training.

An analysis for the second week of training reveals that 5 hours of instruction are devoted to topics not requiring tanks, 32 hours of instruction requiring tanks, and 11 hours of "Anchored Subjects." Assuming no notable increase in tank strength and based upon an analysis similar to the third week, I submit that it would become necessary to borrow 24 hours of "Fluid Subjects" from the instruction assigned to later weeks of ATP 17-201. This of course leaves only 10 hours of "Fluid Subjects" to borrow during the last 6 weeks.

With no substantial increase in the tank strength, an analysis of the third week reveals 12 hours of "Anchored Subjects," 8 hours' instruction not requiring tanks, and the remaining 28 hours requiring tanks for instruction. It is apparent that we can instruct only for 7 hours with our present tank strength. Even if we decide to borrow the final 10 "Fluid Subjects" and assign them to the third week, it becomes apparent that we are short 11 hours' instruction, for which period the ATP does not suffice or specify an answer. What is the answer?

The situation described in the analysis of the third week is precisely where CC "A," 1st Armored Division found itself during the third week of Advanced Individual Training. The only practicable answer was to re-train in subjects appearing deficient, and direct such substitute tank training as was allowed by the availability of training aids and qualified instructor personnel. The real problem, of course, faced CC "A" in the weeks to follow, testing the ingenuity and efforts of all commanders. It was only expert and determined leadership in the later stages of this critical situation that permitted S-3's to warn their commanders at appropriate levels, thus minimizing the resulting deficiencies.

There are other implications beyond the scope of this report. I refer to the commanders' estimate of the unit preparedness. Long a subjective concept, this estimate could become more meaningful and capable of objective analysis if a specified "Tank Phase-in Program" were part of the ATP. It would appear, too, that a unit retaining the personnel trained under such obstacles would be able to overcome any resulting deficiencies at a later date, which was the situation encountered by units within the 1st Armored Division. If, however, individuals were to be taken out at the end of such Advanced Individual Training in a period of rapid mobilization or as required for overseas replacement, the inevitable result would be tankers in name only.

THE BOOK SECTION

THE SHOULDERS OF FAITH

GEORGE WASHINGTON, Volume V. By Douglas Southall Freeman. Scribner's, New York. $7.50.

Reviewed by
LYNN MONTROSS

Remote as the American Revolution may appear, it is closer in some respects than the Civil War to our military experience of the present century. This is the moral of Volume V of Douglas Southall Freeman's biography of George Washington, covering the five years and eight months from the French alliance to the postwar months of 1783.

Washington, in short, had to get along with foreign allies, even as Pershing in 1918 and Eisenhower in 1945. And any commander who has made the best of that situation knows that colleagues of alien nations may have little in common save a chafing yoke.

Not many readers of Dr. Freeman's minutely documented study could continue to view Washington's war as a simple struggle because it was waged by little armies with weapons now gathering dust in the attic of progress. "It is an educational mistake," says the biographer in his introduction, "to assume that the small scale and antiquated tactics of the Revolutionary War make it unworthy of examination by students, professional and amateur. All the perversities of human nature that bedevil a commander and some examples of stubborn pettiness almost unique, are to be observed in Washington's campaigns. . . . Much of the military history of the years reviewed here is rich, also, in illustration of what happens to supply and to public finance when war weariness overtakes a people. Still more is to be learned about the maintenance of amity and co-operation between wartime allies."

The period covered by Volume V takes Washington from the age of 46 nearly to his 52d birthday. He had reached the peak of his intellectual powers while retaining a noteworthy degree of physical vigor and endurance. On one occasion he rode 60 miles in a day, and during a postwar trip to the West the 51-year-old tourist traveled 750 miles on horseback in nineteen days.

Even the durable Washington might have been dismayed, however, if he had suspected at the time of the French alliance that five more anxious years of war stretched ahead. Nearly three years of experience lay behind him—years in which he had at least kept an army in the field until Gates' victory at Saratoga brought France into the war as an open rather than secret ally.

During this apprenticeship Washington was defeated in his three largest battles, Long Island, the Brandywine and Germantown. On the other hand, he had won the admiration of his opponents with his brilliant little Trenton-Princeton operation—a double play that saved the game when it appeared to be irrevocably lost.

The father of his country has sel-

The Author

Dementi Studio

Douglas Southall Freeman is one of the leading historians of the day. Editor and lecturer, he is author of such standard works as the noted four-volume biography of *R. E. Lee* (1934), and a three-volume *Lee's Lieutenants* (1942-44). He is now engaged in writing the biography of George Washington, a multivolume work of which this is the fifth.

The Reviewer

George Y. Brothers

Lynn Montross is a newspaperman and novelist who turned to the study of history and soon established his reputation in this field. He is the author of several books on the Revolutionary period, including *The Reluctant Rebels* (1950) and a new volume reviewed here recently, *Rag, Tag and Bobtail*. He is now with the Historical Division, USMC.

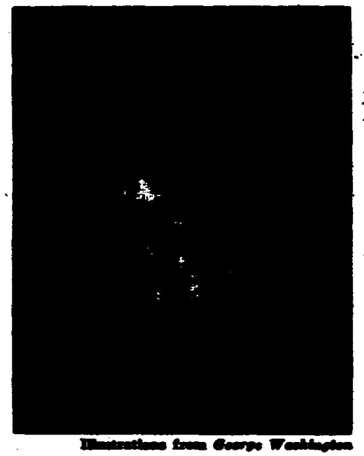
dom been lauded as a top-drawer general even by critics who credit him with great leadership. This negative verdict appears to be supported by the results of Monmouth. Two months after the news of the French alliance, Washington muffed perhaps his greatest opportunity for a smashing battlefield triumph. General Sir Henry Clinton, retreating from Philadelphia, presented the flank of a column ten miles long. Washington, taking a parallel route with equal numbers of about 10,000, led his largest force so far of trained troops —the Continentals drilled by Steuben at Valley Forge. American morale was high, and even the terrific June heat favored an army in shirtsleeves to beat overburdened redcoats.

The great Napoleon was indecisive on several fields a generation later, so that Washington may perhaps be pardoned for the irresolution that made Monmouth an empty and disappointing American victory. Dr. Freeman finds extenuating circumstances, but the fact persists that American attacks were delivered piecemeal and the British were the aggressors at critical moments. Clinton had double the American losses but he brought his vulnerable column through safely to New York.

It was at this time that Washington hit upon the fixed idea which led down the years to the winning of American independence. Saratoga had brought the French alliance, and he aspired to another Saratoga made possible by that partnership.

Washington had no expectation of strangling another Burgoyne who ventured too far from his base of

Benedict Arnold . . . smiling.



Illustrations from *George Washington*

THE GREATEST HOUR OF WASHINGTON THE SOLDIER. Washington at Yorktown with Lafayette and Tench Tilghman. A column of French and American troops has just passed in review. Tilghman has in his hands the articles of Cornwallis' capitulation, which he is to carry to Philadelphia for formal presentation to Congress.

supplies. The new Saratoga was to be a Franco-American naval and land operation at the expense of some British general (the name to be filled in later) trapped on the seacoast. British naval power had doubled the effectiveness of the invaders, and Washington proposed to give them a dose of their own medicine with the aid of the French fleet.

This was the beginning of a series of frustrated attempts to gain the decisive co-operation of French admirals. D'Estaing failed Washington shortly after Monmouth when the rebel commander planned to bottle up the British in New York, with his army closing in by land while the warships blockaded the harbor. The French admiral pleaded that the water was too shallow off Sandy Hook, though this excuse was challenged a century later by Mahan.

Washington rebounded with the proposal that his ally try again at Newport, where another British army was ripe for the plucking. This time a tempest intervened just as d'Estaing was about to fight a British squadron coming to the rescue. Afterwards the French admiral was unopposed, the storm having scattered the enemy ships. But d'Estaing abandoned the campaign and put into Boston for refitting, so that another opportunity went glimmering.

Sullivan, commanding the American land force, was so outspoken in his resentment that it took all of Washington's tact to patch things up with Count d'Estaing, a nobleman of volcanic emotions. Cordial relations were restored, nevertheless, even though a Boston mob showed its disapproval by killing a French officer.

Savannah was the scene of the next fiasco. Again Washington was not present, and Lincoln commanded the American contingent when d'Estaing's fleet arrived from the West Indies in the autumn of 1779. This time d'Estaing was dilatory when he should have been decisive, and impulsive when prudence was indicated. He allowed Lincoln little voice in major decisions, and the Franco-American attackers met a bloody repulse.

Once more Washington had to pour oil on the recriminations of his countrymen. The following winter was the most dismal of the war, and the starving little army at Morristown suffered worse hardships than those of Valley Forge. The word "logistics" was not then current, but it took all of Washington's leadership to scrape up enough supplies to keep the cause from perishing. He had to cope with the discontents of officers and war-weary lethargy of civilians while cherishing the French allies who represented his only hope of victory.

The strength of character which brought the commander through his trial is saluted by Dr. Freeman in the most eloquent passage of this volume:

"Patience, as always, was the stout-

Benjamin Lincoln—solid all the way through.

Hamilton—his the most brilliant mind.

est weapon of Washington in combatting the perplexities of circumstance and the perversity of man. He saw that the way to freedom in America was not a succession of night marches to Princeton and of frenzied charges down the main street of Germantown. It was not enough to feel the sleet of Trenton and the furious sun of Monmouth. Freedom was demand no less than reward. Part of the price was knowledge of the limitations of humankind, and readiness to reason with dull and stubborn mortals on the obvious as well as the obscure. Liberty meant iron discipline for the few because to the many it was license or laziness, plunder or non-participation. When tens of thousands grumblingly protested against the lightest load, the strong and the diligent . . . must carry burdens that only the shoulders of faith could assume."

Those shoulders enabled Washington to endure the winter at Morristown, the treason of Arnold, and the mutiny of the Pennsylvania line. Those shoulders enabled him to bear the added burden when his strategic plan met two more frustrations. Early in 1781 he hoped by means of French sea power to cut off one of the British forces raiding Virginia, but Admiral des Touches sent a boy to do a man's job when he parted with only three frigates of his squadron at Newport. Later he committed an adequate force, but too irresolutely for decisive gains.

Meanwhile the French army under Rochambeau in Rhode Island was being kept inactive for a year by British sea power. Not until the early summer of 1781 did it join Washington on the Hudson, giving him hopes of trapping Clinton in New York if Admiral De Grasse could (or would) come from the West Indies with the main French fleet.

Rochambeau not only acknowledged Washington as generalissimo but proved to be the most understanding of all the allies. American independence, as Dr. Freeman points out, owes an unacknowledged debt to this greathearted Frenchman. He fell in with the hasty change in plans when De Grasse promised aid in Virginia for a sharply limited period. Thus it was Lord Cornwallis instead of Clinton who was set up for the knockout blow.

Considering the communications of 1781, it seems an authentic miracle that the Franco-American army in New York and the French fleet in the West Indies were able to meet in Virginia while Lafayette on the spot kept Cornwallis "amused" with his outweighed little army. The odds were against a timely junction, but fortune appears to have been atoning for Washington's buffets of the dark years. He had a moment of agonized despair, it is true, when De Grasse decided at the last minute to withdraw and offer battle on the high seas to the British squadron. The admiral, as Dr. Freeman puts it, was of "that not unfamiliar type that has to be persuaded to do what he knows he ought to do and probably intended all the while to do."

Washington applied the persuasion on a visit to the flagship, and the outcome was the supreme triumph

St. Clair, loyalty versus suspicion.

Rochambeau, the most generous of allies.

of his dealings with foreign allies. De Grasse consented to give his unstinted aid, which meant that Cornwallis was in a bad way. For on this occasion Washington had the command of the sea and the two-to-one material superiority on land which the British themselves had enjoyed so many times during the war.

After four years of frustration, Washington was now about to see his fixed strategic idea molded into fact. Washington was about to bring off his Saratoga, and the name of it was Yorktown.

So overwhelming were his advantages that he could scarcely have lost after cutting British escape routes. Thus it was as a strategist rather than tactician that the man of massive patience won his greatest victory—a victory giving his generalship a claim to more applause than it has usually received from biographers. For if there was no Chancellorsville in his career, neither was there a Gettysburg nor an Appomattox.

Dr. Freeman is at his best as an appraiser of generalship, and the present work adds a great deal to the stature of a distinguished Washington biography. It is a pity, in fact, that Volume V did not appear in time to comfort Pershing and Eisenhower in their contacts with foreign allies. They would probably have agreed that the age of the flintlock was not so far removed, after all, from the day of the machine gun, the tank, and the bombing plane. For a balky ally can be just as obdurate today as in the year of Yorktown.

VON RUNDSTEDT
The Soldier and The Man
by Guenther Blumentritt

Here, neither a glorification nor a vindication, is the story of one of the dominant military figures of Germany by his Chief of Staff. Posing the question, "Why did the Army succumb to Hitler's influence?" the author shows the underlying psychological struggle between the old and new elements. Aloof from politics, von Rundstedt finds himself under orders from a Supreme Commander such as no General Staff had ever encountered.

The inside facts of the battle for Europe are disclosed—the command to "hold back" before Dunkirk; von Rundstedt's criticism of the regime; his removal from command and reinstatement; private thoughts on the orders he receives; the political intrigue following Rommel's appointment to command the Western Beaches, which undermined the entire German defence system on the eve of invasion!

Limited stock from England. $3.50

FRANZ VON PAPEN MEMOIRS

Franz von Papen's career has consistently reflected the fortunes of his country. As court page to Kaiser Wilhelm II he witnessed the traditional pomp of imperialism: as a prisoner in post-war labour camps —convicted by his own countrymen, though cleared of war-guilt by the Nuremberg Tribunal—he was a victim of the chaos following defeat. Between these two extremes he spent forty years at the centre of events, and whether the balance he maintained there was the result of a clear or an ambivalent conscience is still a matter of conjecture. No document that has come out of post-war Germany has covered so wide a field, and none has given a clearer picture of German policy at home and abroad during the first half of our century.

Limited stock from England. $6.00

BATTLE CASUALTIES: Incidence, Mortality and Logistic Consideration

This book presents data and concepts on the incidence, mortality, evacuation, and hospitalization of battle casualties, and on the need for medical specialists in forward areas.

Because of its practical emphasis the contents apply almost entirely to World War II. Comparatively little space is devoted to historical discussions and comparisons. Although written for the medical specialist, the book will be of interest to all whose military interest and duties involve estimation of battle casualties or preparation of plans for their movement and care.

by Gilbert W. Beebe, Ph.D., and Michael E. De Bakey, M.D. $10.00

The Other Side of the Hill
by B. H. Liddell Hart

A new English edition of the book published several years ago in the U. S. under the title *The German Generals Talk*. Revised with new and fresh material and enlarged over 60%, there are new chapters on Guderian, on Dunkirk and on Italy. In view of its major revision, which will not be published in America, and because of its value to students of military history, ARMOR makes it available as a service.

Limited stock from England. $2.50

The Road to Glory
by Arthur R. Thompson

After establishing the Purple Heart in 1782, George Washington presented it to but three American soldiers, the last in June, 1783, and then discontinued it as a military award. It was revived in 1932 after almost 150 years during which no decoration was given to servicemen in consequence of wounds in war.

Here is the authentic story of the third Purple Heart . . . the story of Daniel Bissell, a little-known but heroic and important figure in the American Revolutionary army, who operated as a spy behind British lines.

$3.75

WEAPONS
by Roger Marsh

Vol. I: Overture to Aggression
Vol. II: Red Sky

Two pamphlets on Russian small arms and aircraft guns, from 1848 to today. 39 pages and 275 illustrations.

By the set $2.00

Our World from the Air
by E. A. Gutkind

This superb compilation of over 400 aerial photographs offers an important new way of looking at our world. For the first time it seems to be observed as a whole in all its richness and diversity, its natural and man-made patterns of order and disorder. Visible, too, is the drama, past and present, of man and his estate as well as the earth's graphic warning against further abuse of "our plundered planet" by future generations.

400 halftones & maps. $7.50

Lincoln Finds a General
Volume III: Grant's First Year in the West

In Volume III Kenneth Williams turns back to the opening of the war and to Galena, Ohio, and traces through their first year, the series of events in the West which were eventually to carry a retired captain of the regular army to the position of general-in-chief. The War of the West is the War of the Rivers, the Mississippi, the Cumberland and the Tennessee. Volume III tells in full and fascinating detail the first year of the struggle as it has never been told before. Here are men and events judged in the light of telegrams and dispatches; here are the generals—Halleck, McClellan, Buell, Wallace and Thomas; the battle of Belmont, the capture of Forts Henry and Donelson—all the action in the West to mid-July, 1862, is described in detail.

Vols. I & II: $12.50 $7.50

Hear Me, My Chiefs!
by L. V. McWhorter

All-inclusive account of the Nez Perce Indians, a peaceable and prosperous people who, according to sources made available to McWhorter by Indian collaborators, were pushed into the Nez Perce War of 1877 through fateful forces. The major portion of the book is devoted to that dramatic struggle, the last great Indian war on this continent.

Illustrated. 656 pages. $10.00

The Comanches
by Wallace and Hoebel

The fierce bands of Comanche Indians, on the testimony of their contemporaries, both red and white, numbered some of the most splendid horsemen and light cavalry the world has ever produced. For more than a century and a half, since they had first moved into the Southwest from the North, the Comanches raided and pillaged and repelled all efforts to encroach on their hunting grounds. The Comanches fought the Texans, made off with their cattle, burned their homes, and effectively made their own lands unsafe for the white settlers. They fought and defeated at one time or another the Utes, Pawnees, Osages, Tonkawas, Apaches, and Navahos.

381 pages. $5.00

Official U.S. Army History

KOREA–1950

This book records by text and photographs the first six months of the conflict that began in Korea on 25 June 1950. The volume, dedicated to the American soldier and his comrades in arms, is divided into five chapters. The first gives a brief summary of the history of Korea and outlines the events that led up to the invasion of South Korea by the armed forces of North Korea in June 1950. The last four chapters narrate the military action from the time the first few U. S. troops arrived in South Korea to help the Republic of Korea Army repel the North Koreans to 31 December 1950 when the troops of the United States and other United Nations regrouped south of the 38th parallel for a new drive on the communist forces.

USE THE ORDER FORM BELOW — **PAPER BOUND $1.25**

ORDER FORM BOOKS LANGUAGES ALBUMS — *Armor*
1719 K Street, N.W., Washington 6, D. C.

Please send me the following:

_____

_____

_____

_____

_____

_____

NAME (Please Print)

ADDRESS (Street or Box number)

CITY (Town or APO)

STATE

☐ I enclose $.....
☐ Bill me. (Subscribers only.)
☐ Bill unit fund.