

The
FIELD ARTILLERY
Journal



AUGUST, 1944

ARMY REGULATIONS

? ?

- Think they're complicated?
- Hard to keep up with changes?
- Waste time going from book to book?
- Too many forms?
- Tough keeping 'em straight?

The answer every time is—

NO!

—when you have the *New*

HANDBOOK TO ARMY REGULATIONS

By WALTER SCZUDLO

Lt. Col., Adjutant General's Department, A. U. S.

★ The HANDBOOK TO ARMY REGULATIONS is a combined index, cross-reference guide, and digest of all Regulations, W D Circulars and Letters, and other directives in the general field of administration. It is complete, up-to-date, and authoritative. How many times have you wanted an *alphabetical arrangement by subject* of the meat from all pertinent regulations? That's what you get in this book. To find out what you want to know about "Travel", for example, you look on page 274 of the HANDBOOK. You DO NOT have to look up A R 35-4890, or 55-120, 7b, or 605-180, or 625-5, 4c, or 95-90, 6, or 140-5, 80a, or W D C 102-43, and then fit the pieces of the jigsaw puzzle together while worrying whether you've *got* all the pieces. The HANDBOOK will give you the dope, fitted together and condensed.

★ A feature of the HANDBOOK that is worth the combination of a safe is an *alphabetical list of over 150 commonly used forms*. No more will anyone have to ask "What form do you use for this?" All the forms are succinctly described, and citations are given to the correct regulations, so that you can back up immediately any argument or question.

★ Time temper, and confusion—that's what the HANDBOOK has been designed to save. Once you get the HANDBOOK habit, you'll wonder how you ever got by without it. It's the new way to cook with gas!

Over 300 information-packed pages - \$2.50

Order from

UNITED STATES FIELD ARTILLERY ASS'N

1218 Connecticut Avenue, N. W.

Washington 6, D. C.

Rand McNally ATLASES

Premier Edition: For the person whose interest is wholly in maps, indexes, and population figures of an atlas. Contains 118 full- or 2-page maps covering the entire world, all printed in four colors. All show cities, towns, counties, railroads, rivers, lakes, mountains, and other physical features. 11" × 14", 270 pp., cloth bound. **\$5.00**

International Edition: Covers the full ground of the Premier edition, plus a full page of text with each map describing the inhabitants, geography, climate, history, products, etc., of each state, Canadian province, and foreign country. In addition, 18 pages are devoted to beautiful colored pictures and descriptions of places of interest throughout the world. 11" × 14", 408 pp. and 18 inserts, cloth bound. **\$7.50**

Popular World Atlas: 11" × 16", 112 pp. reproduced in color by rotogravure process. **\$1.00**

Current Events World Atlas: 48 pp. give part of the material found in the **Popular World Atlas**, in the same form. **25c**

(See discount offer on page 584)

U. S. Field Artillery Assn., 1218 Conn. Ave., Wash. 6, D. C.

POCKET MAPS

covering additional areas are now available. They fold into covers 4¼" × 9¼". With a few exceptions, those listed are 21" × 28" and cost 50c each. Australia is 42" × 28" and sells for 75c; Europe (available only without covers) is 10c; map of the Netherlands, Belgium, and Luxembourg is 14" × 21", as are also those of Switzerland and of Hawaii and Oceania.

	Scales, Miles Per Inch		Scales, Miles Per Inch
Africa	260	Oceania, Australia	
Alaska	64	and New Zealand	463*
Asia	340	Philippine Islands	39
Australia	85	Scotland	12
Canada	132	Southern Asia and	
China and Japan	138	the Near East	218
England and Wales	16	Soviet Union	208
Europe		Switzerland	12
(without covers)	140	War Map of	
France	33	Central Europe	54.25
Hawaii and Oceania		War Map of Greater	
	Mercator Projection	Germany	34
Ireland	11.5	War Map of	
Italy	34	the Pacific	Mercator Projection
Mediterranean Lands	124	Western Pacific	280
Netherlands, Belgium and Luxembourg	15		
New Zealand and Fiji Islands	55	*Oceania, 463; Australia, 240; New Zealand, 77.	

(See discount offer on page 584)

U. S. Field Artillery Assn., 1218 Conn. Ave., Wash. 6, D. C.

LT. COL. JOHN E. COLEMAN, Editor
MAJ. BERTRAM H. WHITE, Assistant
LENA PEDIGO, Business Manager

THIS MONTH'S COVER gives another bow to the "heavies." An 8" howitzer is firing at night during the offensive against Mt. Camino.

AGAIN THIS MONTH your JOURNAL is enlarged to 96 pages. These July and August issues are the largest in our history, because of the quantity of excellent material of current interest, technical usefulness, and historical value.

JOURNALS of this size are costly to produce, however. Your annual dues just about cover the direct cost of 12 smaller issues, in effect leaving nothing to care for overhead and general operating expense. That gap is filled by the book department maintained by your Association. The more you patronize it, the more you gain in two ways: all its profits are ploughed back into your JOURNAL, to bring you a better, brighter, and more stimulating magazine; also, through it you can buy your reading matter and gifts for friends at a substantial saving. Our shipments are *safely* delivered in all parts of the world, so don't let your being at a remote station deter you from taking advantage of your Association's facilities.

There is another thing you can all do to help your JOURNAL—stimulate membership among your neighbors, be they enlisted or commissioned. The larger our press run the smaller is the unit cost, hence more of your annual \$3 can go into enlargement and improvement of your JOURNAL.

Finally, see to it that we always have your *full* and *correct* address. Just an A.P.O. number is not enough—the post office returns your copies here. Neither is a temporary (4-figure) A.P.O. good for more than a brief time, even though your unit also appears in your address; send us your permanent number just as soon as you know it. Give us your cooperation and your JOURNALS will reach you, wherever you may be.

The United States Field Artillery Association

ORGANIZED JUNE 7, 1910

President
Major General Lewis B. Hershey

Vice-President
Brigadier General Jesmond D. Balmer

Executive Council
Major General C. C. Haffner, Jr.
Major General Lewis B. Hershey
Brigadier General William H. Sands
Brigadier General Edmond W. Searby
Colonel Stuart A. Beckley
Colonel Ralph C. Bishop
Colonel Michael Buckley, Jr.
Colonel Alan L. Campbell
Lieutenant Colonel James P. Hart, Jr.

Secretary-Treasurer
Lieutenant Colonel John E. Coleman

The Field Artillery Journal

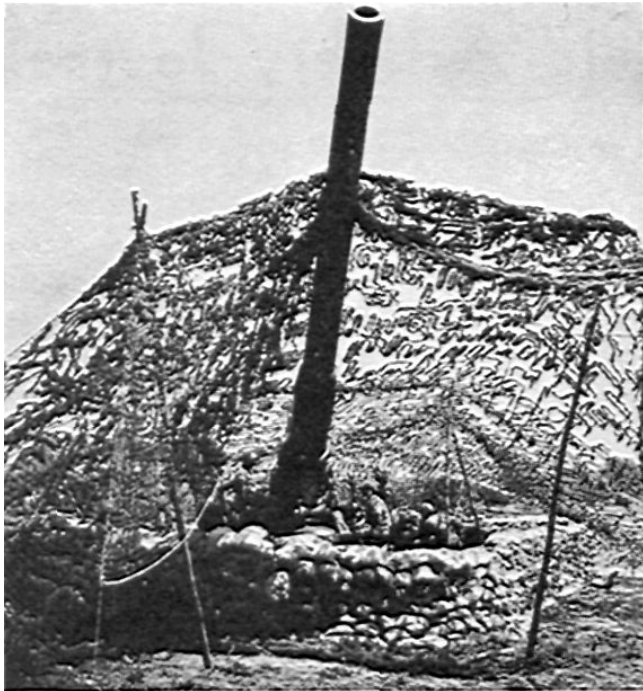
"Today's Field Artillery Journal is tomorrow's Training Regulations."

AUGUST, 1944—Vol. 34, No. 8

	PAGE
8" GUN IN ITALY.....	498
EMPLOYMENT OF ARTILLERY IN ITALY By Col. N. P. Morrow, FA	499
GERMAN ODDITIES	505
BREAKING THE GUSTAV LINE By Lt. Col. Joseph R. Couch, FA	506
AS SKIRMISHERS..... By Maj. Edward A. Raymond, FA	507
O.A.C. PRELIMINARIES By Lt. Col. George C. Duehring, FA	510
COUNTERBATTERY By Lt. Col. Walter Thomas, Jr., FA	511
COUNTERBATTERY—RIGHT NOW! By Capt. Edward G. Seidel, FA	515
CORPS AND NON-DIVISIONAL ARTILLERY—PART I..... By Lt. Col. D. S. Somerville, FA	516
MALAYA By Col. Conrad H. Lanza	521
SHELL SEPARATOR, AGAIN	529
ARTILLERY OPERATIONS OF THE NEW GEORGIA CAMPAIGN By Brig. Gen. Harold R. Barker, U.S.A.	530
ARTILLERY SUPPORT OF FOOT CAVALRY By Lt. Col. Charles E. Brady, Cav.	537
MAKE YOUR GUNNERY PRACTICE REALISTIC! PART III.....	538
CORRECTION FOR AIMING POST DISPLACEMENT By Col. William C. Huggins, FA	540
AIMING POST DEFLECTION CORRECTION TABLE FOR 155-MM GUN M1 By Lt. Col. Frank H. Skelly, FA	541
SIMPLIFIED COORDINATE SCALE..... By Maj. C. R. Plankenhorn, FA	542
PERIMETERS IN PARAGRAPHS..... By Col. Conrad H. Lanza	545
PERTINENT IDEAS, OLD AND NEW From the F.A.S.	559
MAINTENANCE PROBLEMS WITH TRACTOR M5..... By Capt. Edmund J. Murphy, FA	560
FIGHTING THE UNCOMMON COLD.....	561
WHEN YOUR OUTFIT MOVES BY RAIL..... By Capt. Lauren K. Soth, FA	563
EMERGENCY WIRE LAYING BY LIAISON AIRPLANE By Lt. Col. Gordon J. Wolf, FA	566
FDC AND THE ARTILLERY AIR OBSERVER By Maj. Ivan E. Jackson, FA	567
THE AIR OP IS HERE TO STAY By Capt. John W. Oswalt, FA	568
TO ALL UNITS.....	572
OBSERVATION IN SUPPORT OF ARMOR By Maj. Sydney S. Combs, FA	573
USE OF RANGE DRUMS IN MEDIUM TANKS By Maj. E. D. Lucas	574
ARE YOU GETTING FULL ELEVATION ON YOUR 3" GUN?.....	575
NEW ANGLES ON DETERMINATION OF DIRECTION..... By Lt. William S. Livingston, FA	576
A CP TABLE FOR DIVARTY OPERATIONS SECTION..... By Lt. Col. R. B. Shreve, FA	578
IDEAS ARE WEAPONS By Lt. G. B. Vail, FA	580
DIARY OF WAR EVENTS	581
FOR HEROISM AND SERVICE.....	582
BOOK REVIEWS.....	584

Published monthly by the United States Field Artillery Association. Publication office 3110 Elm Avenue, Baltimore 11, Md. Business and editorial office. United States Field Artillery Association, 1218 Connecticut Avenue, Washington 6, D. C. **Address all communications to the Washington office.** Entered as second class matter August 20, 1929, at the post office at Baltimore, Md. Accepted for mailing at the special rate of postage provided in Sec. 1103, Act of October 3, 1917, Copyright, 1944, by The United States Field Artillery Association. Subscription price \$3.00; Canada \$4.00; foreign \$3.50; single recent copies to members, 25 cents; non-members, 35 cents. THE FIELD ARTILLERY JOURNAL does not accept paid advertising. It does pay for original articles accepted, but unsolicited manuscripts must be accompanied by return postage if they are to be returned. *Addresses and ranks will be changed as frequently as desired, upon notification; not otherwise. Changes should reach the editor three weeks before date of next issue. Immediate notice should be given of any delay in the receipt of the magazine.*

Authors alone are responsible for statements made. No articles are official unless specifically so described.



Protected by sandbags and camouflaged, this 34-ft. tube looks gigantic at full elevation. This weapon, which uses the same carriage as the 240-mm howitzer, weighs 69,500 lbs.



Loading tray must be long, to accommodate a 102-lb. bag of powder, as well as stout, to support the heavy projectile.



"ON THE WAY!" Camouflage must cover a large area, to conceal the manifold installations at each piece.

8" Gun in Italy



All sand and other dirt must be carefully wiped from each projectile before loading. Note rope grommet to prevent damage to rotating band, and sand-bag ammunition shelter.



13 cannoneers man the 45-ft. staff to swab the tube after each round. Inverted loading tray is just left of the downward-hinged breech block; to its left is rammerstaff loading bell.

Employment of Artillery in Italy

By Col. N. P. Morrow, FA

The author spent nearly six months in North Africa and Italy as a member of the Army Ground Forces Observers Board, an agency set up to secure for Headquarters, Army Ground Forces, early information on developments in tactics and technique of the various Arms and Services, and on functioning of materiel and equipment. This article is necessarily, to some extent, a repetition of some material contained in reports submitted to AGF, some of which have been distributed to various headquarters.

When artillery commanders in Italy were interviewed, they invariably gave cheerfully and willingly of their time and thought, although other duties were pressing, in order that troops in training at home might profit by their experience. It is from that point of view that this article is presented: What developments in artillery procedure in Italy should be known to artillery commanders here that will benefit training?

It can be stated definitely that there have been no radically new developments in employment of artillery in Italy. Many times artillery commanders stressed that the doctrines taught by the Field Artillery School are sound. What at first appeared to be new practices were seen to be, when analyzed, an application or extension of accepted teachings, dictated by peculiarities of the terrain or the particular tactical situation.

To a certain extent the first few weeks of the Italian Campaign were a repetition of Tunisia and Sicily, the well-known "moving situation" of the text-book. But steadily our advance grew slower and more painful, displacements were less frequent and for shorter distances, positions were occupied for longer periods, artillery fire power became ever more vital. In the light of later events, it is now evident that during those weeks the German was fighting a skillfully conducted delaying action, this to gain time for the organization (with impressed Italian labor) of a "final defensive position," the elaborately organized Gustav Line. The situation which developed was in many respects analogous to that which obtained along, say, the Verdun Sector in World War I. It was trench warfare once more, "zone defense."

During the weeks between Salerno and Cassino our Corps Artillery was considerably reinforced, a number of medium and heavy battalions which had not previously seen action entering the battle. This made available to the front line infantry commander much more in the way of artillery support than he had been able to rely upon previously. To exploit fully this added fire power now became the objective of artillery commanders. Their aim was two-fold: first, to be able to place the mass of fire promptly when and where desired; second, when the nature of the target did not require a large mass of fire, to be able to put down quickly the fire of that battalion best suited from the viewpoint of its capabilities of fire and its caliber.

OBSERVATION

Observed fire was constantly sought when obtainable. Also, it was desired that fire should be observed and conducted by that OP best located to see the target. This meant that as often as not forward observers conducted the fire of battalions other than their own. To secure this flexibility it is obvious that elaboration of communication facilities, both telephone and radio, was necessary. This was achieved by providing alternate and lateral lines of communication well beyond the "normal" net. To insure prompt transmission through several relays, insistence upon a thorough knowledge of telephone and radio procedure by operators was essential. The wire maintained by Div Arty HQ averaged about 80 miles, that by Corps Arty HQ

100 miles or more. It early became patent that greater switchboard facilities than those offered by the BD-71 were necessary; Artillery Brigade and similar headquarters are now equipped with the 40-drop BD-96.

Forward Observers

Artillery FOs and the personnel of their sections are, with the Cub pilots and observers—of whom more later—the unsung heroes of this war. Much has been written and spoken recently in honor of the fighting doughboy. He merits all of it and no artilleryman begrudges him his meed of praise. But the forward observer sections also lead the life of the front-line doughboy, share his hardships, and suffer casualties in like ratio. The typical forward OP is on or near a mountain top and quite close to the German front. Movement in the daytime brings fire, hence the relief must be done at night—and it takes all night because of the nature of the climb. Thus forward OP tours are normally for about four days. The new FO spends the day with the old, studying the sector with him, and the old leaves the second night. Observation is continuous, with the most remunerative targets likely to be seen at late dusk or early dawn. The younger officers of the battalion make up an observer pool, run by roster. The physical strain is great: as many members of FO sections have been evacuated because of frozen feet or exposure, as from wounds.

A 1/50,000 battle map is used in Italy. All FOs carry this map. Because they conduct fire on many targets with battalions other than their own and because they may not know or be able to see the base points used by other battalions, designation of targets in the great majority of cases is by coordinates. It follows that artillery observers must understand the use of maps. Not only should maps be used often at service practice, but all artillery officers should know how to determine location on a map by resection, how to follow a route, and how to identify visible terrain features by coordinates.

Forward observers should be trained to assist each other when appropriate. For example, a drifting cloud may obscure a target from an OP during adjustment; another OP may be able to take over the adjustment. An observer not otherwise engaged should watch the fire for effect of other battalions on targets which he can identify. Similarly, observers should know the schedule of unobserved fires and take advantage of any opportunity to observe and correct. For example, unobserved fires prepared during periods of low visibility may suddenly become visible to certain OPs because of an unexpected break in the clouds. If the observer has with him a list of targets and fires scheduled at a particular time, he can and should be prepared to make proper corrections. This is merely following the principle to "observe whenever possible."

Most observed firing is by FOs, and nearly all by them is by air-ground methods. This does not mean, however, that instruction in standard methods of adjustment should be abandoned. Higher commanders state that a knowledge of small-and large-T procedure is definitely useful even though the observer is using air-ground methods and is not consciously thinking in terms of lateral adjustment. Instances have occurred

in which excessive time and ammunition were required when it was very apparent that ignorance of large-T procedure was the cause of the trouble. It has also been found that in making precision adjustments, such as a BP registration, normal methods produce better and quicker results unless the BP is more or less "in the observer's lap." One Div Arty Exec stated that when the division came out of the line it was found highly advisable to re-introduce to a knowledge of standard methods of fire, all officers who might be used as observers. Another said that it had been found useful during slack periods for battalion or battery commanders to visit OPs and there conduct "service practice" by having the observer "fire problems at areas on the terrain where he thought there might be Germans." Moral: *Training never ceases.*

Liaison Officers

Closely allied to the work of the forward observer is that of the artillery liaison officer with the infantry battalion commander. The LO frequently acts as a forward observer because much of the time the infantry battalion commander is forward where he can watch the action of his battalion, and where by turning to his artillery LO he can quickly place artillery fire where he sees it is needed to influence the combat. It is evident that the LO is an important staff officer of the infantry battalion commander. In most units he coordinates or controls the FOs, both to avoid having them all moving forward at the same time and to keep them so placed as to insure at all times the best possibilities of observation. This is not secured if the FOs accompany the infantry advance just to be with it. If they are pinned to the ground by small arms fire they serve no useful purpose and are merely likely candidates for the casualties list. The LO is the logical person to discuss with the infantry battalion commander the question as to when the FO should move. The present tendency, therefore, is for the LO to control the movements of the FOs rather closely.

GROUP COMMANDERS

The increase in the number of non-divisional artillery battalions during the past few months was noted above. Due to a combination of circumstances the appropriate number of Group Headquarters did not accompany these battalions. Their absence was soon felt. One Corps Artillery Commander stated that he was considering improvising one or two Group Headquarters to fill the need.

The most important function of the Group Commander is that of making the general position area reconnaissance which must precede displacement. The object of this general reconnaissance is to determine which position areas are suitable for one caliber and which for another, there being many positions which are adapted to a particular weapon only. This general reconnaissance also includes the matters of routes, locations of rear installations, initial security measures necessary, etc. As a result of it the battalion commander can be shown a small oval on the map which is known to contain a suitable position area for his unit. The time he must be absent from his battalion on preliminary reconnaissance is thereby greatly reduced—an important consideration.

An equally important function of the Group Commander is the frequent inspection of battalions as to sanitation, security measures, safety precautions, camouflage, motor maintenance, alertness of FDCs, and similar details. The need for such

inspections is especially great when units first enter combat, because experience shows that at that time many seem to feel that all rules are off. Things that have become routine in training are forgotten or neglected. Many commanders in Italy stated that units still in training should be cautioned against this tendency to let down when battle conditions are first faced.

Group Headquarters are also useful in facilitating the establishing and maintaining of wire communication between Corps Artillery Headquarters and the battalions. This is, of course, because Corps Artillery can lay to Group, the latter in turn to its battalions. It is true that fire missions are transmitted directly from Corps Artillery to battalions, bypassing the Group Headquarters, so to speak. But the latter maintains its own situation map, keeps advised as to missions assigned its battalions, and can take over fire direction if communication to Corps Artillery breaks down.

The preceding paragraphs seem to indicate that the function of Group Headquarters is much the same as that of the old-time Regimental Headquarters. That is the case, and in one more respect the job of the Group Commander is like that of the former Regimental Commander. The alert and diplomatic but forceful Group Commander saves his battalion commanders many a headache by checking on and watching countless administrative matters which it is unnecessary to enumerate here. This has already been proved many times over for those battalions which were so fortunate as to be under a Group Headquarters.

ARTILLERY POSITIONS

In considering selection and occupation of position we must bear in mind the definite distinction between rapid and deliberate occupation. In the former, when time is important, risks will be run which would not be considered when more time is available. Throughout Tunisia and Sicily, and until the Volturno was crossed, movement was fast and displacements frequent; after the Volturno and until the Cassino line was breached the exact reverse was true. After all, it is a cold calculation of preservation of manpower. If the enemy is retiring, the harder we push and keep him off balance the less chance he has to dig in and lay mines.

In the rapid occupation, getting the first round on the way quickly may be vital (just as in Test I of the AGF Tests). Battery executives should know how to use the pocket compass for laying for initial direction—and it was stated that it was surprising, the accuracy which could be obtained—and to fire whichever piece is ready first. In mountain country distant peaks make good aiming points; using an AP may speed up the opening round, and aiming stakes can be placed later.

The following paragraphs apply in general to the deliberate occupation of position. Essential modifications or omissions which pertain to the rapidly moving situation are obvious.

Selection and Development

In selection of positions the commander concerned is always limited by two factors: suitable artillery positions are few and space must be found for a considerable number of battalions. This means that some units must of necessity get into some very difficult positions, "areas which in our training at home we would never have considered." All commanders agreed that training in the States must stress difficult driving and occupation of positions which will at times require some blasting to create shelves on which a gun can be spotted only by winching.

The first consideration in choice of artillery positions (next to range, because a battery *must* be able to reach its target) is

flash defilade. To secure it, an obviously difficult position will be accepted. Associated with this principle is a definite tendency to consider German mortar possibilities in selecting position areas. These weapons are aggressively handled and do not hesitate to "countermortar artillery." Experience also taught that positions near crossroads or road junctions should be shunned because such features draw artillery fire. This applied to heavy weapons as well as light, even though it involved using difficult access routes.

Overhead cover is desirable to escape air observation, but heavy trees are to be avoided because they convert shell fire into air bursts. There were numerous factual accounts of batteries more or less in the open which experienced few casualties, while batteries under tree cover were suffering severely from the same type of fire. The olive groves of Italy offer the best type of cover that can be found. Another protection invariably sought when available was the artificial terrace so frequently found in Italy, particularly if there was a fairly steep reverse slope behind the terrace into which burrow-type holes could be excavated for shelter of personnel.

For individual shelter the slit trench always went down first because it could be dug quickly. It should be long enough to permit the soldier to recline full length, as in many areas which received a considerable amount of fire most battalion commanders required that personnel sleep under cover. Experience has proven clearly that nearly all casualties are suffered by men who are out from under shelter.

Improvement in organization of position never ceases—it is continuous. After slit trenches are complete, digging of individual fox-holes (for protection from air bombing or from heavy artillery concentrations) begins. In veteran units the men need no urging to do this, and much ingenuity is displayed in utilizing such terrain features as terraces, faces of cliffs, steep banks of stream beds, etc. In the mountain terrain of Italy there are many skillfully dug man-made caves which afford complete protection to members of units fortunate enough to have such features available. A fox-hole type of shelter must also be provided for the Battery Executive and his assistant, although at times he may install himself in a house or its basement if one is accessible, not too conspicuous, and ruggedly built.

In this connection it should be noted that the masonry houses of Italy offer about as good protection against shell fragmentation as do sand-bags and are reasonably secure against anything except a direct hit. The rainy and cold Italian winter was in itself a temptation to use such shelter for installations in which a great deal of paper work was necessary. For this reason the battalion FDC and CP were frequently so located, the comment being offered that the existence of such a house should not be allowed to become a predominant factor in the choice of battery positions, which should be selected first, the matter of CP selection to be next considered. Other excellent CP locations were in caves, in quarries, or on reverse slopes, the steeper the better. Consequently the battalion CP and FDC were often in front of the battery positions. When no cave, quarry, or other favorable terrain feature existed, the FDC and CP were then dug in and the spoil used to fill sand-bag revetments. Overhead cover—sand-bags on log rafters—was highly desirable, and there were definite instances in which this precaution undoubtedly prevented casualties.

In the past few months German air power has either diminished or was being conserved for later events. At any rate, air bombing of our artillery in position became very

infrequent. This was not true, however, of German counterbattery fire; a concentration might land in a position area at any time. The result was a natural working of the law of cause and effect. Not only were pieces always well dug in, but additional protection against fragmentation was secured by erecting solid revetments, for which anything offering physical protection was used—sand-bags, projectile cases, boxes, or other containers which could be filled with earth. In other words, protection against shellfire grew into a more important consideration than camouflage. This does not imply that camouflage was neglected or forgotten. On the contrary, careful study was given to the shape of nets over pieces, and the wornout nets (which units were allowed to retain) were painstakingly saved and used to cover spoil around gun pits, entrances to kitchens, and so on. Vehicles for which good



British 5.5" gun on the Volturno front

overhead cover could not be used were invariably netted. Because of terrain features the drape shape was much more prevalent than the flat top, which was employed only in those infrequent instances in which it was necessary to occupy positions in flat, open areas for lack of any other site.

Occupation and Pre-occupation

Occupation of position, except during a pursuit situation such as the latter phase of the Sicilian Campaign, is invariably at night. Training in the States, it was often remarked, should emphasize night occupation "in absolute blackout, even the cellophane hooded flashlights being banned. Route markers must be trained. These must be intelligent and reliable, and they work best in pairs because they are often posted for long hours. Also, provision must be made to insure beyond doubt finding place marks and locations of aiming stakes in the dark." Reconnaissance and selection of position, it should be noted, are executed by daylight unless the tactical situation is such that night reconnaissance simply cannot be avoided. This daylight reconnaissance may be limited to only one or two hours; even so, it will eliminate much of the grief attendant upon night reconnaissance followed by immediate occupation.

When time permits, and it usually does, there is an intermediate and very important phase between selection and occupation. This is *preparation* of position. It includes preliminary establishment of communication (including installing a forward switchboard), digging or partially digging gun-pits, survey, and, *by no means the least important*, search for and

removal of mines. It is a safe bet that before withdrawing the Germans have liberally mined any likely position area. If the battalion commander is restricted in the amount of personnel he can have initially in the position area, he will take forward mine detectors—meaning both those very valuable instruments and the men to operate them. These men are specialists, carefully picked and specially trained. In the available hours of daylight the position area selected will be searched for and cleared of mines, including routes in and out, gun sites, location of aiming stakes and paths thereto, location of battery executive, etc. The area searched should be clearly marked by white tape. In a veteran unit there is no trouble keeping men inside the tape, because they know that wandering beyond it is unhealthy. The preparation of position preliminary to occupation may extend over only a few hours or it may last for several days or even a week or two. The more time, the better. It is advisable to place markers in a position once it is selected, and often guards to keep other units out. Obviously there are many locations from which artillery cannot fire which are perfectly suitable for other installations.

Road space is always at a premium. In the movement forward to position, either deliberate or rapid, the number of vehicles per battery will be strictly limited—often to 8 or 9 per battery. For such movement, clearance must be obtained from the appropriate G-3 for the use of the road during certain hours. Normally the movement is by controlled convoy, which means that the move must be started and completed on time. Occasionally tactical considerations may require movement by infiltration. Troops in training should therefore practice both types of movement.

The decision as to what vehicles, if any, were to remain at or near the position area hinged upon two factors: the tactical situation (that is, the imminence of a move) and cover available. Because road space was precious it was desirable to keep prime movers and certain other vehicles near the batteries, if cover permitted (in the form of ravines or steep banks, as well as overhead).

Drivers should dig slit trenches near vehicles and remove the fire extinguishers when they leave the trucks to sleep. By this precaution many vehicles were saved from burning after they had been set afire by incendiary projectiles.

Service Elements

Kitchens were in the battery position area whenever circumstances permitted. At times, when there was no good cover nearby, kitchens were maintained at the rear echelon and hot food sent up at night in marmite cans. At other times—for days on end—gun crews had to heat their food in cans, this being made possible by the highly regarded Coleman one-burner stoves. In other cases the kitchen truck might be brought up at night, unloaded, and sent back, and the kitchen set up in a house near the battery. In the very considerable majority of batteries visited kitchens, either in trucks or in a house, were at the battery position. And, speaking of kitchens, it should be noted that the good old fashioned chow-line is a thing of the past. The Germans have a pernicious habit of firing at suspected troop locations at meal times. The flash of mess-kits in the sun was very likely to bring fire. By painful experience men learned to get their food one or two at a time and not to linger in the open away from cover. Often the dead were those who were not quick.

Service batteries were from 7 to 10 miles in rear of the

battalion position areas. Accessibility to the road connecting positions and ASP, cover, and hard standings to facilitate motor maintenance, were the factors considered in selecting locations. When the battalion displaced forward the area vacated was frequently occupied by its Service Battery, which was thus assured of a clean area, a not unimportant consideration.

Interior Arrangement

As to disposition of pieces in battery positions, there was no standard solution. Of course, the old "normal battery front" is no more. Dispersion was always sought but often hampered by limitation of space and cover. Many battalion commanders stated that they preferred fronts of 500 yards but could very rarely get them. The spotting of each piece is determined by the terrain, by study of flash defilade. This may result in pieces being closer than 50 yards apart, the minimum desired. Not more than two pieces should be in the same straight line. Other considerations being equal, most commanders preferred the flat, irregular, W battery front, but would reiterate that this is seldom available because of the limiting factors of defilade, cover, and room. It can be readily seen that each occupation of position presents its own problem which must be solved each time by careful terrain study. The same consideration determined the arrangement of batteries within battalion areas. Very seldom were batteries along the same general line. Usually one battery was somewhat to the rear of the other two, and frequently the three were echeloned one behind the other to a depth of 750 to 1,000 yards, a solution forced by terrain and space limitations.

Most battalions found it advisable to have the CP (or administrative headquarters) separated from the FDC (or tactical headquarters). Many commanders preferred to have the S-2 at the CP, where he could work better than at the FDC—which at times, when many fire missions were going on, tended to become something of a madhouse. On the other hand, some desired him to work in close collaboration with the S-3 at the FDC and check his fire missions against his own information. The first solution, the separation of the two, is regarded as desirable because of the practice which many battalions followed of having a separate map and firing chart at the CP. This was run by the S-2, whose assistant, by means of a direct wire to the FDC, listened in to calls for fire and kept them plotted. In this way an alternate FDC was available in an emergency to take over if the regular FDC was shot out, as had happened.

At the fire direction centers it was found that the tendency was to keep the operators and computers fairly closely concentrated in order to facilitate control, close supervision being regarded as more important than obtaining the relative security to be obtained from dispersal of personnel. Also, it was felt that the protection given by well dug in and sand-bagged FDCs was to be preferred to dispersal.

The firing chart used is simply an extension of the Italian 1/50,000 map, using the same grid system. To correct certain inaccuracies the map is supplemented by a list of true coordinates furnished by Army from accurate topographic control. On the chart are plotted the base and check points and current concentrations, work on it being much more convenient than on the map, which carries so much detail. A list of a considerable number of concentrations, furnished by corps and division, with assigned call numbers and coordinates, is maintained to avoid cluttering up the chart. Base and check points and some concentrations can be transferred directly from map to chart by their coordinates; observed fires on areas not readily determinable on the map are plotted by removing

the *K* and deflection correction from adjusted data.

Firing charts are maintained at all batteries by the executive, to whom corrected data are phoned from time to time. An instrument sergeant or scout corporal (someone other than the recorder) keeps the chart posted, the executive checking it from time to time. He is thus prepared, if communication to FDC is shot out, to carry on with a fire mission. Because of the widths of battery fronts the executive must have phone communication with each piece. Individual headsets worn by chiefs of sections solve the problem and allow them reasonable freedom to control their sections. As the executive cannot exercise the close supervision of the battery formerly possible, the importance of the chief of section has been accentuated; each one is now in reality an assistant executive.

In general, CP signs and similar markers are liberally employed. In rear areas at important road junctions there are veritable forests of signs—a number of sign boards listed as many as 50 or 60 units. There is no great difficulty in finding one's way to a particular CP if one looks sharp. The above remarks do not apply to infantry battalions which, when at the front, are likely to use symbol signs or none at all.

ARTILLERY FIRES

The greatest artillery development of this war has been, as all artillerymen well know, the perfection of the technique of massing fire quickly and accurately. There is no need to discuss it here, as procedures in Italy have followed the methods taught at the Field Artillery School and pursued in later training. In application one new expression has arisen which is permanently added to the artilleryman's vocabulary. This is TOT—"time on target." It means that time of flight is allowed for so that the projectiles of a number of batteries will arrive at the target simultaneously. A TOT is fired at a pre-designated time by two or more battalions, normally 5 to 7 on a definitely located target. Of course, common grid control is essential. "Serenades," "Bingos," "Stinkos," and "Stonks" are applications of the TOT principle, expressions used in various armies or corps for types of massed fires.

Except for night harassing missions and interdictions, and for firing by the larger calibers, the battalion has been the fire unit for fire for effect. To attack targets of opportunity the procedure has been the same as in Test I of the AGF Battalion Firing Tests; one battery adjusts, the other two come in for effect. When terrain permitted adjustment of height of burst it has been found useful to mix time, smoke, and HE, one battery firing each type, the battery used for initial adjustment firing time. There has been very little zone fire, only adjusted range or center range being used on small area, as it was felt that dispersion would take care of coverage. When a large area is to be covered one battery is usually fired at center range, one a *c* short, and the third a *c* over, rather than walking through with successive elevations by all batteries, as the latter method introduces more chance of error.

Some officers believe that it might be well, in our gunnery instruction at home, to place more stress on some knowledge of probabilities and of the elements of trajectory. The story was told of one FO near Cassino who expended quite a few rounds on a self-propelled gun behind a wall on a steep reverse slope. He could get hits on the wall but a slight increase in elevation gave lost overs. He simply did not realize that the target was in dead space for the weapon firing. S-3s should be able to compute with some assurance the number of rounds which will probably be required to accomplish certain destruction missions. "It is not so

much the matter of ammunition supply as the difficulty of its transportation and delivery under adverse conditions of terrain and weather. You just can't throw away ammunition that costs so much sweat and toil to bring up," one officer stated.

The rolling barrage has been used often enough to make it advisable that officers be instructed in methods of computing it. It has been found particularly useful to mark physically the line of departure for a night attack. The importance of carefully studying the terrain to be crossed by the infantry in its advance, in order to determine the time intervals between lifts in the barrage, has been proven by actual experience. The rolling barrage was usually followed by successive concentrations. Infantry commanders were furnished with overlays showing both scheduled and call concentrations. By checking the overlay they could call for fire on any area merely by referring it to a numbered concentration. Normal barrages were planned and fired as described in FM 6-40.

Many higher artillery commanders stated that during the past few months there has been a definite tendency toward carelessness in observing all the precautions for close shooting corrections. Vigorous measures have been instituted, however, and instructions issued reaffirming the necessity of measures to insure accuracy, such as some effort at calibration (even in battle), frequent metro messages, precision in computing data, checking registration, and care in drawing ammunition by lot number at ASPs. These commanders have pointed out that check on calibration can be secured from day to day by rotation of pieces used to verify registration.

Survey has been largely confined to the position area, and is invariably accomplished during the preparation of position prior to occupation. It has been found that initial direction has been much more accurately established by base angle on the orienting line rather than by use of compass, which has frequently been unreliable—possibly because of local magnetic disturbance.

THE FA OBSERVATION BATTALION

The story is told that certain trained observation battalion officers sent over as replacements were initially assigned to an Air Corps unit on the assumption that they were meant for the one-time Observation Squadron. As a matter of fact, because in pre-war days we had only one observation battalion, many field artillery officers had very sketchy ideas as to how this valuable unit should be employed, and the Army Artillery Officer found it necessary to issue a suggestion that the Observation Battalion be told what to do, not how to do it.

Experience has proven that the observation battalion works best as a unit, that detachments from it should not be made except in emergency. If a detachment must be made, it should be as large as a complete battery whenever practicable. One Corps Artillery Commander stated that the observation battalion is his "right arm in coordinating survey and in securing hostile battery locations."

Flash detachments of observation battalions have been very profitably employed in making high burst adjustments of corps artillery battalions. It was found that time and ammunition were saved in this manner. The statement was made that medium and heavy battalions still in training should take every opportunity to work with observation battalions. There were a number of instances in which flash observers adjusted on targets of opportunity. This personnel should be so trained in order not to lose the chance to fire on such a target when

lack of communication between flash stations prevents normal flash location.

AIR OBSERVATION

It is safe to say that the hopes of the original proponents of the Cub plane for its use as an artillery OP have been more than realized. The secrets of its success have been the aggressiveness, skill, and daring of pilots and observers, who cannot be too highly commended, and the fact that, trained as artillerymen, they understand artillery procedure. The German front line soldier detests the Cub plane because of the unpleasant results that follow shortly after its appearance in the air. Many times German artillery fire has been silenced by the sight of a Cub.

It has been found profitable for the Cub observer to visit the battalion CP at night to be briefed for the following day's missions. Air photos of areas to be searched have been extremely useful in these conferences. Reports of observations by observers have been among the important sources of information for counterbattery sections in building up inferences in hostile battery locations.

Experience has proven that the most remunerative targets are picked up at late dusk and early dawn, when flashes are best seen. Furthermore, there has recently been considerable flying in bright moonlight nights when the light is sufficient for identification of terrain features. Since this is now standard procedure it is felt that air pilots still in training should practice moonlight observation.

For fire by long range weapons on targets deep within enemy territory, adjustments have been successfully made by Air Corps pilots in high performance planes. Such missions are now regarded as routine. Advance briefing of the pilot is important, a vertical with concentric circles about the target being used. The Air Corps SCR-522 radio must be employed. As the entire procedure is a bit tricky, heavy artillery units in the States should take every opportunity to practice it.

CORPS ARTILLERY

One Corps Artillery Brigade commander stated that he preferred for his units to be regarded as "reinforcing artillery" rather than "Corps Artillery." This remark sums up much that might be written on the subject. The same commander said that to exploit the capabilities of long range weapons it is necessary to push them well forward. In one position a Corps Artillery battalion was "counterbattered" by German machine guns. Forward observers of Corps Artillery have aggressively sought observation, and the percentage of observed fires of their battalions has closely approached that of division artillery.

There has been no tendency to regard counterbattery as the chief mission for corps artillery, although counterbattery intelligence has been handled at Corps Artillery CPs. The main role of Corps Artillery has been to supplement the fires of division artillery where and as needed. When a Corps Artillery battalion was placed in direct support of a division, direct communication was established between the battalion and

division artillery CPs, and the battalion so designated received its missions from division.

When an attack of any magnitude was planned it was always preceded by a conference of artillery commanders concerned, at which the plan of fires was worked out as the result of complete discussion and exchange of views. The published orders which followed were merely a confirmation of plans



An Italian gun crew swabs out this railway gun, in use on the Cassino front. The original caption says this "194-mm . . . Italian gun has a range of 17 kilometers and a crew of 25 men." As nearly as we can determine the Italians had no railway artillery of their own. More likely this mount was modified (or built) to accommodate the French 194-mm gun, which originally was on a caterpillar mount; that piece had a tube 42.4 calibers long and a maximum range of about 19,000 meters. The French also had a railroad gun called the M. 70/84/93. Its tube was 320-mm in diameter, and 30 calibers long, with a maximum range of some 21,600 meters. Evidence is quite conflicting, as (at least in the photographic print) on the breech can be seen "194 MM 1870-93." So take your choice. In any case it's a sizeable weapon which is doing quite well on our behalf.

agreed upon at the conference.

AAS AND TDS

Separate articles could well be written on the employment of AAs and TDs in Italy. They should be prepared by officers of those branches. These paragraphs will not attempt a detailed discussion.

An AA automatic weapons battalion was normally attached to each infantry division. Since the targets of German planes which attacked division areas were usually the artillery positions, the AA battalion was generally given the mission of protecting the artillery. It was found advisable for the AA battalion commander to make his own reconnaissance and dispositions after he knew what positions the artillery would occupy. Experience proved that it was best for the AA commanders to recommend how the organic field artillery AA weapons should be spotted so as to integrate them into the AA defense scheme. The gunners manning FA weapons were ordered not to fire on planes until the AA weapons had opened fire, unless they were actually attacked. This solved the troublesome problem of identification, because AA personnel were better trained in plane recognition. It is gratifying to state that a respectable number of German planes were shot down and duly credited to organic FA anti-aircraft machine guns.

TD battalions have also been attached. Because of the mountain terrain in Italy, the threat of German tank attacks of large scale was negligible. Since the Volturno was crossed the TD battalions have regularly been used in fires up to long ranges on ground targets. One TD company has usually been attached to each light battalion. Initially artillery FDCs attempted control, but this just complicated the procedure—so it is now routine for each TD company to operate its own FDC, set up reasonably near the artillery FDC.

The primary mission of TDs remains unchanged but in their secondary role they constitute an important part of division artillery fire power, which is a recognition of the principle of economy of force. Survey is performed for them by the field artillery, as is most (but not all) observation. The greater part of their missions has been night harassing and interdiction, in which capacity they have taken a considerable load off the 155

guns. Upon occasion they have also figured prominently in pre-attack preparations.

TD and FA officers in Italy advocated that TD units in the States take advantage of opportunity to train with field artillery. The same remark applies to the larger caliber AA units. During recent months these have been relieved to a large extent of their primary role by the marked slackening in German air bombardment. A great deal of their firing of late has been against ground targets, with excellent results.

Much of the unquestioned success achieved by the field artillery in Italy has been due to the fact that commanders have continued to *think*. The flexibility attained has been due to elaboration of communication facilities secured only by sheer hard labor. Thought and work must also be expended in training if our units are to be ready for the test of battle.

Know Your Enemies' Weapons . . .

GERMAN ODDITIES

Three weird "critters" were employed against us on the Anzio beachhead—two miniature tanks and a one-man submarine.

"Goliath" was the name of the smaller tank, better known to our troops as the "Doodlebug" and to the krauts as *Minenbund*. It was controlled by a 550-yd. 3-strand cable which unwound from a drum on the tankette. Separate electric motors, each powered by its own storage battery, drove the two tracks; steering was by braking one track. The demolition compartment, slightly forward of center, held about 250 lbs. of explosive which the remote-control operator was supposed to touch off after stopping the vehicle at its target. Actually these

mobile mines were highly ineffective, as they could not move in reverse and were easily stopped in mud, on inclines, and in ditches or craters. Low speed of 4 to 6 m.p.h. made them easy targets, and their .1" plates (plus an extra ¼" in front) gave little protection. Upper photo at left is a right-side view.

B-4 was a larger explosives carrier, about 12' long, 6' wide, and 4' high. In the rear is a 6-cylinder engine, in the left front a radio and control compartment, and in right front a space for the driver. The latter takes it as far as he dares (maximum speed: 30 m.p.h.), dismounts, and by radio sends the vehicle on to the barbed wire, road-block, or pillbox he wants to destroy. There the explosive is dropped, a time fuze fired, the tank backed to the driver, and he drives back home again. Such is the theory, but in practice the B-4 was fine meat for our artillery. Photo below shows right side of the B-4.

A one-man sub went aground and its 17-year-old crew was captured. Tube at left is the torpedo, that at right is the driving compartment (which ordinarily is on top). The torpedo tube is attached to the driving tube by shackles, so it can be released to proceed to its target while the pilot returns safely.





*Night preparation
on the Cassino
Front east of the
Garigliano River,
Central Italy, May,
1944.*

BREAKING THE GUSTAV LINE

By Lt. Col. Joseph R. Couch, FA

May 1, 1944 found our battalion of 155-mm M1 howitzers, Corps Artillery, in position east of the Garigliano River and south of Cassino in Central Italy. Our mission, as one of the battalions of the ABth Groupment, was direct support of the Zth Infantry Division of the French Expeditionary Corps (CEF).

For nearly four months von Kesselring's Gustav Line, with Cassino as its strongest point, had blocked the advance of the Allied Armies in Italy. The terrain was greatly in favor of the defending Germans and they made the most of it. A defense in depth was employed. Pillboxes, machine guns, antitank guns, and artillery were all skillfully emplaced and defended with great determination.

The enemy held high hills overlooking the Garigliano and Rapido Rivers, which constituted the front lines from Cassino to a point on the Garigliano 2 km. south of San Andrea. There the lines left the river, rejoining it near Castelforte. The zone between the front lines east of Castelforte and the river formed a bridgehead across the wide bend in the Garigliano. South of Castelforte the lines again veered away from the river; our left flank rested on the sea west of Minturno.

The zone between the river line and the hills was heavily mined and wired. Strong machine gun nests and antitank positions covered the low ground near the river. The bulk of the German infantry forces were strongly emplaced on the hills. We had knowledge that they were well equipped with antitank guns and tanks. Enemy artillery appeared to be deficient in strength but it had the advantages of excellent observation, previously prepared positions, and unblocked roads.

About May 3d we received warning that preparations for a great Allied attack were under way. Our roads were crowded with troops, tanks, and guns—all marching to their assembly areas. Since we had air superiority, troops in the rear moved into position both during daylight and dark. Positions near the river were occupied only at night.

A large concentration of artillery was massed in our narrow sector. The normal Division Artillery was supported by Direct and General Support Corps and Army Artillery, heavy AAA guns, and tank destroyers. Positions were prepared within 1,000 yards of the river line, and were occupied at night by artillery battalions up to and including 155-mm guns. These units were not allowed to fire prior to the attack, but were permitted limited C. I. registrations, synchronized with fire of battalions already in position at greater distances from the front lines.

To preserve secrecy all civilians within two miles of the front were evacuated to rear areas. Units in exposed positions dug in, enforced camouflage, and remained quiet.

On May 10th my battalion was ordered to stock ammunition. Tanks and infantry moved up to the river line.

All battalions were furnished with enemy battery lists compiled by Flash and Sound units, Photo Interpretation Units, and battalion OPs. We also received coordinates of strong points, enemy assembly areas, and supply routes.

H-hour was announced on May 11th. It was to be 2300 hours that date. Fire plans were sent to all battalions. Late information was received on enemy battery lists and strong points. Excitement ran high even in veteran units, as we prepared our concentrations, checked and rechecked our data. After months of a stabilized front in the mud and mountains of the Cassino line our long awaited drive on Rome was at hand.

When the minute hand of our watches crossed 2300 hours the thunder of the Allied artillery barrage began. Gun flashes lit the sky all along the front. The ground trembled, and the air was split by the roar and rumble of our guns.

Each battalion had a different fire plan. Ours was:

- (a) 53 minutes of fire at maximum sustained rate on previously-located enemy batteries. This began at H hour and continued to H+53.
- (b) Preparation fire on enemy strong points and concentration areas for 73 minutes, from H+53 to H+126.
- (c) On-call missions on all types of targets from H+126 until 1400 hours May 12th.
- (d) Fire on observed missions whenever targets were located by air and ground OPs.

Following the artillery closely, friendly infantry and tanks crossed the river lines, poured through the bridgehead across the Garigliano, and established bridgeheads across the Rapido. On our right the British Eighth Army stormed the town of Cassino, the historic Abbey of Montecassino, and the surrounding hills.

Artillery barrage lines advanced as the infantry and armor progressed. Long range guns near the river lines pounded German supply and escape routes unceasingly. Air forces played their part, bombing and strafing enemy columns as they fled in disorder. Our fire continued throughout the day of May 12th.

As our troops advanced the devastating effect of our artillery fire was disclosed. Great numbers of German vehicles, guns, and tanks were destroyed. Enemy dead littered the hills and roads. Hundreds of prisoners surrendered in their dugouts and foxholes. Most of them were badly shaken and demoralized by our overwhelming barrage.

Our initial mission was to break the Gustav line. We broke it. How the Allied advance continued with great destructive effect on the enemy is now history.

Although this account is presented from an artillery standpoint it is no attempt to discount the work of other arms. The battle was won only by the closest cooperation between infantry, artillery, armored forces, and air corps.

With some modifications due to terrain, weapons, and strength employed, this break-through of a strong defensive zone followed the pattern used so effectively by the British at El Alamein and by the Russians in many of their great victories. Without doubt it will be employed again and again before the final defeat of our enemies takes place. In each case the gun will play a major role.

AS SKIRMISHERS

By Maj. Edward A. Raymond, FA

If the command *As skirmishers* has been given to cannoneers in the current war with Germany, history fails to record the incident. Other specialized arms—the Coast Artillery Corps and the Engineer Corps, for example—are taught infantry tactics in addition to training in their own branch. Three campaigns against the Nazis are showing the Field Artillery the wisdom of that course.

True, field artillerymen are given instruction with carbines, rifles, and machine guns. Very recently combat musketry, in addition to known-distance firing, has been included in basic training. Infantry tactics, however, are not included. The idea seems to be widespread that artillerymen will stay in fox holes at the gun position when attacked, and will proceed to sell their lives as dearly as possible.

A few battery and battalion officers have felt the inadequacy of their own knowledge, and so have put their heads together with friends in the infantry or have gotten themselves copies of FM 7-10 (*Rifle Company*)¹ and FM 7-15 (*Heavy Weapons Company*). They have taught their men what is expected of them in a close defense, and have held some dry runs. They and their NCOs have realized that infantry work depends on maneuver as well as on fire and that control is lost, in very large measure, once men are deployed. *Essential* information and instructions must be put out *first*, and that takes practice. Enlisted men are usually quick to see that if they cower in gun positions under infantry attack they will be smothered with mortar fire and surrounded. The knowledge that they themselves can deploy, maneuver, and cut off the enemy and destroy him produces an entirely different attitude in tight situations.

Every American division but one which fought in Tunisia had one or several batteries overrun.

TUNISIA

In a recent article in this JOURNAL² the writer described the defense of Battery A at Borjtoum. Artillery positions were under infantry mortar fire during the greater portion of the day. Lt. Carr, the Battery Executive, wrote in his report of the action that after a half-hour attack by German tanks had been beaten off with direct fire, "approximately 200 enemy infantry were observed approaching. The order was given to leave the guns and *deploy as infantry*³ to protect the battery position. The men were placed in a position along a hedge to the right, in an orchard in front, and in a ravine to the left. The drivers and wire section took up defensive positions around the farm where the trucks were parked. From these positions the infantry attack was repelled with .30-caliber rifle fire and .50-caliber machine gun fire. When the infantry attack had been driven off, the personnel returned to the guns and continued firing." This officer knew his stuff, and had put it over to his men. They had trained for such a situation. No one who has talked with Lt. (now Capt.) Carr would ever say that the personnel of that firing battery were not scared—but from the fact that only two men were lost in the day's action, it is evident that they were not panicked.

¹Restricted; 40c per copy.—Ed.

²P. 104, February, 1944.

³Italics mine.—E. A. R.

Elsewhere, notably at Kasserine, artillery units as large as a battalion were lost in hostile tank and infantry attacks.

The British in Tunisia shared our own experience. The gallant stand of their 155th Field Battery at Beja has been told in these pages.⁴ The British First Army's final drive for Tunis started northeast of Medjez on 21 April 1943. Owing to the width of "no man's land" it was necessary, on both corps fronts, to emplace much of the artillery on ground not normally held by the British. Two divisional artilleries (each of 72 guns) were lying behind Banana Ridge, protected by approximately one infantry battalion. On the night of 20-21 April, 1943, while emplacement of the guns and dumping of ammunition was in full swing, an enemy infantry attack was launched which surged around the left of the ridge and came on south into the position areas. This was combined with a tank attack from the south and a diversionary attack on a salient six miles to the southwest. As may be appreciated, this action promised to throw a monkey wrench into preparations for a major attack, scheduled to go off less than 48 hours later. There was a lot of fierce and confused fighting in and around the guns, during which time, some miles to the southwest, the enemy appeared on the high ground immediately overlooking the entire back area.

All kept their heads; the infantry on Banana Ridge maintained their positions, the artillerymen (fighting hand to hand in some cases) backed them up, and the net result of this "spoiling attack" was that the enemy left over 500 German prisoners in British hands, lost over 30 tanks, and failed to delay the main attack by even one hour. It might be noted at this point that all combat elements in the British Army receive infantry training; artillerymen learn to function in infantry squads as well as in gun crews, and British units in training pit battalion against battalion in infantry exercises (or "schemes," as they are called). British artillery units in action on fluid fronts prepare rifle pits away from their emplacements, and dig defenses for CPs and other artillery installations.

Another instance from North Africa of the value of this training also comes from the vicinity of Medjez. A British survey regiment (the equivalent of our FA observation battalion) fought in the lines for two hours with rifles and machine guns until relieved by infantry. The story of this exploit was seized upon with great glee up and down the front, and wild tales were told of bespectacled ex-professors of mathematics beating the brains out of Germans with theodolites. Actually the survey unit did hold a key position when it appeared to be lost, and captured 40 Germans.

SICILY

In Sicily an armored field artillery battalion attached to the 3d Div was sent to Trabia on the afternoon of 22 July, independently and without any infantry protection. This was an encircling maneuver made to cut off the enemy as he retreated east along the north coast. The battalion organized itself into a protective formation—point, support, etc.—and set off. It reached Trabia and during the next two days operated as far east as Cefalu.

⁴P. 653, September, 1943.

The battalion commander's Operations Report to the Commanding General, 3d Division (Reinforced), for the period 14-22 July gives the following box score without any casualties of its own:

Location	Prisoners taken		Disposition
Castanova	130	Italians	Turned over to 3d Div inf.
Prizzi	300	Italians	Turned over to 3d Div inf.
E of Corleone	50	Italians	Sent to rear along road
Godrano	200	Italians	Sent to rear along road
Trabia	1817	Italians	} Turned over to 3d Div inf.
	29	Germans	
	15	civilian suspects	
Altavilla (Sicily)	210	Italians	Turned over to 3d Div inf.
Caeano	200	Italians	Sent to Palermo on foot
Cefalu	200	Italians	Sent to rear along road

This same armored battalion, at reduced strength and employing four-gun batteries, next took part in two successive amphibious operations. Both were designed to cut off the enemy rearguard as it withdrew along the coast. The first of these landings (on 8 Aug) was made successfully, though not at the proper place. The artillery functioned in its primary role. Parenthetically, the 105 Howitzer Motor Carriage M7 proved a superior landing vehicle. It could be debarked in as much as 6 of water and still come ashore under its own power. It could operate over soft sand, and negotiate extremely difficult beach exits. Being able to fire without the delay of going into position, it was able to furnish immediate support as soon as it reached the beach. Fire was directed by Grasshopper planes which had skirted the intervening German lines by flying out to sea. In the operation 100 German prisoners were captured and an estimated 250 men were killed. Some 30 enemy vehicles were destroyed, including 2 PzKw IV tanks, and over 10 miles of ground were gained. Our own casualties were 6 killed, 15 wounded, and 16 missing in action. One US tank was gutted and 2 more were damaged.

Within 24 hours preparations were in progress for a second amphibious operation, and on 11 Aug a battalion of infantry supported by Batteries A and C, together with a platoon of tanks and a reinforced company of Engineers, landed behind the enemy lines at Brolo (see Fig. 1).

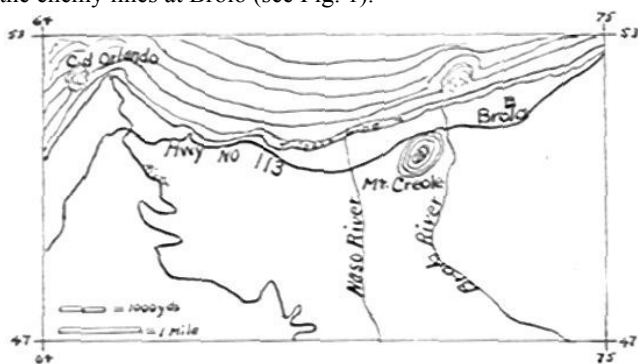


Figure 1

The landing was made at 0230 hours on the correct beach, and complete surprise was obtained. The assault company moved in rapidly and secured the east and west flanks. Companies F, G, and H, and Battalion Headquarters, landing at 0315 hours, moved unopposed to Route 113. By this time the alarm had been given and severe machine gun fire was received from Brolo. The force pushed across Route 113 and the infantry

climbed steep Mt. Creole (Hill 253). Machine guns and heavy weapons were disposed equally on the flanks. The tank platoon landed at 0245 hours, but had great difficulty getting up off the beach. After getting across a 10-foot railroad embankment it got stuck in the dry irrigation ditches of a lemon grove.

The M7s crossed the railroad embankment with great difficulty and took up positions in the grove. "A" fired east toward Brolo while "B" fired west on targets of opportunity. Both batteries found difficulty in operating in the grove. From 0700 on throughout the morning the enemy delivered intermittent mortar and artillery fire and constant MG and 20-mm fire on the American infantry positions. German tracers started grass fires, and it became necessary to withdraw temporarily from the east end of Mt. Creole.

At 1200 hours an enemy concentration of troops, tanks, and artillery was observed east of Brolo. American artillery and mortar fire succeeded in scattering the concentration.

At 1315 hours 7 tanks were seen in the town, with an estimated two companies of infantry. Our mortars were out of ammunition. The artillery was unable to use direct fire due to the short range (1,400 yards) and to terrain features. Air bursts were used to some extent. Naval fires and air bombing were requested on the town of Brolo. This was delivered at 1410 hours and the enemy counterattack was checked.

At 1500 hours a tank and a field piece were observed going into action west of the Naso River. By 1530 hours a steady infiltration of enemy troops was observed to be coming from the west. Meanwhile the enemy in Brolo was re-forming. Naval fires and air attack by P51s were requested again and delivered at 1520. Good casualty effect was seen on the enemy's personnel but no apparent damage was done to his armored vehicles or artillery.

From 1500 to 1800 hours the batteries in the lemon grove and the infantrymen on the hill received heavy, continuous artillery fire. Casualties, however, were relatively light.

At 1600 hours the US company which was holding the east end of the hill was ordered down off the hill to join the reserve company at its base. As this move was accomplished a Piper Cub flew over and dropped a message, "Hold out; help on the way.—CG, 3d Div."

At 1820 hours 3 PzKw IV tanks followed by infantry succeeded in penetrating the American position. They moved west along Route 113 between the Brolo and Naso Rivers on the flank of the artillery position. Two of the German tanks were destroyed by rocket launchers and AT grenades, but not before they had destroyed 7 artillery pieces and 2 half-tracks.

At 1830 hours US planes again delivered a bombing attack, but this time on our own positions. Serious casualties were sustained.

The infantry commander next ordered the two companies which were holding a line near the east end of the hill, and all attached units, including the artillerymen, to withdraw to the top of Mt. Creole. This difficult task was accomplished under constant fire from enemy tanks and artillery. Small groups of men separated from their units dug themselves in in the lemon grove for the night, but by 2100 hours the majority of the Special Landing Force was preparing hasty all-around defenses on the top of the hill. Next day two combat teams of the 3d Div pushed forward and reestablished contact.

The unfortunate artillery in this action had been forced by lack of choice into a most unfavorable position. Popular magazine advertisements to the contrary notwithstanding, M7s

are unequal to slugging it out with tanks in the open at pointblank range. When the tanks are accompanied by infantry the situation is still worse. Only prompt, skillful deployment as infantry can save the day.

The British KBNth Field Regiment was road marching near Lentini in Sicily when it ran into an Italian armored column, which it proceeded to overpower and capture by infantry means.⁵

ITALY

In Italy the same lesson crops up again. "At the height of the German threat to the Salerno bridgehead," wrote *Time* (27 Sep 43, p. 10), "the 189th FA Bn (Lt. Col. Hal Muldrow) was the only force facing German tanks and infantrymen. Muldrow stripped his gun crews, gave them rifles and machine guns. The German spearhead was stopped, enveloped, thrown back."

The commander of the 45th Div Arty, writing from memory about a month later, paints the big picture. One combat team from the division, less one battalion and a battery (see Fig. 2) was ordered to ford the Calore River and move east, clearing a

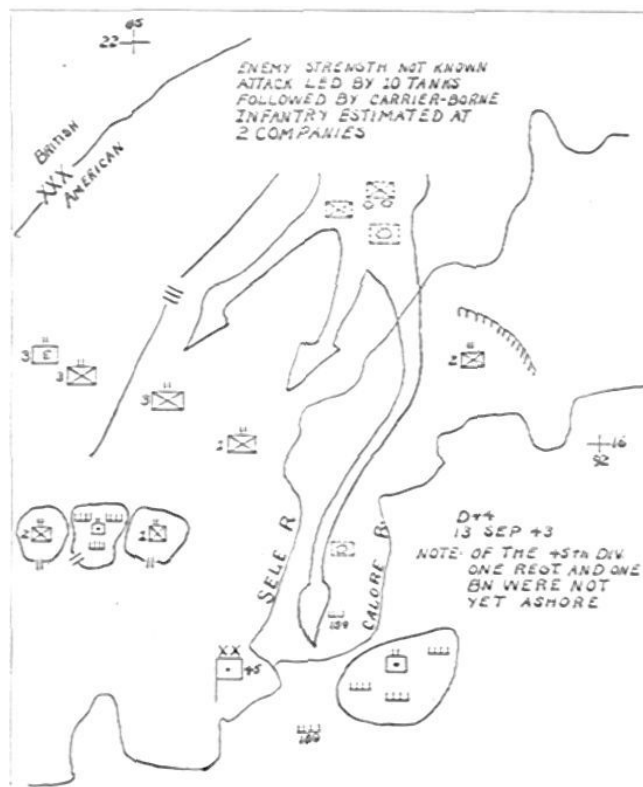


Figure 2

V-shaped salient formed by the junction of the Sele and Calore Rivers. The infantry crossed the Calore on the morning of 10 Sep but it failed to clear out enemy pockets along the two rivers; worse than that, it failed to discover and block a ford over the Sele River. By noon, as the rear of the combat team column was passing the town of Persano, the enemy left in their rear by the American reconnaissance elements opened fire on the last section of the artillery. German tanks and infantry had cut off the combat team. During the day the isolated force pushed on ahead until it met stiff resistance, then took up a perimeter defense.

Meanwhile the 18th FA Bn (medium) arrived and emplaced south of the Calore.

About 1600 the Division Commander arrived and took

command of the zone, sending another combat team forward north of the Sele. This unit moved forward until it came opposite Persano; then it ran into stiff resistance and was halted.

A battalion from a neighboring division was then ordered into the salient between Sele and Calore to reestablish contact with the first combat team. It made the same mistake of not protecting its flanks and the ford over the Sele. It, too, was struck from the rear, this time so forcibly that the whole battalion was scattered. "At this time," writes the Artillery Officer, 45th Div, "the 189th FA Bn in its position south of the Calore saw about 16 vehicles coming down the road from Persano; some were armored and some carried infantry. Upon inquiry the neighboring division reported by telephone that the vehicles belonged to the battalion it had sent into the salient. The (189th) artillery battalion commander had his fire direction center only about 300 yards south of the American ford over the Calore. He and his executive started forward and, at the ford, were fired at from one of the vehicles at a range of not over 100 yards. They quickly took cover, worked back to the FDC, mobilized their CP personnel and antitank weapons, and opened fire on the vehicle.

"In the meantime another FA battalion, emplaced to their right rear, ordered up all extra cannoneers and reported the situation to the division artillery CP. The Division Artillery Executive was on duty. The Artillery Commander was north of the Sele conferring with the Division Commander, who was engaged in rapidly shifting his troops to meet the serious attack situation there. The Executive reported his information to the Artillery Commander by radio and was told to take command of all troops in his area and hold until infantry could be got there. He immediately reinforced the artillery, now deployed along the high ground, with detachments of engineers, tank destroyers, artillery, and miscellaneous units. The Division Commander ordered a company of infantry entrucked and moved to the artillery sector.

"Although both FA battalions had battery emplacements within a few hundred yards of the enemy they refused to budge from their positions until other troops had taken over the front-line defense and they had been twice ordered to a new position."

As this article is written indications are coming to hand from Anzio that there, also, artillerymen have had to use their secondary weapons.

TRAINING AND METHODS

The training of artillery organizations for infantry combat is left to the responsibility of unit officers and NCOs. It is they who should work out their own secondary line-ups with infantry weapons. These will vary according to the T/O & E of the organization, but will not exceed the infantry platoon in size. There should be squads of approximately 10 men each, with pairs of Bazooka men incorporated. There should be a machine gun squad per platoon. Platoon headquarters must include a number of runners, as they will be the normal means of communication.

Junior officers and NCOs themselves should learn and then teach their men:

Squad formations in combat, fire discipline, and use of ground. Also arm and whistle signals.

Visual training, to include judgment of distance and recognition of targets.

Night training.

Attack of armored vehicles by infantry means.

Use of the bayonet.

⁵P. 165 of this JOURNAL for March, 1944.

Junior officers themselves should learn and then teach their NCOs:

**Principles of maneuver—attack, defense, and security by day and night.
Conduct of patrols and study of terrain.**

Application of fire.

Wood and village fighting.

Technique of control—messages, reports, and orders. This point bears some elaboration.

When a unit acquires a high degree of training, orders can be fragmentary. A platoon commander must always be perfectly sure, however, that everyone understands his order. Since infantry training in an artillery unit will ordinarily be somewhat sketchy, it will save time in the long run (and prevent costly errors) if the verbal order covers to the extent appropriate in the specific situation:

1. **Information of the enemy, including probable intentions.**
2. **Information of own troops, including the support to be expected.**
3. **Mission.**
4. **For each rifle squad: frontage, objective, axis of advance or withdrawal, any restriction on movements of the squad. Initial point, start line, and time of start. Fire plan, including restrictions on ammunition expenditure and use of smoke.**
5. **For machine gun squad: position, sector of fire, final protective lines, instructions for opening fire, priority of construction for improving emplacements and clearing fields of fire.**
6. **Security.**
7. **Axis of communication.**

Junior officers should, in addition, learn how to devise and conduct exercises. These can be made realistic and entertaining, and a welcome relief from route marching as physical hardening.

Junior officers should remember that the keynote in minor infantry tactics is the same as in sport—*anticipation*. Action must be started before the need for it arises. Plans for contingencies should be prepared beforehand. Where offensive action is necessary to defend a position, a simple plan, based on detailed reconnaissance, should be formulated ahead of time.

The squad first fired upon should seek to hold the enemy engaged, while remaining squads take advantage of this covering fire to encircle the enemy if possible. Rifle grenadiers are on the flanks. If enfilading fire from automatic weapons can be brought to bear, so much the better. Men should arrive at an objective together, so should start approximately on line.

When a position defense appears to be a good solution, foxholes or trenches should be prepared in a position suitable for all-around defense—preferably in a triangle if the ground permits. Squads should be within 30-60 yards of one another. If wire can be obtained, it should be put out at least 35 yards from the position in order to keep the enemy out of hand grenade range. Field fortifications should conform to the ground and should be camouflaged whenever time allows.

We train our men to handle infantry weapons; we have not trained their leaders to handle their men as infantry. Artillery has had to fight with secondary weapons often; any unit may have to do so. The junior officer or NCO who is worthy of his men will make good his lack of knowledge before it is too late.

O.A.C. PRELIMINARIES

By Lt. Col. George C. Duehring, FA

Dear Joe:

It was good to hear from you again and to learn that you are coming to Sill in about a month to take the Officers Advanced Course. Your query as to what it would be profitable for you to brush up on in Gunnery before coming here is pertinent.

Some students arrive here with the idea that Gunnery is general in its scope in this course. That is not true. There are about 220 hours of Gunnery in the course, and every period is designed to give both the Government and the student their money's worth.

About 60 hours are devoted to observed fires. Before coming here review carefully the preparation of fire by aiming point and deflection, and by compass. Perfect your procedure in the conduct of fire by axial, lateral, and forward observer methods. Do not be superficial—spend as much time as you can shooting problems on a terrain board or table top.

In the realm of corrections study the determination of K and the deflection correction, the determination of VE , and the solution of the metro message. These items are basic, of course, but a refreshed knowledge prior to coming here will give you more time for other studies.

Have you looked up a logarithm lately? Well, you might do so, and practice solving right and oblique triangles by logs. Yes, that is basic, too, but quite a bit of practice is necessary before proficiency is gained, as you know.

The paragraphs in FM 6-40 pertaining to center-of-impact registration and high burst registration are valuable, as are the paragraphs dealing with the observed fire chart. Do some work

with them.

All of the foregoing is basic and the hours you can spend in preparation before coming here will pay dividends—big ones.

Now, if you have still more time available sit down with a copy of TM 9-526 and a Graphical Firing Table and practice with that boon to the Arm. You will spend many hours here with the *GFT*. A pre-arrival familiarity is an asset, although not a necessity.

After reading the above you are probably wondering why you should come to school after studying all of the mentioned items. However, I have made no mention of survey plans and procedure; fire direction for the battalion, division artillery, group, or corps; time, ricochet, or high angle fire; prearranged and scheduled fires. All of those subjects will require your close application here. The school requires a high standard of accomplishment, so the better a student is grounded in fundamentals the more time he has to study all of the other material offered in the course. Gunnery is the subject which seems to be the most difficult for students to grasp, which is another reason to work on it in your spare time prior to arrival.

Notice that I have not mentioned the firing battery. There is no time in this course for its study. Any refresher that you can get will be profitable, of course.

Do not get the idea that the entire course is Gunnery, but it was Gunnery that you asked about and it is effective fire that does the business on the battlefield.

I am looking forward to seeing you again.

Sincerely yours,

COUNTERBATTERY

By Lt. Col. Walter Thomas, Jr., FA

ABOUT THE AUTHOR

Colonel Thomas is Counterbattery Officer of our II Corps. As such, he has had experience in Tunisia, Sicily, and Italy. He operated under the organization here described, and found that it works.

WHO DOES THE WORK

Officers

Counterbattery Officer supervises all activity of the CB section, contacts and coordinates with Counterbattery Officer of adjacent corps, represents this section at planning conferences, presents counterbattery plan to planning staff, and coordinates the artillery plan with the work of his section.

Operations Officer serves as executive of the section. He supervises all operational activities, i.e., assigning missions, keeping operations journal, recording fire possibilities of all units of the corps (including adjacent corps artillery). He also prepares counterbattery preparations with the help of the Intelligence Officer and issues same to brigades and division artillery headquarters.

Assistant Operations Officer assists Operations Officer and acts as understudy; keeps the general situation map; keeps chart of observed fires (this is kept on an overlay in 5-day periods for purposes of comparison and study); keeps daily list of observed fires; keeps a record of all missions assigned by the Counterbattery Section; and prepares operational portion of the daily report.

Intelligence Officer makes a continuing study of enemy artillery positions, keeping record of trends of movement by different calibers; informs Corps G-2 (or Corps Artillery Liaison with G-2) of locations, strength, and activity of enemy artillery, giving all pertinent information relative to shelling received; exchanges information with lower unit S-2s, particularly with division artillery; isolates and identifies new positions, particularly long range; maintains close observation to detect changes in enemy tactics; investigates technical aspect of counterbattery (identification of shell fragments, different weapons, and various ammunition in use); prepares and keeps up to date the Hostile Battery List; directs work of Photographic Interpreter; prepares intelligence portion of the daily report or supervises preparation; and supervises the work of Assistant Intelligence Officer.

Assistant Intelligence Officer assists Intelligence Officer, supervises work of Hostile Battery Historical File clerk, supervises daily operations overlay, makes any special studies directed by Intelligence Officer, and prepares intelligence portion of the daily report under supervision of Intelligence Officer.

Photo Interpreter (stationed at APIU) extracts all photographic information of enemy gun positions from PIU reports and from reports of interpreters at APIU, maintains a systematic file of all gun positions found on photographs, transmits information to the Counterbattery Officer by fastest available means, upon request of Intelligence Officer makes a search of suspected areas for enemy gun positions, and checks locations from daily Hostile Battery List of observed missions against photographic cover.

NOTE: All officers must be capable of functioning in any capacity for short periods. 24-hour operation is imperative.

Enlisted Men

Chief Clerk supervises activity of all enlisted men and is able to substitute in any position, performs administrative duties (distribution of reports, obtaining of supplies, etc.), acts as typist, keeps operations journal (assisted by clerk), and keeps files of publications and reports of units.

Clerk and Typist assists in typing and filing, keeps operations journal, and performs general clerical work as assigned by officers.

Draftsman and Clerk (two are included) do all plotting on operations overlay, do the drafting for counterbattery preparations, keep the observed fire chart, and assist Hostile Battery Historical File clerk.

Hostile Battery Historical File Clerk with assistance from draftsman files in the Hostile Battery Historical File all information pertaining to enemy positions, keeps the file of photographic locations up to date and notes whether occupied or unoccupied, and assists in drafting.

Photographic File Clerk and Typist is at APIU.

Communication Personnel perform normal functions.

Photo Interpretation

Photo interpretation was the only sure means of locating positions and distinguishing them from roving gun positions. The interpreter is not infallible, however, and will miss some positions and can be confused by dummy positions. But the interpreter gave our best-defined locations, including number of guns, type, width of front, facing, and whether position was occupied or unoccupied.

Photographic locations were plotted on the operations map and were marked as either occupied or unoccupied. The operations overlay was placed on top of the operations map to permit a ready reference to photographic locations while plotting flash azimuths, "shellreps," sound locations, or observed missions. The photo interpretation locations were not fired upon until some supporting evidence of activity was obtained from a "shellrep," a sound location, or observation. However, on a counterbattery preparation photo interpretation locations that were recent and listed as occupied were included.

The Intelligence Officer used photo interpretation locations as a basis and added to them the sound locations, observed missions, and information from other sources; this located the areas in use by enemy artillery and the types of material in these areas.

The officer from the Counterbattery Section stationed at the APIU collected and filed all locations and information pertaining thereto. After each sortie was flown he immediately notified the section of new positions and any changes in old ones. The Photo Interpreter also examined the areas indicated by sound and flash locations, thus adding to his knowledge of the enemy positions. This proved helpful in locating long range guns. At the request of the Intelligence Officer the Photo Interpreter examined suspicious areas and made a report of activity of installations found.

Observation Battalion

The Observation Battalion, in constant contact with the Counterbattery Officer, furnished the most locations.

Flash locations were telephoned immediately to the Brigade

S-3 from the flash platoon, were fired, and a report of completion was made to the Counterbattery Section immediately. The locations were plotted on the operations overlay and filed in the Hostile Battery Historical File. Flash locations were considered as accurate as photographic interpretation locations, but the flash observation posts could seldom give the detail obtained from photographs.

Sound locations were forwarded to the Observation Battalion S-3 by telephone as quickly as possible after plotting by the sound central. He examined them, added any pertinent information he might have previously recorded, and telephoned the location to the Counterbattery Section. This clearing through the S-3 was necessary to coordinate the work of more than one sound base. Normal installation included two 4-second bases and one 2-second base.

A sound location received by the Counterbattery Section was plotted on the operations overlay. It was compared with shelling reports for time and direction, and with other information in the Hostile Battery Historical File. In the event that substantiating evidence was produced, either the sound plot or a more accurate location (within limits of the accuracy assigned to the sound plot) was fired. The sound plot was filed in the Hostile Battery Historical File for future reference. Sound plots were given an accuracy by the Observation Battalion which was recorded, but sound plots were never fired without substantiating evidence.

Ground and Air OPs

General surveillance of the battlefield was of such tremendous proportions that no one agency could give a complete picture. The Counterbattery Section had special agencies, such as the Observation Battalion and Photographic Interpretation, to concentrate on the enemy artillery; however, ground and air observers added a large amount of detail and did in some instances direct the attention of these special agencies to guns that had been undetected.

Battalion ground OPs conducted the large majority of observed fire missions. The completed mission was reported immediately to the Counterbattery Section, where it was plotted on the operations overlay and filed in the Hostile Battery Historical File.

OPs could not always conduct fire on enemy batteries, especially at night. However, a flash azimuth forwarded to the Counterbattery Section was combined with other available information. By extracting pertinent information from the Hostile Battery Historical File and using the azimuth given by the observer, the Counterbattery Section could often decide which enemy battery was firing or could direct the flash OPs and Photographic Interpreter to suspicious areas. When the personnel of all units reported instances of enemy artillery activity based on coordinated time, the compilation of this information would isolate or even identify the enemy gun position.

Similarly, the observers reported enemy shell fire falling in friendly territory. The filed and plotted details of these observations presented a full and informative picture of the extent of enemy shelling within our lines. In many instances units were unable to report shellings because of communication difficulties or because of being pinned to the ground. The observers' reports included time and location of shelling, giving the Counterbattery Officer enough information to start countermeasures.

Air OPs were increasingly useful to the Counterbattery Officer, not only in adjusting fire on guns hidden to ground observers but

also in reporting other details especially valuable to counterbattery intelligence. Either by the use of map coordinates or from marked photographs the air OPs were helpful in finding positions that were defiladed from ground observers. Radio contact was maintained while the plane was in the air. The information received was acted on immediately or was filed for reference.

G-2

The information which Corps G-2 received from sources not usually available to all units was forwarded promptly to the Counterbattery Officer by an officer of the Artillery Section at Corps Headquarters. The more productive sources were:

Air Corps Tactical Reconnaissance Squadron. The locations given were map spots and the accuracy was doubtful; where long range guns were spotted while firing, however, valuable intelligence information was obtained. All information was plotted and filed in the usual manner.

Prisoners of War. Prisoner of war interrogation reports were studied at Corps Headquarters, and any information about artillery was forwarded to the Counterbattery Section.

Civilian Reports. Civilians were questioned by G-2, and in several instances gave useful information. Guns, especially large guns or artillery installations, were frequently noted by civilians who gave fairly accurate information of general areas.

Order of Battle. G-2 was particularly interested in the enemy artillery Order of Battle. The Artillery Intelligence Officer furnished information of groups of light, medium, and heavy artillery, and G-2 from these reports and information from other sources could usually place organizations of the enemy artillery in particular areas. Working with the G-2 Order of Battle, the Intelligence Officer was able to estimate the number of enemy guns opposing the Corps.

While the reports of locations from the above sources were not accurate enough to fire upon, they did give a background and when added to other information in the Hostile Battery Historical File were quite valuable.

WHAT THEY DO WITH IT

Hostile Battery List

For ready reference and for use of units, the Counterbattery Section maintained a list of the most recently active positions, known as the Hostile Battery List. It was prepared from the Hostile Battery Historical File and included all occupied photographic interpretation locations, some flash locations, observed missions, and sound locations that had repeated several times. The occupied photographic interpretation locations were included without further verification. Flash locations and observed missions were included if the record showed previous activity and if the last activity was within a 72-hour period. Sound locations were included when they had repeated several times within the 72-hour period. The list was published and amended daily in the Counterbattery Report; at irregular intervals an entirely new list was made.

The purpose of the list was to keep units informed of the latest areas of activity and also to have in several different places the best locations so that another agency would have a fairly good base on which to start operating in case of loss of the counterbattery records.

"Counterbattery Preparation"

The purpose of a counterbattery preparation is to neutralize enemy artillery during an attack. The locations were selected in much the same way that the counterbattery list was prepared, and then the number of locations were reduced by

elimination. The result was a list of the most accurate locations that had been active in the previous 72 hours. The preparation was usually fired immediately after the infantry preparation; it was on call, however, if need for it developed earlier. The counterbattery preparation was repeated if necessary. There was always provision for observed missions during the firing of the program, and resumption of the program immediately following the completion of the observed mission.

Daily Report

The daily report, titled the "Counterbattery Report," was a report of the day's activities during the period 1800 to 1800 hours. It was divided into sub-paragraphs:

(a) *Enemy Artillery Activity:* Information derived primarily from "shelling reports" and intelligence channels showing areas shelled, concentrations large or small, and type of shelling (such as harassing, counterbattery, and interdiction).

(b) *Enemy Disposition:* Azimuth bearings, number, type, and caliber of shells, estimated range secured from "shelling reports," identification of shell fragments turned in, sound locations, observed fire missions, flash bearings from OPs, as well as intelligence information submitted by artillery S-2s—these furnished the information necessary to place the enemy's artillery dispositions and trend.

(c) *Counterbattery Missions:* Sound, flash, air OPs, ground OPs, unobserved (including sound), showing number of each. Included in this paragraph are counterbattery programs fired.

(d) *General:* This paragraph included: (1) the weather and its effect on sound ranging and flash spotting; (2) counterbattery missions fired by all artillery in the Corps, showing coordinates, target description, by whom fired, time completed, method of observation, and effect obtained; (3) additions and deletions to Hostile Battery List; and (4) technical or other data, if any.

FORMS AND THEIR USE

Shellrep

To expedite the transmission of shelling reports, the form shown herewith has been adopted. For column "Item," fragments of the shell wall which retain the portion in which the rotating band was embedded (preferably this should extend to the base) are a definite source of identification. A portion of the rotating band is desirable but inconclusive evidence. A few measurements of these fragments will disclose the type and caliber—and maximum range—of the weapon from which this projectile was fired. (Tag these fragments with a brief description and direct them to the Counterbattery Officer.) Large portions of comparatively unsplintered, thin-wall steel fragments will serve to identify rocket projectiles. If otherwise undetermined, caliber may be broadly designated as light, medium, or heavy, with "type" as HE, smoke, or armor-piercing.

It is unreasonable to expect all the details called for to be included in a single shelling report. Experience shows, however,

SHELLING REPORT FORM
Use Appropriate Columns to Report Artillery Soundings DATE -----

A	B	C	D	E	F	G	H	I	J	K	L
Observed by (Initial)	Map Loc	Direction of Shelling	Caliber	Area being Shelled	Time from	Time to	No and Type of Guns	No, Cal, & Type of Shell	Nature of Fire	Dist. (Yds)	Flash (Sound)

* C.S. Report Harassing, G-2 Report, In/Out (Preparation) Interdiction

that information coming from other sources relative to the same shelling frequently permits further details to be added.

The importance of establishing the number, caliber, and type of guns that are being employed by the enemy must be given serious attention. Errors induced by the common habit of terming a "gun position" as an "enemy battery" which in a local narrow front are not serious, greatly magnify the enemy's strength when applied to a corps front. "Battery" is indicative of four guns. Where at all possible observers will designate numerically the number of guns in position. Exercising care in this regard will bring out the extent to which the enemy is employing an excessive battery front, or individual pieces.

Counterbattery units used the same form as did other artillery units. Reports of shelling came to the attention of the Counterbattery Section by telephone (or radio) as quickly as the information could be accumulated and transmitted by the S-2 or any observer. On receipt, the information was plotted on the daily operations overlay. This gave a graphic picture of the observer's position, area shelled, and direction from which the shells were coming. The accuracy of this azimuth therefore determined, to a great extent, the selection of an active enemy gun position. The accumulation of similar shelling reports built a more accurate picture of shelling activity, areas within range of enemy artillery, particular locations under enemy observation, and to some extent the disposition of hostile artillery. Thus, each single shellrep had its value as a factor in determining future counterbattery action as well as the summarization of the day's action found in the Counterbattery and G-2 Reports.

Log

This book was made up in two parts, listing daily all shelling reports on one page and all enemy gun locations on the opposite page. On the one side, therefore, was a complete summary of all shelling reports received in any hour or for any period. Here, then, was the comparison of similar reports, to balance out duplicate shelling, caliber of active guns, type of fire, and areas getting shelled according to an obviously coordinated plan.

On the opposite side were entries of enemy gun locations—which were for the most part sound and original flash but also included locations obtained from any source, such as reports from Prisoners of War, Civilians, Air Observers, Photographic Reconnaissance. These entries were made with particular attention to time of activity, thereby comparing as nearly as possible the event of each shelling with the reported activity time of one gun location.

The Log with this information was therefore a composite of daily enemy activity, from which were extracted items for the Counterbattery and G-2 Reports and enemy gun locations for the Hostile Battery Historical File. (See next page.)

Telephone Slip

Much of the valuable information that reached our office

Rec'd by:	From whom:			Time			Loc			
A	B	C	D	E	F	G	H	I	J	K
Sept	Loc	Direction	Dist	Area	From	To	No/type	No/cal	Dist	Remarks

Sept by: Coordinates Time active No/guns Loc Obs by Time CR'd

PLOTTED: _____
FILED: _____

LOG FORMS (Right Page)

	A	B	C	D	E	F	G	H	I	J	K	L
Slip No	Rept d By	Map Loc Obsvr	Drctn SdFIFw	Estim DisLoc	Area Shelled	Time From	Time To	No, Cal Guns	No Shells	Nature Fire	Dama ge	F/B Sec

LOG FORMS (Left Page)

Slip No	Time Now	Orig Reptd By	C.P. Coord	HB Name	Time Active	Guns		Accy	Plot		CB'd	Details (Effect)
						No	Cal		Pl	St		

came by telephone. Quite often the amount was increased and accelerated by spurts of enemy activity. To avoid possible loss of this information and to facilitate accurate office procedure the telephone slip in use was a numbered form, divided to contain information of the shellrep (described above) and reported active locations of enemy artillery (part of Log described above).

A slip filled in at the telephone became a working tool that went through the hands of the various office personnel who made either extractions or additions and passed it along to the next proper person. When a slip had completed its function, it was filed numerically with other slips of the day to be retained as a reference for whatever period was necessary.

Mission Request Sheet

Date: _____
 Mission No: _____

TO BE COMPLETED AND RETURNED TO CBO:

Name	Type	Descrip	Coordinates	Conc No	Height	Time used	Time completed	No

This form was used only to improve and coordinate the counterbattery entries in the operations journal of this office with those of any artillery units to whom counterbattery targets were assigned.

Operations Journal

The record of all counterbattery missions fired is a most valuable reference. Information from the Operations Journal was recorded in the Hostile Battery Historical File, plotted on the observed mission overlay, and reproduced in the daily counterbattery report for the attention of battalion S-2, S-3, and observers. This is the form used in this campaign:

Source	Tgt Descp & Coord	Conc No	Time Reqd	Asgd To	Type of fire	Time Asgd	Time Comp	No Rds	Effect	Adj Coord	Obsr

Hostile Battery Historical File

A file card system was used for the purpose of recording information of enemy artillery positions, known as the Hostile Battery Historical File. A card was filled out for each new location with a tolerance of 200 yards as the factor determining when two locations should be entered on separate cards. The 200-yard tolerance could be in both X and Y coordinates. This card contained all information about a particular position, including

number of times active, and number of times (with the number of rounds) the position had been taken under counterbattery fire. There were over 800 cards in this file at the time of relief, of which about 200 were in more or less constant use.

HOSTILE BATTERY HISTORICAL FILE											H B NAME	
											COORD SQUARE	
1	2	3	4	5	6	7	8	9	10	11		
Log No	Corrected Location	Reported By	Date & Time	No. of Guns	Type	Cal	Uncorrected Location	Reported By	Time	Original Source		

HOSTILE BATTERY FIRE						Active Machine		OUR COUNTER BATTERY FIRE				
Log No	Coord & Tgt Descp	Reported By	Date & Time	Number Rounds	Effect	Log No	By Whom	Date & Time	No Rds	Effect		

* Coln No 11: Sng Dir Sound, Flash, Air Gun, Air Photo, P/W, Shelling Reports

The form used is shown here. It is, however, in process of being revised.

Operations Overlay

This was a graphic picture of the enemy's activity for any period; it was found that a limit of 12 hours separating night from day activity was more efficient. On this overlay were plotted shelled areas, and shelling azimuths obtained by observers from sound, furrow, or gun flash. The addition of sound locations and gun positions fired on by forward observers made this overlay, with a background of photographic positions, the mechanical director of counterbattery. Its accuracy was dependent upon the accuracy of observers and the quantity of information obtainable. This picture of enemy activity was always available for translation to G-2 or the Counterbattery Daily Report, and for study of movement and grouping of enemy artillery.

Observed Fire Overlay

This is a study of comparisons between a background of photographic positions and a 5-day plotting on the overlay of observed fire missions. The background of photographic positions, identified by observers, filled the need for recognition of movement and camouflage. It was a quick reference for repeating fire on a previously observed target since the plotted position gave adjusted coordinates, concentration number, type of target, and date of firing. The observed fire overlay in conjunction with the daily operations overlay provided an accurate basis for rapid determination of offending enemy guns on which it was sometimes wise to place immediate neutralizing fire.

COUNTERBATTERY-RIGHT NOW!

By Capt. Edward G. Seidel, FA

The primary mission of our battalion of 8" howitzers is counterbattery. The most successful way to carry out this mission is by observed fire—conducted from OPs. Let's follow the course of our observer on an OP for the first time.

Once established, the observer begins to acquaint himself with the terrain in front of him, comparing it with the map he carried up to the OP. Shortly, he picks up the flash of enemy artillery. He studies the terrain near the flash, checks with his map, and decides on the location. A call to fire direction—and a ranging round goes out. He adjusts and finally gets into fire for effect. By that time the enemy battery has completed its mission and the personnel is under cover. He walks through a zone, reports "Mission accomplished. Neutralized." Thus we preserve a polite fiction.

That battery was not neutralized. It ceased firing when its mission was accomplished, not as a result of the counterbattery fire.

The same observer stays with his OP for a period of days and soon, if he is smart, has developed for himself some sort of chart or sketch with the known locations of enemy batteries indicated. Now if an enemy battery opens up, he calls for a concentration previously fired and really does neutralize the enemy battery.

Then what happens? The observer is relieved. He hands over his notes to the next observer, who finds them unintelligible and has to go through the same process for himself.

How, then, can a fresh observer man an OP and utilize all the information previously obtained by other observers of the battalion, by sound and flash, by photo reconnaissance, by all the other instrumentalities of our intelligence? How can he get fire out there in a hurry when he spots a flash?

Here is a solution which we have tried with some success.

The battalion S-2 plots daily the known enemy battery locations received from all sources. These are keyed as plotted in order to tell how recently each location has been active. Our system is to plot the location on a 1/50,000 map. The map has a sheet of acetate over it, and in a small grease-pencil circle is written the day of the month on which the activity was reported. Locations which are inactive for long periods are erased from the acetate but the plot of the location remains on the map together with the concentration number assigned it. Also plotted are the locations of all OPs.

Now our observer reports to the S-2 that he plans to go to the OP in a few hours. Using only the more recently active locations, the S-2 prepares a sheet listing all these locations in numerical order by azimuth from the OP. A second column gives the range from the OP. Other columns give the concentration number and the co-ordinates. A note on the sheet gives a reference point and a reading by which the observer can orient his BC'scope to read true map azimuth (see Fig. 1).

The new observer then goes to his OP and picks up a flash. He reads the azimuth to that flash. A quick check with his sheet shows a concentration at that azimuth. For further check he can estimate the range to the flash and see if that jibes. Satisfied that he has the proper concentration spotted, he calls fire direction and gives the concentration number and the co-ordinates (to speed plotting on the chart, which may have hundreds—yes, I said hundreds—of hieroglyphics on it). In a

UMPTEENTH FIELD ARTILLERY BATTALION "A" BATTERY COUNTERBATTERY CHART

4 April 44

<i>Azimuth from OP</i>	<i>Range from OP</i>	<i>Concentration Number</i>		<i>Co-ordinates</i>
1880	11000	4B39	8295	1075
1925	9900	4B100	8330	1186
1965	15500	4B30	7953	0833
1970	11150	4B97	8222	1131
2365	8050	9B138	7813	1368
2440	7800	4B143	8917	1492
2500	12250	1B830	7687	1145
2590	8900	2B182	7874	1490
2655	13800	4B17	7840	1649
2780	13100	4B58	7680	1710
2790	12250	9B634	7887	1837
2835	9690	9B644	8120	1846
2880	15800	4B141	7462	1880
2910	10050	4B5	7586	1892
2915	15200	9B641	7482	2017
2945	11240	9B640	7546	2035
2970	8990	1B272	7557	2083
2985	10050	9B26	7830	2089
2995	12050	9B639	7820	2070
3000	11260	4B89	7789	2089
3020	14650	9B642	7806	2080
3080	9430	4B90	7761	2112
3105	9700	4B54	7800	2191
3110	13100	9B637	7772	2205
3110	9800	9B608	7710	2252

NOTE: To orient your instrument, use reference point JOE and lay on it with reading 4987. Your readings will then be true azimuths. When calling for fire, use concentration number AND co-ordinates to speed plotting. Use blank space for remarks and suggestions.

Figure 1

relatively short time he gets the desired result—counterbattery fire on an enemy battery still in the process of carrying out a mission. As anyone who has ever been counterbattered can tell you, such fire is far more effective when the cannoneers are at their pieces than when they are under cover. Aside from casualties and possible damage to materiel, a battery which finds that it draws immediate and heavy fire whenever it shoots soon decides many targets are not profitable.

These sheets also help solve the problem of night counterbattery. Two or more OPs read azimuths to the flash. Instead of laboriously plotting out the intersection, it can be determined from the previously prepared sheets.

Another incident—Charlie OP couldn't see the guns but by sound estimated the azimuth as 4100. Able OP caught a flash at 3970, but couldn't adjust because he had the sun in his eyes and the valley was hazy from fog. Only one enemy battery was listed anywhere near this intersection. It was counterbattered with good results. About that azimuth by sound from Charlie battery—using only his two ears, the observer guessed the correct azimuth within 75 mils.

Jerry's trick of shifting to alternate positions and then back again shows up very quickly this way, since his old position is still plotted. When such movement is detected, a phone call from S-2 to OP and a penciled addition to the sheet takes care of the matter.

Fast-moving situations may make the scheme impractical, but with adaptations it should work.

Corps and Non-Divisional Artillery

FIRST OF TWO PARTS

By Lt. Col. D. S. Somerville, FA

EDITOR'S NOTE: Although the Japs have little artillery and use sparingly what they have, the European Theater of Operations presents a quite different picture: both sides use many guns, making counterbattery a very live subject, and well developed enemy strong points require use of reinforcing artillery. Drawing his material from many sources, Lt. Col. Somerville covers the gist of the subject, plus some personal interpolations of his own. Like all JOURNAL articles, this one should not be construed as official doctrine; it does, however, contain much that is worth close attention and study.

These remarks are intended to provoke thought on certain aspects of the handling of Corps and Non-Divisional Artillery not developed in detail in either the new FM 6-20 or the new FM 6-100. They are based on a study of unit and observer reports, articles in service journals, intelligence summaries, available texts, and classroom experience, to which have been added some attempts at inductive imagination. In general they conform to the manuals cited above, although effort has been made to avoid repeating any parts of the manuals except where essential to the discussion. These remarks are influenced by the following beliefs:

1. That artillery will be employed under centralized control whenever possible.
2. That the real power of artillery is in its employment in mass, and that the massed-fire potential is directly proportional to the amount of general support artillery.
3. That the general support artillery, properly used, can and should execute the emergency and "odd job" missions, leaving the direct support artillery free and unhampered to handle its task.
4. That corps artillery has two main tasks: (1) Executing counterbattery and long range fires, and (2) Reinforcing the fires of the division artilleries. Most fires come under mission (2).
5. That before this war is over there will be less "Indian fighting" and more "big business" than has characterized artillery operations thus far.

For purposes of discussion, the subject is divided into three main parts:

- I—Organization for Combat
- II—Communications and Observation (including counterbattery intelligence)
- III—Fire Plans

SECTION I—ORGANIZATION FOR COMBAT

Organization for combat involves the grouping of artillery into tactical units to fit a particular situation, and includes the assignment of commanders, missions, and zones of fire. It is applicable in varying degrees to both the Corps Artillery and the Division Artillery. While the subject is highly controversial, the main principles and considerations can be summed up as follows:

Principles

1. **Weight the main effort.**
2. **Keep habitual partners together.**
3. **Provide a headquarters to command groups of more than two battalions.**

Considerations

1. **Amount of general support artillery required.**
2. **Employing the artillery of the reserve.**
3. **The number of subordinate units under a commander.**
4. **Time and space to use additional artillery.**

PRINCIPLES

1. *Weight the Main Effort*

The main effort may be weighted in several ways: by attaching extra artillery to the unit making the main effort, by providing assistance from neighboring units, and by furnishing general support assistance. These are three commonly used methods, but there is danger in accepting them without reflecting on just what they mean.

Attachment of extra artillery is a two-edged weapon. To give a division or regiment more artillery than it actually needs is wrong for several reasons. It adds to the problems of control and supply of the unit. Worse, it plainly subtracts from the power of the general support artillery of the force, and hence from the massed-power potential of the artillery as a whole. The direct support artillery of a unit can fire only in the zone of action of that unit, unless as a matter of emergency it is necessary to shift it over to assist a neighboring unit, whereas the general support artillery can fire anywhere along the front of the whole force. Thus it is true to say that the massed-power flexibility depends on the general support. There is a tendency to ignore or reject this concept. The great argument for direct support artillery is not power, but *time*. A better understanding and application of proper communication schemes will do much to break down this prejudice.

It is generally accepted that light artillery is best employed under divisions, and it is customary for corps to attach such units. However, to attach the group headquarters of a light group to a division merely because it has also a couple of light battalions attached, may be embarrassing. The division may wish to form direct support groups under organic battalion commanders, and there will be no real use for the group headquarters. Such matters should be discussed informally between the corps and division artillery commanders before orders are issued. As a general rule the division can profitably employ a group headquarters only if it intends to augment its general support artillery, and not always even then.

Assistance from neighboring units. We have casually accepted contingent fires as a matter of routine. It is believed that only a real emergency requires borrowing direct support artillery. Plans for mutual assistance between units should be based on the borrowing of general support artillery.

Assistance from corps artillery. In the past it was accepted that counterbattery was the big function of corps artillery. Now it is increasingly apparent that reinforcing fires—that is, help to the divisions—will constitute most of the missions. By assigning proper reinforcing missions and zones of fire the corps artillery commander can provide assistance to any unit on the corps front. It is felt that adequate help can be given by corps artillery to any division by assigning sufficient units with missions of reinforcing the fires of that division on call, and that the practice of putting any corps artillery in *direct*

support in centralized operations is to be avoided, even though FM 6-20 permits such assignment. Direct support artillery can get up and move on its own volition whenever it deems displacement necessary, leaving a big hole in the coverage of the front carefully worked out by the corps artillery commander. Also, the term *direct support* implies unrestricted use by the troops; their plans will be upset by priority corps fires sent down to this artillery. A better plan, therefore, is not to have direct support corps artillery in centralized operations: either attach the artillery outright or assign reinforcing missions and let the units alone as much as possible.

In all these methods it must be noted that often the most effective help for the main attack will consist of fires initially placed outside the actual zone of action of the unit. We attack where the enemy is weak; therefore we should expect to find the targets that call for the heaviest initial fires lying on one side or the other.

To digress for a moment, this is as good a place as any to go into the subject of reinforcing missions. To avoid confusing the term "reinforcing missions" with "reinforcing artillery" (which is attached) the latter term is not used in this article, the words "attached artillery" being used instead. A reinforcing mission requires that one general support unit furnish liaison and communication with another artillery unit, and answer calls for fire unless priority missions interfere. Only general support artillery can be given a reinforcing mission; it should be given to those units conveniently disposed to perform them.

This brings up another confusion that exists, the idea that a reinforcing unit must have precisely the same zone of fire as the reinforced. This is not true so far as single battalions are concerned, and attempts to enforce it will cause trouble. The past policy in some units of assigning reinforcing missions to particular battalions, rather than to the group as a whole, is faulty. The corps artillery commander should not specify that a particular battalion of a group will reinforce the fires of a division artillery; rather, the order should read "XX Group will reinforce the fires of YY Div with [two] medium battalions." The group commander should be given latitude in executing reinforcing fires. If he is required to specify the battalions, it means that calls for fire come direct to those units, not through the group. If these battalions are firing priority missions they must either refuse the call or go through time-consuming arrangements for the use of other battalions of the group which are idle and capable of firing on the target. The "direct to battalion" calls save a *little* time often; they waste a *lot* of time often. In general it is best to handle these fires through the group FDC when two or more battalions have common reinforcing missions, thus adding flexibility and economizing on liaison personnel and communications.

2. *Keep Habitual Partners Together*

Now to return to the subject of organization for combat. The second principle is that of keeping habitual partners together. This admonition applies most forcibly to the infantry-artillery team, but it can also apply within the artillery itself. Working together, an infantry regiment and an artillery battalion build up a working intimacy that pays dividends in battle. The regiment expects the support of its own artillery whenever it goes into action, and there will be real and justified squawks if it does not get it. Thus the corollary is that the organic battalion commander should command a direct support group composed of his own battalion and an attached non-divisional battalion.

Regulations permit this if the two commanders are of the same grade. Also remember that the attached battalion has no liaison sections: liaison will always have to be performed by the organic personnel. (Forward observers can be obtained from both battalions, but should be controlled by the organic liaison officers with the infantry battalions.)

As for keeping partners together within the artillery itself, it has been said in the past that we have no hesitancy in reshuffling battalions and group headquarters around at will to fit a situation. This concept should be amended to say that, while we will do this recombining when absolutely necessary, we will keep groups together whenever we can. Not only have they too a working-together experience, but it is a difficult matter for any commander or staff to be equally facile at the problems of transport, ammunition supply, fire control, and weapon characteristics of all calibers that might be dumped into their laps.

3. *Provide Headquarters for Groups of More Than Two Battalions*

The third principle in organizing for combat is that we should provide a headquarters to command groups of more than two battalions. We have stated above the desirability of maintaining habitual associations with the infantry. Regardless of the amount of artillery, the infantry commander should deal with the battalion commander with whom he is acquainted and with whom he normally deals. The mutual understanding of each other's personality and characteristics helps to enhance the association and to further understanding and coordination.

CONSIDERATIONS

1. *Amount of General Support Artillery*

How much general support artillery is needed? This is a question without answer. The general support is the commander's first reserve, the power he can instantly impose anywhere on the battlefield. But the direct support is the artillery immediately available to the troops out in front. How much should each have?

It is believed that there has been a general tendency to emphasize direct support and neglect general support. Perhaps this is the result of the types of open warfare that have characterized most operations thus far. But taking the general case, and avoiding such special situations as amphibious operations, attacks of fortifications, etc., the general support artillery represents the biggest single help that can be given at any one point. Properly used, it eases the burden of the direct support by augmenting its fires and by covering the flanks, the deep targets, the avenues of possible counterattack, and, in the case of corps artillery, the enemy artillery. The more the general support takes care of these, the more the direct support can concentrate on its primary job of attacking those enemy forces and installations that directly and immediately impede the troops. It goes without saying that this larger view of the general support embraces faith in communications.

A word as to control of the general support. No general support unit should fire when there is *any doubt* of the safety of our troops. The best information as to the location of our advanced elements comes from the forward observers of the direct support artillery, and missions should be carefully checked with these battalions before fire is delivered. The general support observer is interested in targets well into enemy terrain; once he finds a good OP he stays there while it is

useful, and it is unusual for him to be abreast of the forward observers and in a position to check personally on the progress of the advance. The safe rule, therefore, is for the observer to report the target and let higher authority decide on how and when to shoot it. Often some forward observer can adjust or conduct surveillance.

It may not be amiss here to reflect on the tendency to overemphasize speed of fire on targets calling for massed fire. Most observers want to get *some* fire down right now. Where target location can be accurately determined without adjustment there is no excuse for dispersing with a few rounds a profitable target that could really be smashed by five or six massed battalions. A tank park that has been in a grove of trees for two days will be there for ten minutes more, and these ten minutes are best utilized in relaying a detailed and precise description of the target and getting a substantial mass of fire ready to descend on it. Something of the same criticism applies to observers who stop fire too soon, imagining effect that does not exist. There is no substitute for the judgment and experience of the forward observer; battalion commanders who spend their time well up front have realized this.

There are other factors beside speed of fire (the essential quality of direct support) which point toward the decision as to how much artillery will be in direct support and how much in general support. In decentralized operations the bulk of the artillery may have to be attached to the divisions, and each may have to place a large percentage in direct support. Such would be the case in a landing operation. But we are talking about centralized operations here. Normally all of the corps artillery should be in general support, and since it must conduct counterbattery its strength must keep place with that of the enemy artillery. The number and accuracy of location of profitable corps targets is also a factor. In general, the more coordinated and deliberate the effort, the stronger the general support.

A recent Russian experience illustrates the point that the general support should be powerful and flexible. In this particular operation, involving considerable coordination, the division artillery picked up and followed its rapidly advancing infantry in complete disregard of previously arranged plans of displacement. Because of bad roads and congestion it was unable to fire again that same day, so that from noon until night of the first day there was practically no direct support artillery for the attack. The general support artillery, however, took over and sustained the artillery support during the period. Had the force commander not had a reserve of power at his disposal the attack might have failed. It is interesting to note that the Russian trend of thought is toward putting all possible artillery under high control and keeping divisional artillery to the necessary minimum, as indicated by the fact that Russian divisional artillery now organic is less than half of what it was at the start of the war. Indeed, their desire for centralized control is so strong that in many operations the general support control is not delegated lower than to the army (which corresponds to our corps).

2. *Artillery of the Reserve*

The second consideration is the question of employing the artillery of the reserve. Perhaps this may be better stated as planning for the release of the artillery of the reserve when the reserve is committed. In general, all artillery on the battlefield is used, even though its corresponding infantry, cavalry, or tanks are held out. Following our plea for maintenance of

partnerships, the reserve is entitled to its own artillery when needed—and as it will probably become the main effort when committed it is entitled to generous artillery support. Plans must therefore envisage the changes in organization for combat required when this artillery takes over its new mission; it should not be unduly encumbered or required to scatter personnel and equipment over the landscape. It should not be assigned such a vital part in the general fire scheme that its withdrawal will leave no one to cover its missions or will require major readjustment to provide for them.

3. *Number of Subordinate Units*

It is probably true that efficiency falls off when a commander and staff have more than four units to control. This tenet is reflected in the AGF plan that groups contain not more than four battalions. The problem can sometimes be solved through the use of sub-groups, discussed later.

4. *Time and Space*

Time and space factors enter directly into organization for combat. There is on record the case of one operation by the German artillery in Galicia in 1915 which, after considerable planning and movement of troops, had to be abandoned because the road net would not carry the artillery ammunition needed. The problem of how much artillery to use in a particular operation is therefore not always based on the amount available or the generosity of the high command. It takes about 25 minutes for a battalion on a good road, unmolested by the enemy, to pass a point. A unit of fire takes another 10 minutes. These figures can jump up ten times under adverse conditions of mud or "ball-bearing" sea sand. Movements will often be at night; other secrecy measures slow down movement. Survey takes time. Pioneer work takes time; one of the recent Russian reports describes a situation where the repair of roads and bridges required the attack to be set back two days. And in detailed operations the planning itself takes time: we cannot discover all the enemy artillery overnight, nor can fire plans be drawn up in an hour.

While we are on the subject, it might be well to comment on the priority of bringing in extra artillery for an operation. The sequence should be about as follows:

First: Bring in those battalions that can go directly to battle positions offering good security and cover.

Second: Bring in those that can go to positions offering good security and cover close to battle positions.

Third: Bring in as late as possible those battalions having neither a good battle position nor a good position nearby in which to wait.

Probably this sequence cannot be carried out except when there is plenty of time for planning and movement. It was used successfully by the German artillery in World War I, reconnaissance and survey being planned by the High Command and the work being done largely by the units normally garrisoning the sector. In one operation it was possible to so coordinate arrangements that out of a total of 1,100 batteries something less than 30 batteries had to be brought in at the last moment.

EXAMPLES OF ORGANIZATION FOR COMBAT

The following illustrations show examples of organization for combat, with a brief discussion of the good and bad features of each. Divisional organic artillery is shown as 1st, 2d, 3d, and 4th (medium) FA Bns. The 400 series are attached medium artillery, the 900 series represent heavy artillery. Reinforcing missions are shown by dotted arrows.

Note the great variety of plans that can be made as the

amount of artillery increases. This is a controversial subject, and the illustrations given are not *the* solution by any means. There are probably many others better in some respects, not so good in others.

reinforcing battalion for one regiment; in Plan B the medium will have to do all the reinforcing. Plan A is more flexible in that the 101st FA Bn will be available anywhere later on, as, for example, to augment the artillery of the reserve; Plan B would require some adjusting to release this battalion for such a purpose. In both plans division artillery has 3 subordinate echelons. Note that in Plan B the 1st Inf can get only 2 battalions of general support to help it; in Plan A it can get 3 if needed. The crux of the debate is that Plan A favors general support, Plan B favors direct support.

(Note that a battalion may be given the mission of reinforcing more than one unit, with a stated priority of answering calls for fire.)

Fig. 2 illustrates organization for combat of a division artillery with 2 light and 2 medium battalions attached, plus a group headquarters. Plan A and Plan B differ only in the organization of the general support.

Plan A has 5 units under Hq 110th FA Gp. Plan B combines the 3d FA Bn and 102nd FA Bn (under CO 3d FA Bn) to cut this number to four. Since the reserve (3d Inf) will

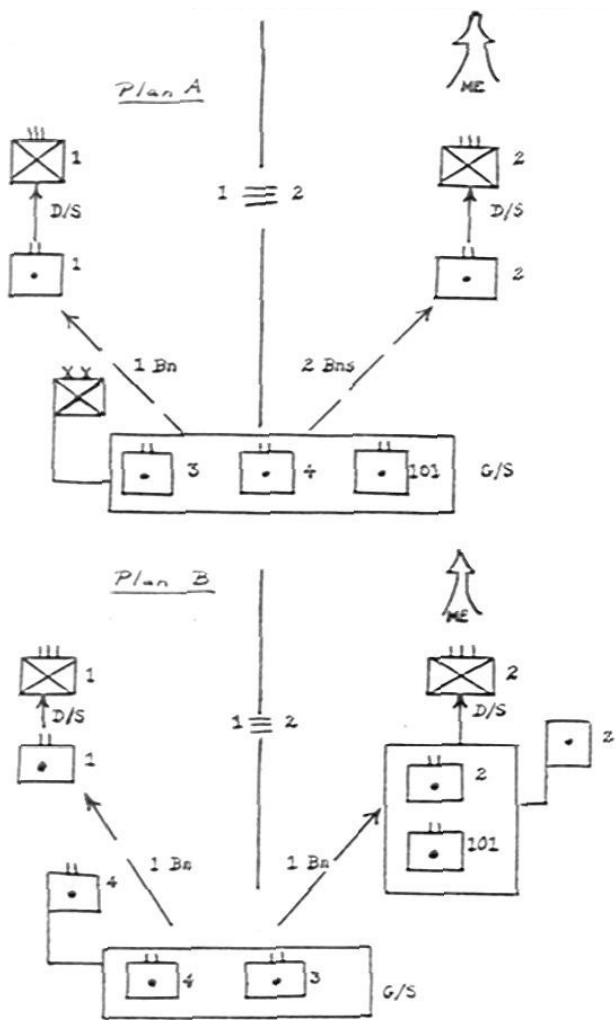


Figure 1

Fig. 1 (Plan A) illustrates organization for combat of a division artillery reinforced by one attached light battalion (101st FA Bn). In this case the general support includes the organic medium battalion (4th FA Bn), the artillery of the reserve (3d FA Bn), and the attached 101st FA Bn. The main effort is weighted by assigning secondary missions to general support battalions to reinforce the fires of the 2d FA Bn. The division artillery is shown as commanding the 3-battalion general support; a group headquarters, if available, could be used, but is not necessary as the 3d FA Bn might be held out as a separate battalion or included in a sub-group with either the 4th FA Bn or 101st FA Bn (preferably the former).

Plan B illustrates the same division artillery, but in this case the 101st FA Bn is grouped with the 2d FA Bn under CO of the latter to form a 2-battalion direct support group.

Let us compare the two plans. Plan A makes one battalion immediately available to the 2d Inf, two others available on call. Plan B makes two available at once, one other on call. In Plan A the commitment of the reserve will take away one-third of the general support, in Plan B it will cut it in half. In Plan A the loss of the 3d FA Bn will not mean the loss of the prearranged

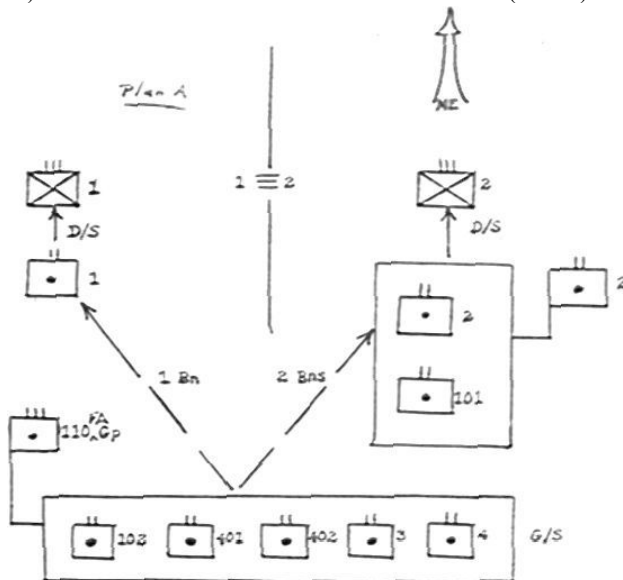


Figure 2

become the main effort when committed it is entitled to at least as much direct support as the original main effort. The subgroup is therefore only a plan whereby the two battalions that will go together as direct support for the 3d Inf will work together from the start. Plan B is the better.

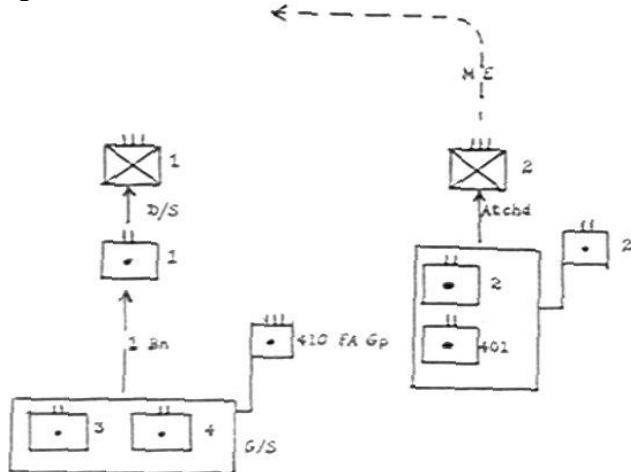


Figure 3

Fig. 3 illustrates a controversial problem, the organization for combat of a division artillery with one medium battalion and a group headquarters attached, the main effort being an envelopment so distant that the general support artillery cannot assist it throughout. It is necessary to attach the artillery of the enveloping force. The problem, of course, is whether the enveloping force gets the 3d FA Bn or the medium 401st FA Bn. The 3d FA Bn will travel faster and the 401st FA Bn is a better general support weapon, but what will you give the 3d Inf when it is committed? Arguments can grow from this, but it is believed better to give the 401st FA Bn to the task force and disregard the difference in mobility for the sake of letting the 3d Inf have its old partner. Again, the enveloping force also may run into targets calling for heavier projectiles.

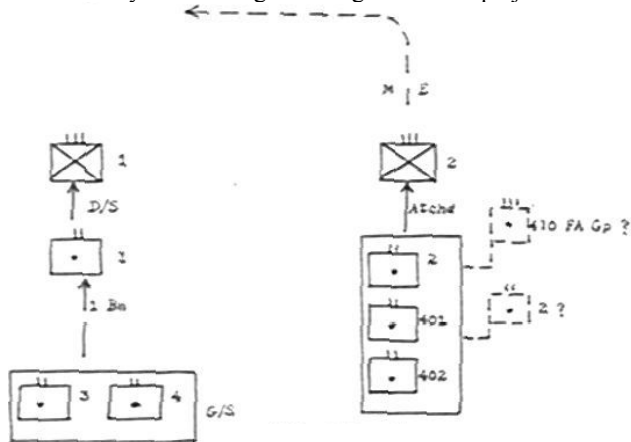


Figure 4

Fig. 4 illustrates a variant of the same situation where the enveloping force is more heavily weighted, there being an additional medium battalion available. In this case the problem arises as to who will command the artillery of the task force. If the division artillery goes along there is no question. If not, there is a choice of overloading the organic battalion commander or of putting the artillery under a group commander, a stranger. Probably the better solution is to let the

CO 2d FA Bn command the artillery with the enveloping force. The Group Hq can be used to command the general support.

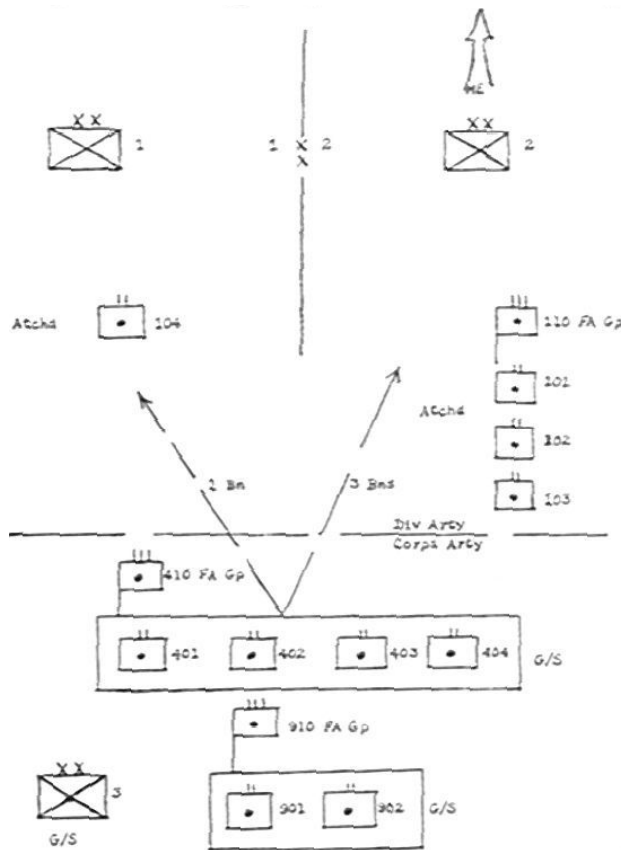


Figure 5

Fig. 5 illustrates a typical organization for combat of a corps of three divisions, two in line and one in reserve. Attached artillery consists of a group of four light battalions (110th FA Gp), a group of four medium battalions (410 FA Gp), and a group of two heavy battalions (910th FA Gp). There are many solutions. In this one, as is usual, all the non-divisional light artillery was in turn attached to the divisions, the medium and heavy artillery being retained as corps artillery. Note that reinforcing missions were given to all medium battalions, but that the heavy artillery was held outright for corps missions. They can reinforce if necessary, but if the estimate of artillery needed for the operation was accurate the two heavy battalions will be kept busy on long range fires. The artillery of the reserve division (3d Div Arty) was employed as a unit under corps control, but was not split up or otherwise entangled, as we wish to avoid difficulties in releasing it when needed by its own division.

SUMMARY

While there are many schemes for organization for combat as the amount of artillery increases, so long as the general principles and considerations given above are kept in mind there should be little trouble in finding one that will work well. This article has advocated strong general support under centralized control. Even on extended fronts there should be centralized control if communications will work and there is reasonable overlap of fires. In the following sections there will be shown communication and fire control procedure that should make it possible to mass on a target all the corps artillery within range with little more difficulty than to mass a group or fire a single battalion.

MALAYA

-:- By Col. Conrad H. Lanza

Malaya, as the term is used in this article, includes only that part of the Malay peninsula which prior to the present war was under British rule and control. Politically, this area includes:

British Colonies:

Penang
Wellesley Province
The Dindings
Malacca
Singapore

Federated Malay States:

Perak
Selangor
9 small states, designated as Negri Sembilan (Malay for 9 states)

Independent Malay States:

Perlis
Kedah
Johor
Kelantan
Trengganu

This group of small countries occupies that part of the Malay peninsula south of North Latitude 6° 50'. The north boundary is Thailand. The maximum length of the peninsula in a NNW-SSE direction is 435 miles; its maximum breadth (measured at right angles and near the center of the peninsula) is 185 miles.

The backbone of the peninsula is a range of rough mountains, having no general name and nearer to the west than to the east coast. Mountain slopes are steeper on the east than on the west side.

On both sides of the mountains are low lands—often flat, sometimes rolling. Part is cultivated, but except near the sea the major part is unbroken and uninhabited jungle.

On the west side the coast is protected from the southwest monsoon by the high ground on Sumatra; consequently the sea on this side, while subject to local squalls, is not subject to storms and does not have a southwest monsoon rainy season. This coast is habitually bordered by dense mangrove swamps, which are a difficult obstacle to invasion landings. Sandy beaches are rare.

The east coast is subject to the northeast monsoon, with very rough seas during this period (normally from December to May). These rough seas prevent mangrove swamps in most places, and this side of the peninsula is bordered with fine sandy beaches. The Japanese took advantage of this in December, 1941, in debarking large forces on the east side.

The greater part of the population lives on the west side of the mountains. Good roads and railroads, and numerous towns, facilitate communication between all sections. The east coast is sparsely settled. At the northeast tip is an inhabited area, connected by road and railroad with the west side of the peninsula. At the center of the peninsula is a road from one coast to another. There is no road on the east side in a north-south direction, and communication in this direction for an invasion force would have to be improvised.

Besides opposing local resistance, an invasion force landing on the west side is liable to attack from the north, from enemy forces based on Thailand. Against enemy forces coming from the east side of the peninsula, covering forces are required only across the two routes mentioned. As these cross rough jungle

mountains, blocking should neither be difficult nor require large forces.

The Straits of Malacca, on the west side of the peninsula, are 160 miles wide at the north entrance. They decline in width to 25 miles at the south end. Both sides of the Straits are held by the Japanese. An amphibious expedition against either Sumatra to the west or against Malaya to the east, is open to attack by enemy air forces operating from one side of the strait to the other. As both shores are lined with mangrove swamps containing innumerable creeks, an almost ideal situation is presented for operation of enemy light naval forces against an invasion fleet within the Straits. Penetration of an invasion force into the Straits, without first clearing out enemy centers on both sides, would be subject to danger against a vigorous enemy.

The mission of an invasion of Malaya would probably be the recapture of Singapore, the largest city in Malaya. This city lies at the extreme south tip of the peninsula. It is a first class port and air and naval base. Its location covers the sea passage from the Indian Ocean to the South China Sea. Secondary missions would be to seize the economic resources of Malaya; these are primarily tin, of which it has been the principal world producer, and rubber, of which it has been a most extensive exporter.

The inhabitants of Malaya include Malays, which are the dominant native race, and Chinese, the principal commercial race. Most of the Chinese have been born in Malaya, and as such are British subjects. Malays and Chinese are nearly equal in number. In some places (as in Singapore) the Chinese greatly outnumber the Malays; elsewhere the reverse occurs. The large Chinese element consists of hard-working people who work tin mines and are reliable laborers and business men.

Native governments are theoretically Malay, controlled by local chieftains. There is a Sultan or similar dignitary for each state, other than the British colonies. Malays are Mohammedans. They are not especially devout, and certainly not fanatic. They do not comply with Mohammedan regulations as to daily prayers nor do they regularly attend services at the mosque on Fridays. They do, however, usually pay fairly strict attention to the rule as to fasting during Ramadan. This rule prohibits eating, drinking, or smoking between sunrise and sunset for a period of about a month.

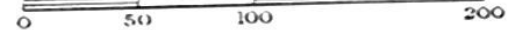
Actual civil rule prior to this war was by British Residents. The headquarters of the Resident was not necessarily at the same place as that of the reigning Sultan. Assistants to the Resident included educated Malays, who were found competent. The Sultan was supreme on all matters relating to the Mohammedan religion, including marriages, divorces, etc., the British having refrained from interference with his authority in this line. By treaty, the Resident was supreme in all matters relating to civil law and administration. In practice the Sultan was always consulted before important decisions are made. Sultans are educated men, some having college degrees. Being familiar with native customs and desires, they have given good cooperation since British occupation.

THE STRAITS SETTLEMENTS and the FEDERATED MALAY STATES

Statute Miles



Kilomètres



— Railways — Canals
483 Slipping Routes Distances in Nautical Miles
 Heights in English Feet



Malays prefer to be governed by chieftains. They are accustomed to this. Chieftains live well, and are frequently wealthy. The mass of people are poor but well fed, and with all necessities of life provided. When the Japanese invaded Malaya, during the winter 1941-1942, the Sultans stayed at their posts.

Four native states—Perlis, Kedah, Kelantan, and Trengganu, all located in the north—have been transferred by the Japanese to the jurisdiction of Thailand. They had previously enjoyed local autonomy under their own chiefs but as part of Siam (now Thailand). In 1909 the British secured the cession by Siam of her authority in the four states. Thereafter it controlled them by the system of Residents supervising and directing the native chieftains. To foster good will the British promoted some to be Sultans, a grade which they had not previously held.

For the past twenty years Malaya has been wealthy. Tin and rubber are the explanations. Most of the tin and rubber are on the west side. Tin is found on (or close to) the surface, in sands which can be shipped in sacks after local washing. The land is owned by the government (British representative), which upon application issues licenses for operating mines. Terms are matters of negotiation, depending upon size, accessibility, and whether water is available or not. Some tin is found and mined on the east side of the peninsula.

Other mineral products of Malaya are wolfram (which is found at times with the tin), gold in small quantities, and numerous minerals not yet developed to any important extent.

Besides rubber, which is the most important crop, large quantities of rice and coconuts are raised. Rice is the principal food of the country but the production is not sufficient for local needs—normally additional rice is imported from Burma or from Indo-China. In case of invasion, which would (or might) result in interrupting this traffic, provision for feeding the natives would have to be considered. There are no other special crops raised except for local needs. These include the nipa palm (much used for thatch for huts), the usual tropical fruits, and small quantities of spices.

Climate in Malaya is always hot. The east side is on an average about 5° cooler than the west side, due to the monsoon. For the same reason the rainfall is considerably heavier, and approximates 150 to 160 inches per annum, concentrated in the winter and spring months.

On the west coast the average rainfall is about 100 inches a year. It is more evenly distributed. There is considerable variation, but peak months for rain are April and November, with an average of 30 inches a month. Rains on the west coast are usually heavy, but of short duration, and ordinarily come in the afternoons. Mornings are generally bright sunshine. Occasionally dry spells without rain last for a fortnight. Rains vary greatly within short distances. A district may have daily rains for a week or more, while an adjacent district may have none.

In the mountains rainfall is heavy, and may amount to over 250 inches per annum. This causes plenty of water in streams, some of which have been developed for irrigation purposes.

Temperatures during the day will run generally to 90° F., or over. They do not reach 100°. In most places the nights are cool enough for one to use a blanket.

Malaya is outside the typhoon area. Sharp local storms occur, particularly on the west coast. They are dangerous to small craft, and on land may blow down tents and cause minor damage.

Fevers and dysentery are common; protection against these diseases is necessary. Cholera is endemic, and at times may cause numerous casualties. It always requires the taking of standard precautions. Other tropical diseases (including leprosy and beri-beri) occur, but are not likely to affect invasion troops materially.

WEST COAST

Perlis

At the northwest end of Malaya is this small state ruled by a Rajah. Its area is only 316 square miles and the total population under 60,000. Its north boundary adjoins Thailand, and is a low series of hills, not exceeding 2,000 feet in height. Across these leads the Bangkok and Singapore Railroad, and two unimproved roads. Over these routes came the Japanese invasion of Malaya in December, 1941.

For any invasion of the west coast the Perlis boundary position is as favorable as any, and better than most, for blocking an enemy advance from the north.

Fifteen miles off Perlis is Langkawi Island, which is hilly and rocky. On the south side is Bass Harbor, unimproved, but large and excellent and suitable for an invasion base. Air fields are available, and additional ones could be constructed. The island is over 20 miles long and some 10 miles wide, and has ample space for depots. A good road system is lacking. If the island is first seized, troops can be assembled there. At the proper time they can then be ferried to the mainland in motor boats and amphibious vehicles under protection of naval and air forces.

The north part of the Perlis coast, extending over the boundary into Thailand, is rocky. Foot troops could land. Just south of the rock section is the Perlis River, at the mouth of which is a village of the same name. Landing and small craft can ascend the river (which is bordered on both sides by swamps) about 4 miles to Tebing Tinggi, whence hard surfaced roads lead to the interior. Following up the road 3 miles is Kangar, which is the capital. The Rajah (grade below Sultan) has his headquarters at Arau, six miles further inland and on the railroad. All important roads, trails, and the railroad in Perlis pass through either Kangar or Arau. Possession of these two places insures control of this country.

Perlis's south half is a rich plain of rice fields. From February to May rice fields in this country are normally fallow and weed covered, and no military obstacle; they could be crossed by troops of all arms. From May to August water is admitted through irrigation ditches. The natives then dig up the weeds, which are incorporated as a binder with mud and then used to repair rice dikes. Planting is in August, and the necessary water is obtained partly from rains; when they are insufficient, water is drawn from the irrigation system. The harvest is in February. It would be possible for the enemy to flood the fields out of season should he desire to do so in order to create difficult terrain for an invader.

Perlis has important tin mines in the hills. The tin ore is unusually pure, and is found in limestone caves in the hills. Good roads exist, and a complete telephone net. Sea fishing is exceptionally good. Fish, with rice, are the main foods of the natives.

Kedah

This state adjoins Perlis on the south and east. Its north (and part of the east) boundary adjoins Thailand, with one good road close to the Perlis boundary. In addition, there are

about ten trails and unimproved roads. The boundary is a continuous line of jungle-covered mountains. Their altitude increases from about 2,000 feet near Perlis, to over 4,000 feet. In case Kedah is occupied it should not be difficult to cover against possible enemy attacks from Thailand.

South from Perlis, the coast for 40 miles is a low plain uniformly 12 miles wide and filled with rice fields. There is an extensive system of canals, which are particularly dense near the center of this sector. Swamps line the shore, but landing places are available.

In the north is the Kedah River, which is navigable for small craft for 8 miles inland to Alor Star, the capital of the state. 30 miles to the south is the Merbok River, also navigable for small vessels to the towns of Semeling and Sungai Patani. The towns mentioned are interconnected by hard surfaced roads. The B. & S. RR passes through Alor Star and Sungai Patani. Between the Kedah and Merbok Rivers landings could be made at Limau and Yen.

South of the Merbok River the land is rolling, and cultivated with coconuts, rubber, and tapioca. This sector is 7 miles from north to south, bounded by the Muda River on the south. Near the mouth of that river is the town of Kuala Muda, which is on the road net and could be used as an auxiliary port.

There is no objective of importance in Kedah to warrant an invasion of this stretch of coast. It would be better to land either to the north in Perlis, or further south.

In December, 1941, the British in withdrawing from Perlis established a main line of defense along the Muda River. There is an excellent road parallel to the river, and south of it entirely across the state to the main mountain range which is almost impassable, except for detachments. This road is very handy for a Muda River position. The British lost this line due to frontal attacks and to an amphibious expedition which landed in rear of their left.

The Muda River line is 40 miles long. From what is now known, the British had insufficient troops to defend it. A shorter line would have been possible along the Kedah River, which is about 15 miles from the Perlis boundary and only about 15 miles long between the sea and the mountains.

Troops advancing from Perlis have one good road and the railroad (meter gauge) leading from north to south. Secondary roads are available in part. In 1941 the Japs used tanks in their operations. Infantry advanced by infiltration, in detachments of from 20 to 200 men. These penetrated deep into rear areas and there set up road blocks, captured command posts, destroyed stores, and generally interrupted rear area activities. Due to the comparatively weak British forces this system of tactics worked. It can not be counted on to succeed where rear areas are properly guarded.

Kedah is ruled by a Sultan. Population of the state is under 500,000, of which about 12% are Chinese, mostly concentrated in the south part among the rubber plantations. About 40% of the people, nearly all Malays, are concentrated in the rice field districts bordering the sea.

Penang

Penang, a British colony with no native rulers, is an island of slightly over 100 square miles. Its population is 250,000. It lies within 3 miles of the mainland, and has an excellent port (known as Georgetown) on the east side. The west side of the

island, fronting the sea, is 15 miles long and has good beaches. The island is generally hilly, with altitudes exceeding 2,400 feet. There are excellent roads.

The official name of the capital is Georgetown, but to the natives this is Tanjong and to Europeans it is Penang. It is a modern town and was well equipped to handle a large trade. It is suitable for an invasion base, but its port could not be used until a beachhead on the mainland had been established sufficiently large to push enemy artillery out of range. In this regard it is inferior to Langkawi Island, 70 miles to the north, which could be used without requiring a beachhead (although the latter would be desirable).

Penang has no resources of its own. Its importance lies in its situation and its port. Air fields exist.

The recapture of Penang and a beachhead for it is essential for an invasion of Malaya. This operation would be facilitated by a prior occupation of Langkawi Island.

Province of Wellesley

This separate British colony is the beachhead for Penang. It fronts 30 miles along the sea and is about 10 miles deep. Immediately opposite Georgetown (Penang) is the town of Butterworth, railroad for a branch line which connects with the B. & S. RR at Bukit Mertajam, about 6 miles inland.

Wellesley is densely cultivated with rice, rubber, and coconuts. There is an excellent system of roads. Best landing places for invasion forces are at Butterworth and north thereof, where there are some beaches with good roads and some towns close to the sea. South of Butterworth are littoral swamps of mangroves, which are difficult to cross.

The main north-south lines of communication pass through Wellesley. East of the province is a part of Kedah which is not thickly settled and contains much jungle.

If Penang and the Wellesley beachhead are established, enemy attacks may come from the north or south or both. If this invasion has been preceded by the occupation of Perlis, an enemy attack on Wellesley from the north is improbable and would be limited to local hostile troops in Kedah.

To protect Wellesley against an attack from the north there is the Muda River line. It would take more troops to defend this line than the Perlis line, plus occupation troops for Kedah, which lies between Perlis and Wellesley.

Perak

One of the Federated States, with an area of 7,800 square miles and a population close to 1,000,000, Perak consists essentially of the wide valley of the Perak River plus the coast sections and the mountains. The coast section is 90 miles long, including The Dindings—which is another beachhead which British foresight provided a long time ago and which is considered separately.

At the north, just south of Wellesley, is the district of Krian. This used to be a region of swamps. By irrigation the British have changed it into a most fertile area. The main crop is rice, but some sugar, rubber, coconuts, and tapioca are raised. The principal towns are Parit Buntar (just inside the boundary from Wellesley) and Bagan Serai (9 miles further south), both 10 miles inland. On the coast opposite these towns landings are practicable; there are roads parallel and close to the sea. A very small port with rail and road connections is at Kurau, at the entrance of a small stream of the same name.

At Bagan Serai the main highroad continues on south, parallel to the coast. The railroad turns inland. It soon strikes rolling country, crosses a low range of hills, and then

turns south again to Taiping, where it rejoins the road. A cut-off road bypasses Taiping on the west and goes through the low coast plain.

Opposite Taiping on the coast is the small port of Port Weld, which has rail and road connections. As there are extensive mangrove swamps in this area it would be a difficult one in which to operate if serious resistance is met. Adjacent to Port Weld on the south is another small port—Matang. Both Port Weld and Matang would be good bases for a small expedition against Taiping, which is an important road and rail junction, but they are not large enough to handle forces of probably over a brigade. This part of the country is a rubber area.

Taiping is an important town of about 40,000 people. It is the headquarters of the British Resident, and is reputed to have the best European residential area in Malaya. Tin is the principal local industry, with considerable rubber. There are barracks and quarters for one regiment of infantry, which used to be garrisoned here.

From Taiping the trunk highway for Singapore and the railroad run close together eastward across a mountain line to Kuala Kangsar, which is the headquarters of the Sultan of Perak. On the railway line are several tunnels which in case of invasion would probably be destroyed by the enemy.

Kuala Kangsar is an important center. Besides having the Sultan, it is the seat of the British High Commissioner for the Federated States. He is provided at government expense with an imposing residence. The Sultan has three palaces, resembling French chateau, and lives in considerable magnificence.

The Perak River runs past Kuala Kangsar. It is ordinarily fordable. At times there are floods, which submerge the lower sections of the city; at such times the river may be a serious obstacle. The British used this river as a line of defense in January, 1942, but were unable to hold it; the Japs crossed at numerous places and, infiltrating through dense country, turned the position. This might not have been possible if the British had had larger forces. It is not to be considered as a precedent, but only as a possibility. Defense in country with dense tropical vegetation requires large reserves, capable of dealing with enemy parties which may reach rear areas.

32 miles beyond Kuala Kangsar by road or rail is Ipoh, the main city of the Kinta District. This district is a huge tin mine. 12 miles south from Ipoh is Batu Gajah, the capital of Kinta. 38 miles from Ipoh is Tapah, at which point ends the cultivated and inhabited country. For the 56 miles from here to Tanjong Malim (on the south boundary of Perak) both road and railroad, which are usually close together, pass through jungle.

Special training is required for troops to operate in a tropical jungle. It is dark, has dense growth and boulders, is a mass of creepers, vines, and thorns; also it is occupied by innumerable insects. This particular jungle is the home of large game including the tiger, elephant, and rhinoceros. These large animals seldom trouble persons. There is so much food for animal life in the Malaya jungle that the predatory animals seldom leave it. Strangers are easily lost in the jungle—if not furnished with a compass they lose all sense of direction. Safest course in this event is to follow down the nearest stream line.

Along the coast south from Matang, mangrove swamps line the coast. There are few places where landings could be made. An excellent road extends southward from Taiping to Bruas, 34 miles away. Here a cross-road connects with the main highway at Batu Gajah.

In case of invasion an advance south needs to proceed both by the eastern main road and railroad, and the western road through Bruas. Average distance between the two roads is 22 miles.

From Bruas the west road continues southward (passing east of the Dindings) as far as the Perak River. This flows for most of its course in a SSE direction until it reaches Telok Anson. Here it turns and empties into the sea, 25 miles to the west. Telok (or Teluk) Anson is a port of 12,000 people, accessible to small ships and having road and railroad connections. This district is devoted to cocoanut plantations but has other diversified crops.

Emptying into the sea 10 miles below the Perak River is the deep Bernam River. The country between the two rivers is well cultivated and is provided with roads. It would be possible to land on the south side of the Perak River or on the north side of the Bernam River. There are occasional villages on the shore having road connections.

The Dindings

This is a British colony, the least important in Malaya. The capital is Lumut, in the south sector, situated on a magnificent harbor of which the colony years ago expected to make a great port. Its intended place in commerce has been taken by Penang and Singapore but The Dindings's port remains and is capable of handling large transports. It remains undeveloped—just a possibility.

Opposite the port is Pangkor Island, about 2 miles off shore. This was originally the site of a Dutch fort. In case of an invasion this island would need to be occupied. It completely covers the main harbor and could serve for depots, sites for airfields, etc.

The Dindings is 15 miles long and about 10 miles deep, without natural boundaries. If this port is occupied the beachhead must adopt artificial lines suitable to the number of troops landed. One good road leads into the interior. Leaving at the northeast corner, it enters Bruas 3 miles away and continues on to the main highway and railroad at Batu Gajah.

Perak and The Dindings are not attractive locations for an invasion. If, however, an invasion is launched southward from Wellesley and meets strong opposition, a landing in rear of the enemy may be necessary. In this case The Dindings is the best available location for an auxiliary landing. First objective would be to move to and seize Bruas, key road junction of this area. From here operations may proceed, according to circumstances, either eastward toward Batu Gajah or northward toward the Matang-Taiping line.

Should the enemy defend Perak against an invasion by the Allies from the north, the north boundary of the province offers a 25-mile line between the sea and the mountains. If this fails, next best position is that covering Matang and Taiping, which (excluding mangrove swamps) would be only 15 miles.

If that line falls the enemy will have to divide, for from there on are two routes southward—the eastern over the mountains to Kuala Kangsar and Ipoh, and the western close to the coast. The eastern route offers several good defense positions in the north among the mountains. In 1942 the British defended only the Perak River line, which was too long to hold with the available forces. The invaders will have to follow over both routes, otherwise the enemy would have possibilities

of attacking a single invasion column by operating from the other parallel route.

If the Allies do invade via Wellesley, it might be easier to land at the Dindings to overcome moderate opposition near or beyond the line Matang—Taiping. If the enemy is strong a landing at The Dindings might be immobilized by superior forces and might cost more than it was worth.

Selangor

One of the Federated States, Selangor's area is slightly over 3,100 square miles and its population nearly 700,000. It fronts on the Straits for 100 miles and has a depth inland of 40 miles to the divide of the main mountain range.

The north boundary is the Bernam River. It is quite an obstacle, for it is non-fordable within 50 miles of the sea. Its banks are lined with mangrove swamps, back of which on both banks is jungle country. The river is navigable for motor launches. It is noted for exceptionally numerous and vicious crocodiles. This river was selected by the British in 1942 as a line of defense.

The main coast road crosses the Bernam River at Sabak, which is a small village located on a loop of the river pointing south, favorable to defenders on that side. Thereafter it follows the coast closely for the entire length of the state. The main Singapore route and the railroad enter the state together at Tanjong Malim and traverse the state 30 to 20 miles inland, generally near the base of the main mountain range. This main route first passes through country considerably cut up and suitable for defensive purposes. Part of it is jungle and part is bamboo jungle. The latter is a second growth which grows on abandoned tin mines and is an obstacle only a bit less dense than original jungle. There are many tin mines, some of which are worked by hydraulic pressure. Rubber plantations are frequent, and there are numerous villages.

16 miles from the boundary is the small town of Kuala Kubu. At this point a good road extends across the main mountain range to the east coast. It is the only east-west road between the boundary with Thailand, and Singapore. The road ends at Kuantan on the east coast. This is not a first class port, but can be used. In 1942 the Japanese did so, and drove back a detached British force holding that area. Continuing on they entered Selangor from the east. Most of the cross-road runs through either mountains or jungles. There are numerous good defensive positions. An advance into Selangor by an invasion force must cover against hostile operations over this road.

The cross-road crosses the main mountain range at The Gap (15 miles northeast of Kuala Kubu) at an elevation of 2,798 feet. South of the road the mountains rise to 5,800 feet, and to the north to over 8,000 feet.

38 miles south of Kuala Kubu is Kuala Lumpur, an important center. It is the capital of Selangor and also the capital of the Federated States. The public administrative buildings are among the most imposing in the Far East. A relatively large number of Europeans resided here; they had good quarters; usually detached buildings, each in a garden. This city is suitable for a GHQ.

There is a large network of roads. Many have a red earth foundation. This earth is around 30% iron peroxide and has been found satisfactory as a base for all-weather motor roads. In dry weather the red dust is disagreeable. For heavy motor traffic this kind of road needs constant care. Invasion forces

should provide measures for this in advance.

Eastward from Kuala Lumpur is a good road which goes over the main mountain range. It then turns north and at the foot of a steep slope 6 miles beyond The Gap joins the main cross-road from Kuala Kubu to the east coast. Hostile forces from the east could operate over this road, which must be covered.

In 1941 the road over the mountains from Kuala Lumpur connected with a trail which led to the railroad extending north and south on the east of Malaya. The trail then continued on to the Pahang River, with a good water route thence to the east coast. It is possible, but not known, that the Japanese may have improved this trail and made a road out of it. It may not go all the way to the coast.

The country around Kuala Lumpur is rolling, and covered with tin mines and rubber plantations. Part of this area has been drained.

15 miles south of Kuala Lumpur is Kajang, a rubber center. 13 miles further the south boundary of Selangor is reached, and crossed by three separate good roads and one secondary road on a 16-mile front. There is also the railroad crossing. The artificial boundary has no military importance.

The coast of Selangor is generally lined with mangrove swamps. In rear of these is a belt of rubber plantations. 40 miles south of the Perak boundary is the Selangor River. North of this river there is considerable jungle back of the coast, but south of it the country is highly cultivated with rubber and cocoanuts. At the mouth of the Selangor is a small port of the same name, through which the coast route runs. There are a few small beaches just to the south.

29 miles south of Selangor is Klang, an important center. East of the coast road are low hills, not exceeding 700 feet in altitude, which is tin country with no through roads. Around the north end of the hills from Selangor are three interconnected roads extending to Kuala Lumpur. From Klang up the valley of the same name are two good roads, also interconnected and also running to Kuala Lumpur.

Klang has a population of some 15,000. It is the site of the palace of the Sultan of Selangor. Rubber is the principal industry, with tin and cocoanuts following. Klang used to be a port, the river being navigable for small vessels. A new port has been built among the mangrove swamps closer to the sea—Port Swettenham. By building concrete sea walls much land has been reclaimed and a modern port established. The harbor is excellent, and is suitable for an invasion base: the largest ships can reach the quays. By filling and draining, the mosquito pest has been reduced to within reasonable limits.

A railroad extends from Port Swettenham to Kuala Lumpur, where it joins the main line. A branch extends from Klang along the coast to Selangor. Port Swettenham is the best port on the coast between Penang and Singapore. Off the entrance to the harbor are several islands, covered with mangrove swamps. The channels are broad but could be blocked by enemy fortifications on the islands or mainland; there is no information as to what he has done in this regard.

20 miles south of Klang is Morib, a small village on the coast. It has a very fine sand beach—rare on the west side of Malaya. The beach is suitable for use by landing vessels, and from there an advance on to Port Swettenham and/or Klang would be possible. There is a direct road from Morib to the interior connecting with the main highway.

Southward from Morib is considerable jungle, the country being sparsely inhabited. It extends 25 miles to the boundary of the next state.

Negri Sembilan

Sembilan in Malay means nine, and Negri means states. Nine small states were united by the British to form the present one, which has an area of about 2,500 square miles and population of some 300,000. It fronts on the sea for only 30 miles and extends across the main mountain range, which does not exceed a 4,000-foot altitude.

The greater part of Negri Sembilan is rolling country. Rubber is extensively grown west of the mountains, but some of it is found elsewhere. Rice is a main crop east of the mountains.

The shore has numerous sand beaches. Port Dickson, despite its name, is not a good port. With the beaches adjacent it is a seaside resort, but could be used as a temporary base for a beachhead. The coast road follows the shore closely.

The main highway and railroad, which are alongside one another, are parallel to the coast and 20 miles inland. The highway is doubled. 15 miles south of the Selangor boundary is Seremban, the capital of the state, and an important road center. A road and a railroad extend to Port Dickson. Two good roads go east over the mountains to the railroad on that side of Malaya, joining at Bahau. A north-south road east of the mountains joins these roads with those crossing over from Selangor further north. In case of an invasion force's advancing southward west of the main mountain range, all the passes must be protected against possible hostile forces coming from the east.

At the south part of Negri Sembilan the main mountain range becomes low hills. Over these the railroad turns east to Gemas, 50 miles inland, where it again turns south en route to Singapore. Gemas is on the boundary of Negri Sembilan, and the junction with a railroad which runs northward to the northeast tip of Malaya; this then continues on into Thailand, connecting within Thailand with the railroad through Perlis.

This East Malaya Railroad is an important enemy line of communication. As already noted it has road connections into Selangor, and into Negri Sembilan north of Gemas Junction.

The main motor road does not go through Gemas. It follows the railroad through much jungle country to Tampin, 32 miles from Seremban. Here it continues south, instead of following the railroad eastward. The Malays in this area have a separate form of local government. Laws are peculiar. For example, only women own real estate, although they can not dispose of it without the consent of the family council.

Malacca

Malacca is the largest of the British beachhead colonies: it has 720 square miles and a population of 230,000. It used to be an important town with a 25-mile-radius beachhead about it. It is now a rich rubber country, with numerous good roads. As a port the town of Malacca is only second rate, but it could be used to advantage by invasion forces.

Considerable rice and some fruit are raised. The country is noted for its scenery.

The coast road follows the shore through this small state. The main highway is 20 to 15 miles inland. The country is rolling, without features which would particularly affect military operations. A landing on beaches near Malacca would be practicable.

Johor

Johor (not Johore) is an independent state ruled by a Sultan. The state is the second largest in Malaya, having 7,500 square miles and a population of about 800,000. Its larger part is jungle. It is the least mountainous part of Malaya.

Johor has a frontage of 100 miles on the Straits of Malacca and, extending clear across the peninsula, has about the same amount on the China Sea. Its south end is 60 miles broad. Off it, separated by the narrow strait of Tebrau, is Singapore Island, to which Johor is connected by a causeway. At the Johor end is the capital—Johore Bahru, much frequented in normal times as a gambling resort for Singapore.

The railroad runs almost through the center of the state from Gemas Junction to Singapore, mostly through jungle forest. There is no road parallel to and close to the railroad. The main highway enters the state from Malacca at Sialang, 15 miles inland; it then turns towards the sea and joins the shore road near Muar.

Muar, about 8 miles south of the Malacca boundary, is on the south side of a river of the same name. This river is a mile wide and a considerable obstacle. The British defended the line of this river in the 1942 campaign. It failed to hold: the Japanese infiltrated across it and turned the left by amphibious expeditions which landed south of it. The British force appears to have been too weak to hold the necessary front. A new invasion by the Allies might find the problem of forcing the Muar River to be more difficult.

On the south side of the Muar River is a road which extends eastward from the sea to the railroad. There are possibilities of landing south of Muar. Considerable rubber grows near the coast.

South of Muar is only one main motor road. It extends 30 miles to the Simpang Kanan River, which it crosses at Batu Pahat (Bandar Penggaram on some maps). This is a small port 5 miles from the sea which could be used by an invasion force. Here the road turns inland for 15 miles, then turns southeast and continues on parallel to the coast. It reaches the railroad near Kulai, 20 miles north of the Tengau Strait. Most of the intervening country is jungle.

South from Kulai the road and railroad continue close together to Singapore. A line of hills, 15 miles north of the Tengau Strait and parallel to it, affords a good defensive position. The British failed to make a strong effort to hold this line in 1942, but the Japanese might hold it. South of these hills the country is well occupied, and there are roads; there are but few north of the hills.

Lower Johor, near the Straits of Malacca, is lined with mangrove swamps and thus not very suitable for debarking large forces. Small forces, if properly equipped and trained, can operate among mangroves. The Japanese did it. They were able to work through and reach solid ground in rear of defended British lines.

The jungle in Johor will be a greater obstacle to an invasion force than elsewhere in the states to the north. Available for the invasion are only one main road and one railroad (meter gauge).

Singapore

This is an island nearly elliptical in shape, with major axis of 25 miles in an east-west direction and minor axis of 15 miles. It is separated from the mainland by Tebrau Strait, over which is the road and railroad causeway to Johor.

Singapore has 217 square miles. Its population, which is mostly Chinese, was last reported as 727,000. The center of the island has low hills rising up to 500 feet. The city is near the center of the south side. The naval and air bases were on the north side, along Tebrau Strait; only the east exit of this strait is available for large ships.



This naval base was a first class one, with fixed and floating dry docks capable of handling any warship. Ample facilities existed for repairing and outfitting ships. The airdrome adjoined the naval bases on the south side. An additional air field was on the south side of the island, east of the city.

The sea entrance to Singapore is covered by numerous small islands. These had been fortified by the British. Presumably they still are. The British considered them as proof against any naval attack.

Singapore was one of the main commercial ports of the world, and has ample facilities for a first class base.

In 1942 the British defended the island by occupying the south side of Tengau Strait, which varies in width from 1 to 2 miles. Under cover of a strong artillery preparation the Japanese crossed the strait at night, selecting for first penetration points in mangrove swamps which were only lightly watched.

For the Allies a direct attack on Singapore by sea is not very promising. Initial landings on the shore of Johor, while practicable for small parties, are not promising for a large expedition. The nearest place on the west side, with a sea frontage suitable for an invasion, is Malacca. Sumatra is 50 miles from Malacca, and unless this was in Allied possession it would be a base from which air and light naval forces could attack Allied shipping. Malacca, as already noted, is not a first class port. As long as the enemy held Malaya to the north of Malacca he could concentrate rapidly against that area, and might immobilize an invasion which had not previously cleared northwest Malaya.

EAST COAST

In general, the east coast has numerous beaches suitable for invasions. It seems unlikely that the Allies would invade Malaya from this direction, but as anything is possible in war a short description will be given.

Johor has plenty of good beaches, but has few routes leading inland. Near the north end of the state a second class road extends from Mersing on the coast to the railroad at Kluang (70 miles from Singapore) and thence on to the west

coast at Batu Pahat. Mersing is in a tin area. Most of the interior country is jungle.

Off the coast are numerous islands and islets. Prior to landing on beaches the Japanese occupied the islets and at the proper time moved the invasion across to the mainland on motor boats. At the present time amphibious vehicles would be more appropriate.

Pahang is the largest state in Malaya, with 14,000 square miles, but its population is only slightly over 200,000. Most of the state is jungle. It has a 120-mile water frontage on the China Sea.

Near the north end is the small port of Kuantan. This is the most important place in the state, and a rubber and tin center. A very good road extends clear across the state from Kuantan to the railroad, 80 miles away, and on through The Gap into Selangor. This is a practical route either

for supplies or military operations, up to the capacity of one road. 27 miles south of Kuantan by road is another port—Pekan, at the mouth of the Pahang River. This stream is navigable for launches as far as the railroad, and is available for military traffic.

Trengganu adjoins Pahang to the north. It has a 140-mile frontage on the China Sea. The area of the state is 6,000 square miles and its population is 200,000. There is not an important place in it. Neither are there any railroads or through roads. Most of the country is forest jungle.

Kelantan is just north of Trengganu. Its water frontage on the China Sea is only 40 miles, but this is the most important stretch on the east coast. The state has an area slightly less than that of Trengganu, but it has double its population.

For 20 to 25 miles back from the coast is cultivated country, largely coconuts. The interior centers about the Kelantan River, which flows NNE through a fertile valley. Near its mouth is Kota Bharu, headquarters for the local Sultan. The East Malaya RR from Singapore enters the state at the south end and follows the Kelantan River to Kota Bharu. It then turns north, and 10 miles further crosses the boundary into Thailand.

The Japanese invasion of December, 1941, started with a landing on the fine beaches near Kota Bharu. The Japs then proceeded south following the railroad (there was no through motor road) to Kuala Lipis, 160 miles inland amidst the main mountain chain. From here a good road extends through The Gap into Selangor on the west side. Another road parallel to and east of the divide connects with roads through passes into Negri Sembilan.

As long as the enemy holds Kota Bharu and the railroad north from it to Bangkok in Thailand, he will always be able to threaten the flank of an invasion on the west coast by operations against, or through, the mountain passes.

COMMENTS

1. Due to the narrow width of the Straits of Malacca, an invasion force within the strait is exposed to attacks from either (or both) shores unless these are secured by the invaders.

2. The safest procedure is to operate simultaneously against both Sumatra and Malaya, clearing the strait gradually. This requires two large forces, but will force the enemy to provide similar forces which will be divided from each other by the strait. As the strait is cleared, troops may be ferried from one side to the other. Air transport should be relatively easy.

3. For an invasion of Malaya, a base at the north end is desirable. Penang is the most suitable. This is probably strongly held by the enemy. It might simplify later operations to first seize and organize Langkawi Island, at the northwest edge of Malaya. Undeveloped, it is yet suitable for a base, having a good harbor and space for air fields. From Langkawi operations could be conducted against Penang.

4. It would be necessary to protect the invasion force against enemy operations moving south from Thailand. The mountain passes just east of Langkawi Island should be seized at the earliest possible moment, without waiting for an island base to be installed. Operations against Penang may, however, wait until fully prepared for.

5. If Penang is taken, including the beachhead opposite it on the mainland, Langkawi may not be further needed as a main base. As long as the Allies have sea control it will continue to be useful as a base for air forces operating in the direction of Thailand, which must be kept under constant observation.

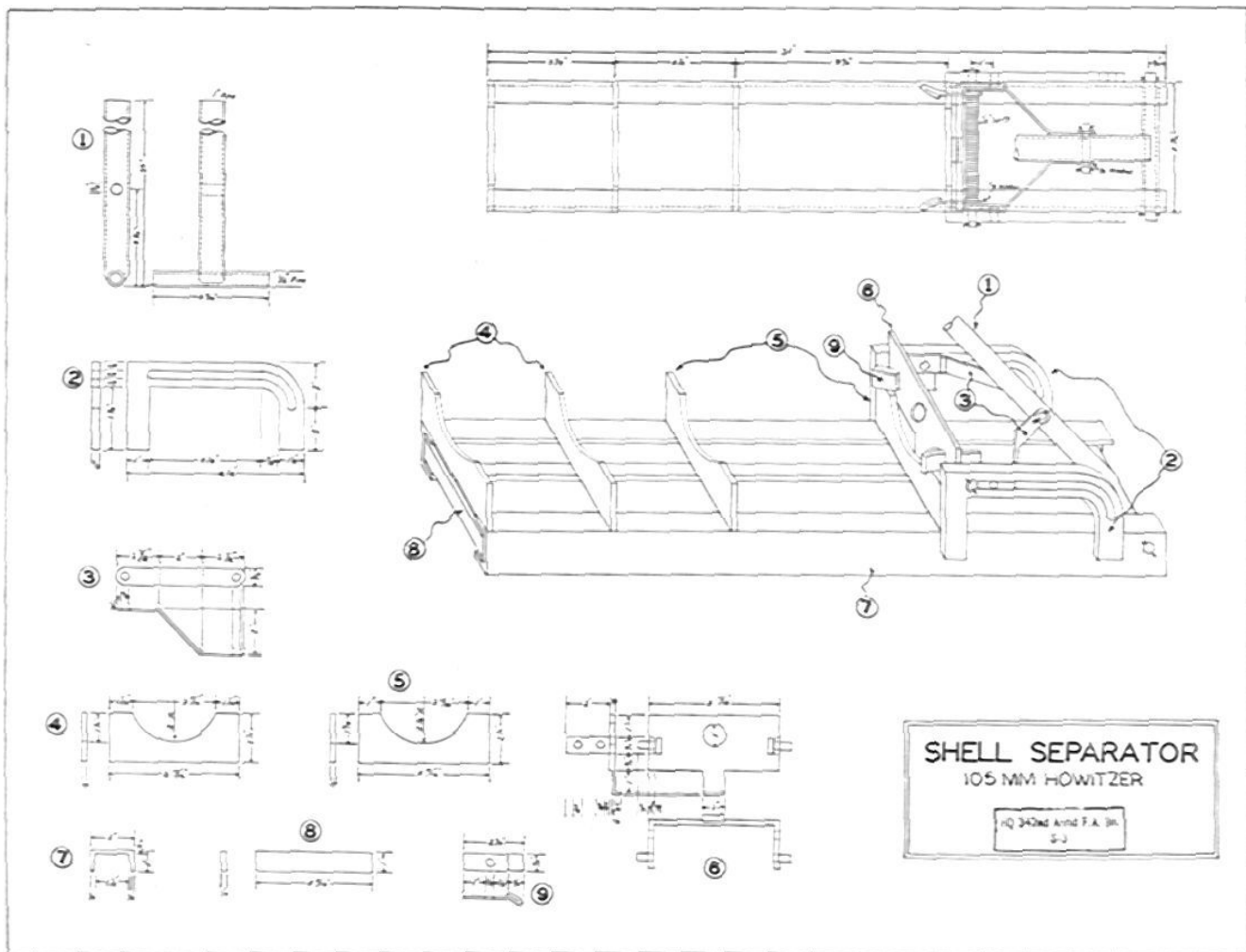
6. Operations from Penang southward toward Singapore, the ultimate mission of an invasion, have been discussed during the description of the country to be passed over. If the invasion adopts this route, secondary water bases may be opened in turn at Port Swettenham and at Malacca.

7. The operations of the 1941-1942 campaign in Malaya are useful for consideration, but should not be considered as a guide. In that unlucky campaign the enemy had the defenders isolated. On the other hand, the Japanese were able to bring in whatever forces they desired. In the campaign to come by the Allies, an operation via the Straits of Malacca will not in itself isolate Japanese forces in Malaya. The sea connection through the China Sea remains open, and also the land connection to Thailand.

8. The enemy may find it possible to heavily reinforce his forces in Malaya. Against an invasion of the west coast, the enemy may attack from north or south and at some places from the east. Invasion forces must guard in all three directions.

9. If the invasion forces seize the Perlis passes at an early date, danger from an enemy attack from the north decreases as the main invasion forces move south. For if the enemy nevertheless does attack from the north, time would then be available to the Allies either to send forces north, or to land an amphibious expedition in rear of the enemy, before the main invasion becomes directly compromised.

10. The further south the initial beachhead, the greater the danger of an attack from the north. So, for example, if Malacca were the original beachhead and was lost due to an attack from the north, the entire invasion force would be in a difficult position.



Shell Separator, Again

Because of continued high interest in the subject, we present another set of drawings for constructing a shell separator (for 105-mm how.) of the type originated by Pvt. Vern D. Bowles. This was originally pictured on page 629 of this JOURNAL for last August, and somewhat different drawings appeared on page 299 of our May issue. The thing really does the job, from all reports. One big advantage of this model over some others, of course, is the fact that its operator can stay crouched low and protected instead of having to expose himself unduly.

ARTILLERY OPERATIONS OF THE NEW GEORGIA CAMPAIGN

By Brig. Gen. Harold R. Barker, U.S.A.

This campaign actually consisted of four phases: (1) landing at Rendova, Segi, Viru, and Wickham, (2) taking the Munda airfield, (3) occupying Baanga and Arundel Islands, and (4) shelling Kolombangara. It was my privilege to act first as Artillery Officer of the New Georgia Occupation Force, then as Artillery Officer of the XIV Corps when the command passed to the Corps. This was in addition to commanding the artillery of the 43d Infantry Division, my normal command. These assignments gave me the opportunity to see the so-called "big picture" and to come in contact with the artillery units of other infantry divisions, as well as the artillery of the Marine Defense Battalions.

There were no fundamental changes from the doctrine as taught at Field Artillery School at Fort Sill and as carried out in the GHQ or Army Ground Force Battalion Firing Tests. It was simply a case of using common sense and applying the basic principles to fit amphibious and jungle warfare. The old saying that each situation has its own solution certainly applied here. Knowing the mission and the basic principles, the use of common sense gave one the answers.

ARTILLERY ORGANIZATION

Thanks to the excellent training record received in the States by all artillery units, it was possible to group the different battalions to meet the changing tactical situation regardless of their normal division assignment. This was necessary as all divisions did not bring with them all of their artillery battalions, and because all battalions did not arrive simultaneously, due to available naval transportation. As artillery battalions became available, regardless of the division to which they belonged, groups were made so that each division had its supporting group and corps had a group to carry out corps missions.

Division Artillery Groups did not always consist of three battalions of 105s and one battalion of 155s. Nevertheless, each infantry regiment in the line had a supporting artillery battalion. In some instances it was necessary to use a 155 howitzer battalion for direct support. This worked out in a most satisfactory manner and the infantry was delighted with the additional fire power. Whenever possible, the assignment of light howitzer battalions for direct support of infantry regiments conformed to their normal combat team organization.

Additional fire power for the divisions was always available by calling the corps FDC, which operated in a manner similar to a DivArty FDC and controlled all artillery within this theater of operations. In addition to direct support missions fired by the artillery battalions, the corps FDC (which was combined with the FDC of the 43d Inf Div) supervised the delivery of the firing of 1,113 missions, including 17 corps concentrations, 741 concentrations of two or more battalions, and 129 division concentrations. Total ammunition expended to cover the fire missions during the New Georgia Campaign amounted to

approximately 175,000 rounds.

The following artillery was available during the operation:

- 6 battalions of 105-mm howitzers
- 2 battalions of 155-mm howitzers
- 2 Marine Defense Battalions (which in addition to their antiaircraft and tank units had 4 batteries of 155-mm guns, M1)
- 24 4.2" mortars.

When it came to the shelling of Kolombangara, all field artillery battalions were assigned to divisions and it became necessary to form a separate corps group. This was accomplished by organizing a new headquarters and FDC and taking one battery each from two 105-mm howitzer battalions, 1 battery from a 155-mm howitzer battalion, and including the 4.2 chemical mortars. Excellent results were obtained from this group. Targets appropriate to each caliber were assigned by group headquarters, and the massing of fires was handled in the normal manner by the FDC. Including the 4.2" mortars in the massing of fires for this group was a new experience, and one which produced excellent results. One point of interest was the fact that the traverse of the 4.2" mortar was limited, which necessitated the dividing of available mortars so that each *zone of fire* could be covered by a proportionate number of mortars. This meant that not all mortars could cover the entire area, but some were always available in each sector. The speed in massing the fires of this composite battalion compared favorably with that normally obtained from other battalions.

TACTICAL EMPLOYMENT

Tactical employment of the artillery during the New Georgia Campaign conformed to the normal procedure as laid down in existing manuals. On the initial landing at Rendova on D-day, the infantry regiment had its direct support artillery battalion for fire support. One battery of this artillery battalion was used to cover Oniaivisi Pass, the controlling feature in the axis of advance to New Georgia proper. The 155-mm guns of the Marine Defense Battalion and a battalion of 155-mm howitzers were grouped under corps control for harassing and interdiction fires on the mainland of New Georgia, in the vicinity of the Munda Airfield.

The artillery battalions that arrived subsequent to D-day were emplaced in positions on islands in the vicinity of Oniaivisi Pass to support the coordinated attacks on the mainland of New Georgia. The first main attack was scheduled for D+9, and the supporting artillery battalions were ordered to occupy concealed positions at night and not to fire prior to the preparation on the day of attack. This was done in an effort to obtain surprise and overcome the possibility of being neutralized by enemy artillery or air force. As the Jap artillery firing proved ineffectual and unorganized, and air superiority was obtained, one gun per battalion was permitted to register on a Division Artillery Check Point prior to the day of attack. This permitted the building up of observed fire charts and control of all artillery for the massing of fires.

RESULTS THAT COUNTED

Some idea as to the effectiveness of our artillery fire can be obtained from the following unofficial report of a Marine observer:

"The hasty terrain map and the photo map lacked much of the accuracy normally thought necessary for firing night concentrations, yet these difficulties were overcome. Some of the liaison officers had an uncanny ability for sensing by ear and maneuvering the fire into the areas desired. To illustrate: One night I was with two battalions of infantry that were cut off on three sides by the Japs, with a swamp on the fourth side. The battalions were shot up, congested, and unnerved. Part of both were clinging to the inner side of what appeared to be a half crater, while some of the men were in the bowl. The Japs laid down a mortar concentration and casualties began to mount. No one could tell accurately where we were, but the artillery officer called down a concentration on a point some hundred yards away, and by waltzing and side slipping fire brought it in so close on two sides that dirt was thrown on us in our foxholes. The mortars were silenced for most of the night.

"Little delay was ever experienced in getting concentrations when and where needed."

One of the most gratifying results of the New Georgia Campaign from the artilleryman's viewpoint was the confidence and enthusiasm displayed by our infantry for their artillery.

As the infantry's confidence in and appreciation of the artillery increased, their demands became greater and sometimes were embarrassing. Many requests for fire covered targets that normally belonged to infantry heavy weapons. Nevertheless, as a rule we gave them what they wanted.

Another outstanding feature was their willingness and insistence that artillery protective fires be placed close to their front lines. As a matter of fact, they wanted their fires placed as close as 50 yards from their front line, time and time again, which was obviously out of the question.

The infantryman's attitude toward the artillery, combined with the artilleryman's appreciation of the many difficulties overcome by the infantry, resulted in the formation of a "mutual admiration society" that paid dividends during the entire campaign.

AMPHIBIOUS AND JUNGLE WARFARE

The following sections will give artillery officers some idea as to what they will come up against in amphibious and jungle warfare.

a. Planning and Conferences

Bear in mind that amphibious operations call for the coordinated efforts of naval, ground, and air forces. This calls for careful, detailed planning and many conferences. A special task force was set up for the New Georgia Operation. Conferences started early in May and continued up to the day of embarkation. After logistical and tactical plans had progressed beyond the initial stages a gunnery conference was held, at which all naval, field, coast, and anti-aircraft fires were coordinated. It was interesting to see how few deviations were necessary from the initial basic plans as operations progressed.

b. Preliminary Training

Before an amphibious task force can operate successfully, definite preliminary training must be undergone by all components.

First, all artillery battalions were put through a series of battalion firing tests similar to the AGF tests. As a matter of fact, these battalion firing tests have been repeated at every opportunity since our division left the States, and had been completed prior to May 1st. In them provisions were made for the careful calibration of all guns, which permitted the grouping of guns with the same relative *K* into the same batteries.

Secondly, combat team exercises were conducted with the artillery firing over its infantry. During these exercises the infantry-artillery team was stressed, and a final polishing up of



A typical 105 position in the southwest Pacific. This one is manned by Marines, but the army's emplacements are similar.

procedure covering combined tactics was given. These exercises started in the early part of May.

The third and last phase of preliminary training consisted of amphibious exercises conducted with the naval ships and personnel that were to be used in the operation. These exercises included the embarking and making a complete landing operation. This required careful planning and a lot of hard work. As the New Georgia Campaign was the second amphibious operation in which the 43d Infantry Division had participated (the first being the Russell Islands), we had gained considerable experience and the final exercise (conducted the first part of June) ran considerably smoother than all previous ones.

At the conclusion of the last exercise the troops remained on the transports and were ready for D-day. All units were combat loaded and transports were grouped by regimental combat teams. Considerable discussion arose as to whether the artillery battalions should be loaded complete in one transport or the batteries separated in several transports. Here again it depends on the particular operation, and in the New Georgia Campaign it might have been better to have loaded each artillery battalion in one transport.

c. Reconnaissance Prior to D-Day

Prior to D-day, picked officer reconnaissance parties were sent to Rendova, Segi, Viru, and Wickham. Included in these reconnaissance parties were infantry, artillery, naval, and staff officers. Their mission was the careful reconnaissance of landing beaches; possible location of bivouac areas for our own troops; possible location of artillery positions and OPs; and as far as possible the locations of Japs and Jap defenses. This mission was an exceedingly dangerous one as all the territory

was under Japanese control. These officer reconnaissance parties returned with excellent reports and without suffering any casualties.

In addition to the above reconnaissance, unit reconnaissance detachments landed in advance of the assault.

d. Security Measures

Ground

One of the most difficult problems for the artillery to solve in jungle warfare is the security and defense of battery positions, CPs, rear installations, lines of communication, and supply routes. The solution hinges on the amount of personnel available for security measures.

Battery positions can be divided into two classes: (1) positions on adjacent islands and (2) positions on mainland. In both instances, if batteries can be grouped in battalion areas the defense scheme is simplified and the available personnel made more effective. Most of our positions during the New Georgia operation were on adjacent islands, and the use of our antitank platoons permitted an effective beach and close-in defense. Positions on the mainland were not occupied until after Munda Field was taken. If positions on the mainland had been occupied during the initial landings and attacks, it is extremely doubtful if proper security could have been maintained. The infantry has its own problems and simply cannot be depended upon for the close-in defense of the artillery. Security of battery positions in jungle warfare against the Japs is more serious than in "normal" warfare, due to the infiltration tactics, and due to the fact that their counterbattery measures are entirely different from ours.

Jap use of artillery for counterbattery work has been generally poor, due to insufficient medium artillery or inability to adapt themselves to the science of artillery. Therefore, they have set up what are known as "raiding demolition units." These are organized in three sections: a demolition section of five groups of three men each, a reinforcement section of riflemen to act as a reserve for the demolition section, and a covering section of riflemen for protection of the flanks. Their equipment includes a week's supply of rations, ammunition,

hand grenades, and material for demolishing enemy artillery. These units infiltrate through our front lines, and after reconnoitering positions—which may take days so they become familiar with the routine of the personnel—the attack is made at a time when defensive measures are the weakest.

With personnel made available to man the guns 24 hours per day and keep them supplied with ammunition, relatively few were left to handle the security and defense of battery positions.

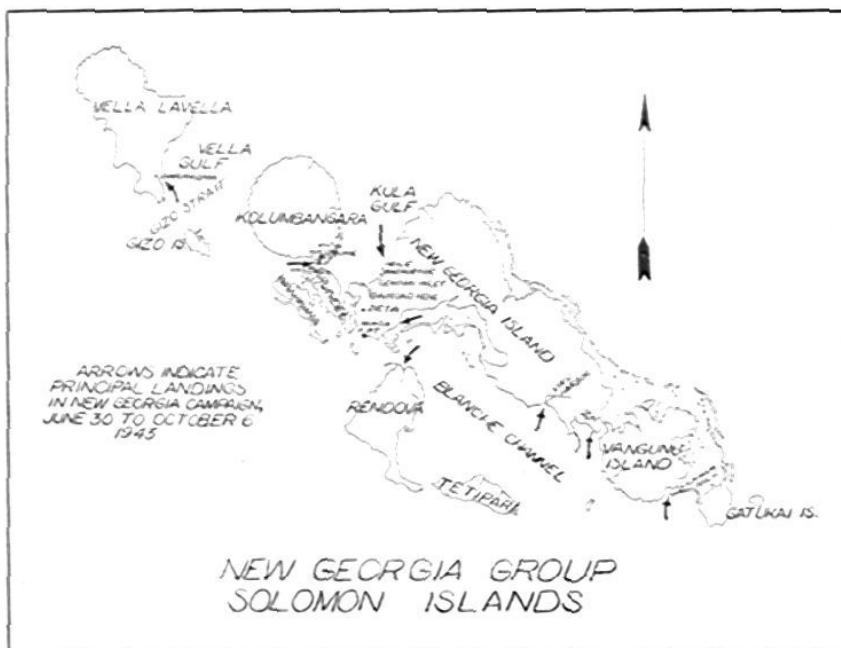
CPs and rear installations must establish their own perimeter defenses, as they are subjected to the infiltration tactics of the Japanese. Foxholes to accommodate all personnel should be located so as mutually to support each other. During darkness all personnel were in covered foxholes and no movement was permitted. Any artillery personnel operating with the infantry who were above ground after dark were fired upon by both enemy and friendly troops.

Plans to place artillery concentrations in defense of command posts and rear installations must be made. The attack on the Division Command Post located on the Munda Trail, New Georgia, emphasizes the importance of making provisions for these defensive artillery fires. On July 17th the Japanese 13th Infantry infiltrated from the north of New Georgia with the mission of destroying CPs and rear installation. As each installation was encountered, a Japanese detachment surrounded and attacked it. About an hour before darkness set in word was received at the division CP that 200 Japs were 1,000 yards down the trail and advancing on the CP. The perimeter defense was manned with the personnel around headquarters, which numbered approximately 100 men. There was no infantry within supporting distance. The nearest troops was a battalion of field artillery on a near adjacent island. A call for reinforcements was made to them and in about 45 minutes a hundred artillerymen with rifles arrived and supplemented the perimeter defense.

The Japanese, who are night fighters, waited until dark and then rushed the position. With rifles and two machine guns they were driven off. They cut all telephone lines with the exception of one artillery line which connected the Div Arty commander with the FDC on an adjacent island. This line had been laid over a different route and did not come through the division switchboard, and so had been overlooked by the Japs.

The enemy withdrew about 100 yards to a surrounding hill and could be heard digging in their trench mortars and clearing fields of fire. As it was evident that the command post would be wiped out if subjected to any prolonged mortar fire, the question came up of bringing in artillery defensive fires. The division CP was several thousand yards back from the front lines and no registration had been made in the area.

As the Jap machine gun fire grew heavier and the chopping got louder it was finally decided to contact the FDC over the one remaining direct line to see if anything could be done. Only one battery, a 155-mm howitzer battery, could reach the area due to minimum elevation. After what seemed an interminable time the first round landed almost on top of the command post. Being



in the trenches unquestionably saved many casualties. By whispering commands by telephone, the four guns of the battery were adjusted by sound on the high ground held by the Japs with their mortars. After the adjustment had been completed a firing schedule was given to the FDC, calling for fires every two or three minutes throughout the night. The Japs rushed the CP from time to time during the night, and in each instance artillery fire was called for. This artillery fire saved the personnel of the division CP from possible annihilation. About 25 dead Japs were found in the morning, killed by artillery fire, and many more were unquestionably killed who were not found, as the Japs took away their dead and wounded when driven off.

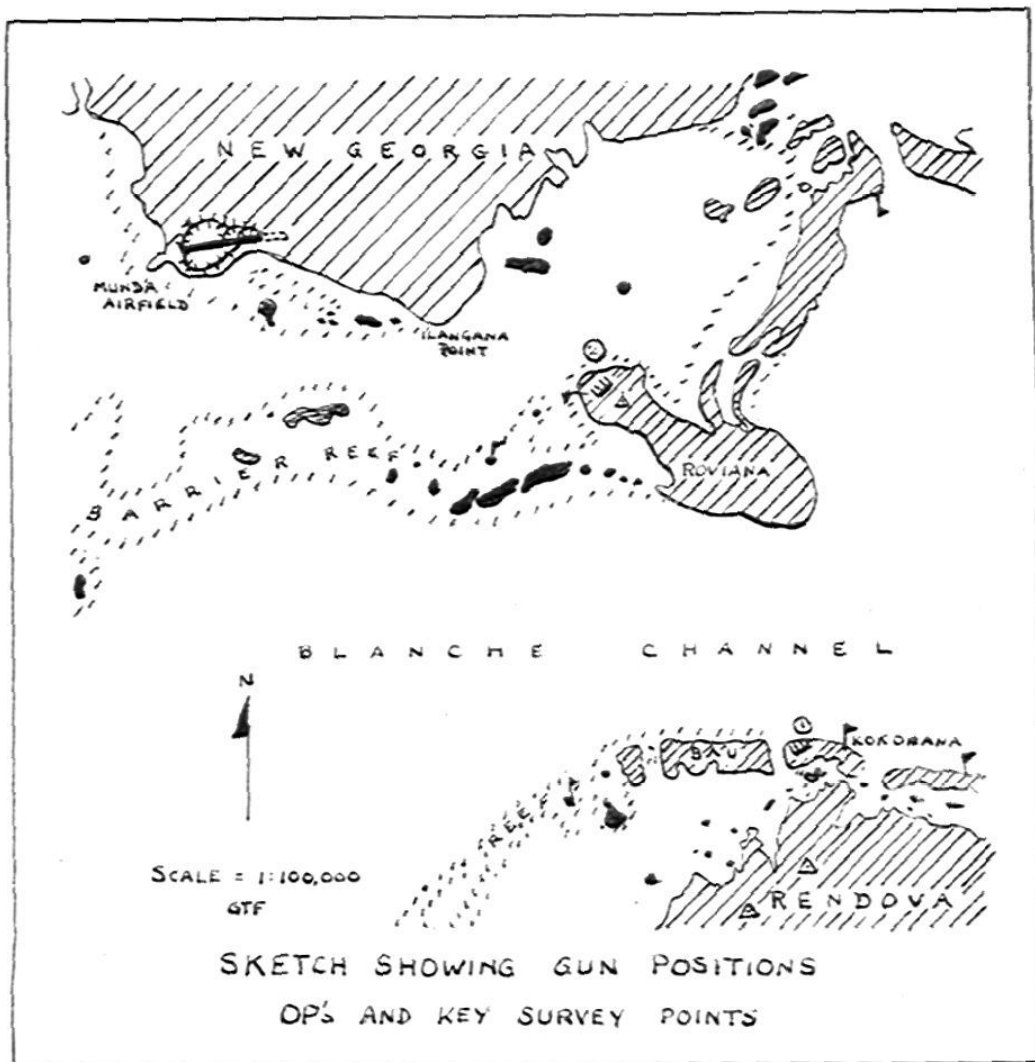
Over this same artillery telephone line orders were issued for a battalion of infantry to land at daybreak and attack the Japanese. This was done and relief accomplished.

Lines of communication and supply routes call for additional personnel equipped with automatic weapons to protect the normal personnel used to carry out these missions.

Air

Passive measures include the use of foxholes and dispersion, while active measures include fire from automatic weapons with which units were equipped. In addition to the normal automatic weapons we were able to obtain thirty 20-mm AA guns from the navy, which were distributed among the four battalions of the division artillery. They proved of inestimable value and were credited with bringing down several Jap "Zeros." These 20-mm guns were equipped with a heavy pedestal mount which made the changing of positions a difficult matter. A tripod mount might overcome this difficulty and permit the use of this gun for both antiaircraft and ground defenses, thus making an excellent all-purpose weapon for the artillery.

Fortunately we had air superiority during this campaign, for in spite of this were subjected to continual bombings of varying intensity during the entire operation. Personnel needed no urging in adopting adequate defense measures.



The antiaircraft work of the Marine Defense Battalions was outstanding and resulted in the saving of many lives and much material.

Camouflage was stressed during the entire operation and, in some cases, excellent results were obtained. In some instances, due to the terrain (such as coconut groves and light scrub undergrowth) adequate camouflage was difficult. The main idea, in these cases, was not total camouflage but making the position hard to pick up by enemy air observation and a difficult target to hit.

e. Firing Charts

The firing chart was the CICSOPAC MAP, Uncontrolled Mosaic, 1/20,000, JAN grid, with transfer corrections by registration. Replots were on observed firing charts. Target data was later transferred to firing charts.

Data for targets fired upon was recorded upon data sheets. Thus, new data for small shifts was in many cases computed without the use of the firing chart.

Battalion targets were designated by coordinates or previous concentration numbers.

Air Observation

The importance of air observation cannot be over-emphasized. Excellent results were obtained with artillery observers.

For this operation each battalion furnished two observers who went through a training course with aviation units. These observers were rotated and their work was outstanding.

The SCR-193 proved the best for air-ground communications. Allotted frequencies seldom permitted the use of the SCR-284.

As our Cub observation planes had not arrived we were forced to use TBFs for this observation work. Since the operation we have received these organic Cub planes.

Adjustments

All close-in fires and night protective fires were adjusted by forward observers during daylight hours. While advancing through the jungle no late forward movement was made; all troops started to dig in. Night fires were adjusted by the artillery for close-in protection at that time. This, in most cases, established the night lines of the infantry.

Sight adjustments often used smoke for the initial round, rarely using air burst with HE. High burst adjustment proved hazardous to friendly troops as fragments fell on adjacent units.

Sound adjustments proved of great importance during jungle operations. FOs became most proficient in their use and many times it was the only method from which any results could be obtained. It is very important during adjustments by sound to start with a range definitely over, then bring adjustment back. The sound of bursts varies during the day and night hours, and in rainy and clear weather. Shells bursting in trees sound different from those in the ground. Nevertheless, these difficulties were overcome with experience. A second observer was often required to protect friendly troops on the flank. Sound adjustments were carefully checked with the FDC before being fired.

One unit recommended the use of a Sound and Flash Battalion. Just how this would work in jungle warfare remains to be seen.

Fire for Effect

An average of one battalion concentration every three minutes was fired on a varied schedule, usually 3 volleys for lights, 2 for mediums, varied to fit the situation.

Protective night fires were fired twice each hour between 1800-2200 and then hourly until 0600 on a varied schedule.

The maximum rate of fire was limited to one round every 15 seconds, for accuracy by the gun crews.

Although the bulk of the fire for effect was conducted with HE, time fire proved of great advantage in firing on Jap barges. Opportunities for the use of time fire should be constantly borne in mind.

Due to the nature of the terrain, it was impossible to use ricochet fire during the New Georgia operation.

Low angle fire was generally found to be safer and faster, but due to tall trees near infantry front lines high angle fire often became necessary. To obtain a slightly greater angle of fall and clear masks the next lower charge was often used with the low angle.

Tall trees near front lines should be watched carefully during adjustments.

High angle fire was used to search sharp reverse slopes.

There were surprisingly few cases of short shooting, thanks to the FOs' carefully watching the terrain and high trees, and keeping currently posted on the positions of adjacent friendly troops.

Often the Japs fired single rounds into our troops from guns and mortars when we were firing, to create the impression that we were firing short.

Firing Close to Own Troops

In jungle terrain the 105s were usually brought in to from 100 to 200 yards in front of the infantry, the 155s to from 200 to 300 yards. Initial rounds for adjustment were fired from 300 to 600 yards in front of the supported infantry and then brought back to the desired distance.

Over water or in clearings normal distances were used.

Use of infantry mortar fire and automatic weapons for close-in firing was stressed. As the New Georgia operation progressed, better coordination and effect were obtained with these infantry weapons. Further development in their employment will result in relieving the artillery of many dangerous close-in fires.

Replots of close-in fires were used to determine the location of infantry units in deep jungle terrain.

Artillery Support Covering Coordinated Attacks

These attacks were supported by a combination of scheduled and on-call fires. Preparation for these attacks as a rule did not exceed 30 minutes. When several days separated coordinated attacks, a softening-up process was used on all known enemy installations.

Several rolling barrages were fired, starting close to the infantry and moving out 500 yards in 50- to 100-yd. jumps. When the infantry followed closely, they received few if any casualties. When they delayed their movement from the line of departure they suffered heavy casualties from Japanese automatic weapons and made little or no advance.

Night harassing fires were usually fired by one battery in a battalion so as to rest the other gun crews. Night fires requiring more than one battery required individual adjustment of each battery. On-call night fires followed the normal procedure and were participated in by all batteries within the supporting battalion.

Fire Direction Centers

Massing of fires by battalions, divisions, and corps gave excellent results (see preceding comments).

VCOs were used very little except as relief operators. Use of high angle fire on difficult terrain reduced the necessity for the almost impossible task of obtaining vertical control.

Div Arty FDC used a 6-drop switchboard, eliminating the necessity for an operator from each battalion. One line ran to each battalion, one to the S-3 phone, and the remaining line to either the CP or the radio station. This permitted party conference calls or connection of one or more battalions to OP or airplanes with the use of only one operator, who could monitor and make notes for the journal.

Positions

Positions on islands, compared to positions on the mainland, have the disadvantage of water lines of communication. They require boat transportation for movement of personnel, supplies, and ammunition. These boats were very difficult to obtain.

Advantages of island positions are:

(1) Elimination of construction of roads, clearing fields of fire, and the more difficult maintenance of wire lines encountered in the jungle.

(2) Elimination of transportation over muddy jungle trails.

(3) Allowing FDCs, switchboards, and gun crews to operate freely, day or night, without interference by snipers and

raiding parties. Require the use of only small beach parties for close-in defense.

(4) Permitting enfilade fire in many instances.

These advantages of island positions greatly outweigh the disadvantages. This was particularly so in this operation as there were no positions on the mainland where effective fields of fire could be obtained. Communications and supply problems were satisfactorily overcome.

Although initially all artillery was emplaced in positions on islands adjacent to the mainland, a detachment of four 105-mm howitzers, together with gun crews and ammunition, was maintained at the beachhead on the New Georgia mainland. These howitzers were prepared to handle direct fire missions as they developed, the idea being to employ them similarly to the Infantry Cannon Companies, which had not arrived in time for this campaign.

f. Liaison

Command liaison was maintained by rotating, every 3 or 4 days, the artillery battalion commanders, executives, and LnOs. 5-man detachments were used: 1 NCO, 1 telephone operator, and 3 linemen. An extra wire crew was kept at the infantry regimental CP. An extra 4-drop switchboard at the liaison headquarters greatly facilitates communication with the FOs.

g. Forward Observers

All battery officers except the executive were used. They, their detachments, and details were rotated every 3 or 4 days.

Wire communications proved to be the best; radio was of doubtful value.

It was most important that lateral communications be maintained between FOs.

Forward observers need copies of firing chart and photomaps of their areas. These were not always available.

Sixty per cent of all artillery officers were with the infantry on the mainland at all times.

The work of the liaison details, forward observers, and communication details during this campaign was outstanding and was largely responsible for the effective artillery support given the infantry during the operation.

h. Rotation of Personnel

Rotation of personnel with front line detachments—to include liaison and communication personnel and forward observers—is of vital importance for continuous operation. This personnel should be rotated every three or four days, thus permitting continuous and effective work.

i. OPs

Two types were available: tree tops and hill tops that had been cleared by artillery fire. Use of tree tops near our front lines was dangerous due to countersniper fire from our own troops. OPs in general were so few that they often had to be shared by several and sometimes by all battalions. This again emphasizes the necessity of air observation.

j. Survey

For the most part survey was limited to horizontal control, vertical control being very difficult and often lacking in the target area. Survey was continuous throughout all movements, but due to jungle difficulties was at times incomplete. Complete survey for the final defense phase of the area was very important. This was accomplished after the Munda Airfield was taken.

k. Ammunition

Supply was generally by LCTs. Loaded trucks driven on the boat and unloaded without removing the ammunition were a great time saver. Where trucks and boats were available in sufficient quantities, the transportation by fully loaded trucks proved to be the fastest method of moving ammunition. Manhandling time was eliminated in this manner, permitting the LCTs to make several trips per day; their return journey was made with empty trucks.

Sometimes a single shipment would contain thirty different powder lots, making it impractical to register each lot and thus causing some erratic shooting. Where possible, lots were segregated for close-in fires. Powder charges for scheduled night firing were prepared during daylight hours and segregated.

The mixing of Mark I, Mark IAI, and Mark 102 155-mm HE shell was a hindrance.

Some large range dispersions were noted with damp powder.

Quick fuze was used for snipers in trees, and in general gave the best results over the entire area. Delay fuze was used against dug-in troops and installations. This fuze seemed to produce an unwarranted number of duds. Owing to the smaller effective width of burst it was employed for close-in fires.

A ratio of one quick to one delay fuze was used in mixed terrain; 3 quick to one delay gave the best results in jungle. Preparations using these fuze combinations and fired to completely cover the advance of troops eliminated the tree sniper.

Damp fuzes apparently caused duds.

Smoke shells should be stored on end, due to the shifting of contents of the projectile when laid on its side. When shifting from smoke to HE, in close-in fires, add 200 yards for the initial adjustment round for a safety factor.

l. Vehicles

Retain all possible T/BA vehicles. This will be very difficult due to amphibious transportation problems. Nevertheless, these vehicles are absolutely necessary in the movement and unloading of ammunition. Once any vehicles are left behind it is hard if not impossible to get them back.

Each battalion needs a bulldozer or a caterpillar tractor with blade.

Availability of wreckers is most important in handling heavy loads and assisting movement.

Artillery on separate islands requires the assignment of a boat (LCV or LCM) for supply or vehicular movement of ammunition. Smaller boats (LCP or engineer boats) are needed for communications and survey personnel for interisland operations. Assignment of two "ducks" (truck, amphibian, 2½-ton) to each battalion and to Div Arty HQ would be a solution for these boat requirements.

m. Ordnance

The most common trouble with our M1918 155 howitzers was frequent leaking of recoil system.

All weapons require special attention due to dampness.

In jungle warfare all artillery personnel should be equipped with carbines.

20-mm AA guns with a dual-purpose mount should be used to replace the 37-mm AT guns.

n. T/Os

Twelve weeks of continuous combat without relief did not leave our personnel at maximum efficiency. An abnormal amount of loading and unloading from boats requires additional personnel. Batteries cannot be expected to man their guns 24 hours a day, provide their own local security, and do an average of 8 to 12 hours' stevedore work for prolonged periods without additional personnel.

o. Sanitation

In jungle warfare, one has to combat not only the enemy but also the climatic conditions and diseases of this area. Malaria is the outstanding disease and all personnel were administered atabrine. Unit rosters were kept and checked daily by an officer to see that all men had taken the prescribed dose.

Portable latrines and kitchens, both fly-proof, are necessary to reduce fly-borne disease.

The matter of rations is of vital importance in maintaining the strength of the men in combat. On the whole, "C" rations proved the most satisfactory. All men should carry two canteens which should be carefully checked to see that all water is chlorinated.

General sanitation had to be emphasized at all times, as the hot and humid climate increased the danger of infection from any unsanitary conditions.

p. Communications

Inter-island Wire Net

Both 5-pair rubber covered cable and W-110 field wire were used. Considerable cross-talk was experienced in the cable. New W-110 wire without numerous repair splices gave excellent results.

All lines must be kept clear of channels and landing beaches.

Wire Nets on Mainland

Circuits should be laid in duplicate, using different routes. Test stations were established every two or three miles to expedite location of breaks.

Maximum use should be made of infantry regimental switchboards in the forward areas. This reduces the necessity for extra switchboards.

Lateral communication for FOs must be established. W-130 wire gave good service for FOs.

Sound Power Phones

The sound power phone is the best type of phone for the forward observer. It is light in weight, and no ringing mechanism gives away his position at night. We used it also between executive and guns of batteries when emplaced in deep jungle or at any time when gun sections could not easily be controlled by voice, and between OPs and in the warning net and AA installations.

The sound power phone is of all equipment the least affected by dampness. Each battalion should be equipped with a minimum of 15 sets.

Radio

Both the SCR-193 and SCR-284 gave excellent results for air-ground communications. The 600-series radios gave very erratic performance in the jungle. All sets gave their best performance when located in clearings.

The climatic effect on radios in this theater of operations was considerable. Most of the new radio batteries received were unserviceable because of corrosion and shelf life.

Metro

Variations from day to day and during the day were negligible.

K changed from midday to midnight by approximately 9 yards per thousand.

OUTSTANDING FEATURES OF THE NEW GEORGIA CAMPAIGN

First: The excellent state of training of all artillery battalions participating, and their ability to meet the changing situation promptly and efficiently.

Second: The superior work of the personnel employed in maintaining contact with front line infantry units, such as liaison detachments, FOs, and communications personnel. At least 60% of all artillery officers were with the infantry on the mainland at all times.

Third: The magnificent massing of fires by corps, divisions, and battalions in this operation.

DRIVERS' AND MECHANICS' AWARD

Unit commanders who want to encourage better first and second echelon maintenance should keep in mind the award for qualified motor vehicle drivers and mechanics authorized by War Department Circular 248, dated 28 July 1942.

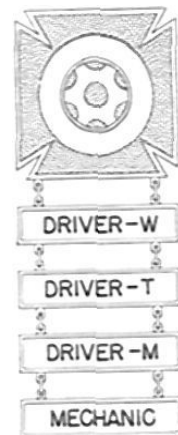
The basic badge with appropriate bar may be given anyone regularly assigned as driver, assistant driver, or automotive mechanic who can qualify under the requirements of the circular. The prospect of winning the award should serve as a real incentive to more faithful performance of organizational maintenance duties.

Over a half million of the badges have been awarded through Philadelphia Quartermaster Depot, but there are still many qualified drivers and mechanics eligible for the awards who have not had recognition.

Nomenclature and Federal Stock numbers of the badge and bars are:

Badge, Qualification, Motor-Vehicle Driver, Mechanic.....	71-B-197-50
Driver-W, for wheeled vehicles.....	71-B-1212
Driver-T, for track or half-track vehicles.....	71-B-1213
Driver-M, for motorcycles.....	71-B-1214
Mechanic, for automotive or allied trade mechanic.....	71-B-1229

These awards may be requested through any local Quartermaster Officer.



Artillery Support of Foot Cavalry

By Lt. Col. Charles E. Brady, Cav.

A battalion of 75-mm pack howitzers was in direct support of a cavalry squadron in the Los Negros Campaign, Admiralty Islands, from 4 Mar through 2 Apr 44.

The terrain of that portion of Los Negros Island upon which the action was fought consists of a long ridge, which extends west of Lemondral creek for roughly 3,000 yards. Its highest point is approximately 300 feet, and the ridge is 25-50 yds. wide. On the north side the hill drops sharply toward Seeadler Harbor; on the south it runs into extremely swampy ground. Thus, the topography forced the attack to be made along the length of the ridge, beginning at Lemondral creek and going west. The villages and supply points mentioned below were located down from the crest of the high ground, along small stream lines.

THE ATTACK

We used all the artillery we could get, and we could not get too much. One entire battalion of field artillery in direct support of our squadron was most profitable.

Preparatory to the attack, a barrage of intensity commensurate with the importance of the objective was indispensable in attaining the objective with minimum casualties. On occasions we found it profitable to use as many as 1,500 rounds or more in the initial preparation. The take off was followed by a rolling barrage, in close, which facilitated the advance. Enemy outposts were driven back so that we were able to reach their main line of resistance without delay and harassment. Artillery fire leveled foliage, bared pill-boxes and bunkers, and exposed enemy points of resistance. Craters from

"Our battalion walked into the engagement with no vehicles whatsoever: we had liaison planes before receiving any of our own vehicles. Ammunition came in by boar and was dropped by plane."—
Capt. Charles B. Cushman, FA

artillery fire offered our troops cover in the advance. The delay fuze was used effectively to bring the shells through the foliage to get the bursts down on the ground. Artillery fire on villages drove the enemy away from their supply points and denied them food and ammunition. Many enemy dead were found in these villages following artillery fire.

NIGHT FIRE

Concentrations on points of resistance and prepared positions (located in the daytime by our patrols) silenced enemy fire, kept the enemy in their dugouts, and prevented movement on the ground between our perimeters and their prepared positions. Fire on our flanks protected our long and narrow lines of communication and supply from envelopment.

LIAISON

Close and constant liaison with squadron, troops, and forward observers, who were with the forward elements, resulted in excellent coordination. All our plans included detailed employment of artillery.

Observer planes were of inestimable value in these jungles. Often it was only through their use that we were able to locate ourselves accurately on the ground. The present location of our troops and the objective of the day were made known to the air observer daily. By the use of flares fired from front positions, the exact location of our troops was determined by the observer so that he could adjust close-in with safety. This worked especially well when our troops were pinned to the ground.

Returning patrols reported coordinates of targets to the liaison officer with the squadron, who sent them to the air observer. In practically every instance the target was well covered with artillery fire. The effectiveness of all daytime fire was constantly adjusted and checked by plane when ground observation was not possible, which in the jungle is most of the time.

GUADALCANAL GPF

On page 732 of this JOURNAL for October, 1943, we published this photograph of a GPF firing in combat on Guadalcanal. Unfortunately the Marine Corps, which furnished the print, did not indicate that this piece was Army-manned.

Captain James O. Murphy, CAC, sets us straight: "The gun is actually one of a battery of Seacoast Coast Artillery which was used as a Field Artillery unit for several months. This battery was attached to the 1st Marine Division, and was cited along with that Division by the President. To the best of my knowledge, it was the first Army artillery unit to fire an offensive shell in this war."



Make Your Gunnery Practice Realistic!

Part III—Typical Japanese Targets

These paragraphs are designed to furnish descriptive material to be used in identifying real or suspected Japanese targets to an artillery officer who is to conduct or request fire upon them. Each paragraph is based upon descriptions of targets which have been fired upon by artillery in the Japanese campaign, as reported by observers or combat unit commanders. Drawings and photographs of actual Japanese installations also were used in compiling the material. Some of the targets have been identified from photo interpretation with details supplied from additional information.

Very little stress has been placed upon the method of directing the artilleryman's attention to the location of the particular target. This is a matter of individual discretion based upon approved methods of target designation and location.

It is hoped that the material contained herein will furnish instructors with vocabulary and descriptive details to assist them in describing targets more realistically and presenting gunnery and tactics problems which will test the judgment of students, and their knowledge of artillery capabilities and limitations. An effort has been made to present a wide variety of target types and situations. Each example assumes that an artilleryman is being addressed by an officer of a supported arm in reference to prospective artillery targets.

1. Take as a reference the road to our direct front. Follow it in the direction of the Japanese lines to the point where it bends to the right (north) and enters the woods. From the road bend look into the woods along the line of the road extended in its original direction. About 50 yards from the road bend there is a slight rise in the ground. A Japanese 75-mm AT gun is located there.

2. To our direct front you see a thickly wooded area. Take as a reference point the forward edge of this woods approximately 200 yards (mils) left (south) of the point where the road enters the woods. This point of the woods is marked by two tall coconut palms together. 200 yards line-short of these two palms and in the flat is a prominent patch of kunai grass. Identified? Go right from there 5^m and at approximately the same range you see a similar but smaller grass patch. There's a Jap machine gun dug in there.

3. On the right (north) slope of the commanding ground to our left front there is a series of narrow gulches perpendicular to our axis of advance. Jap machine guns are sited in the gulch just beyond the second spur of the mountain. They are placing plunging fire on our assault platoons in the valley below.

4. About 200 yards to our immediate front in the general direction of the shadows here on the ground you see a large coconut palm. Notice the mound of earth covered with vegetation at the base. That's a camouflaged Jap coconut log bunker.

5. Looking toward the sun at a range of approximately 400 yards you see a low-lying ridge running roughly north and south. We're attacking that ridge. The Japs have foxholes near the military crest of the ridge and are dug in on the reverse slope. We'd like you to support our advance up the slope, then pin 'em to the ground on the reverse slope and prevent their counterattacking the minute we seize the top.

6. Four Jap light dual-purpose guns are located in low earth revetments on the south border of the airfield. Our patrols have accurately located them here on this vertical. Can you knock them out?

7. Along the shore line just left (south) of where that coral jetty juts out into the sea there is a coral rock-covered dugout

half-hidden by those tall plams. There's a bunch of Japs with machine guns in there.

8. For our landings to be successful, we need your help in knocking out the beach defenses and possible guns shown on this photo.

9. The Japs have concealed trucks and possibly fuel cans in the bomb hole shown here south of the east end of the runway.

10. This area roughly 300 yards in diameter, from the looks of the picture, is a Jap bivouac. Those patches are gardens. If you can pour some of your artillery on them, we'll chase them out.

11. See this track on the photo? There's a lot of activity during the night between this point and one about 500 yards SE. Let's see if you can discourage those Japs a bit.

12. The Japs are using the short bridge across the Vila River branch on the main NS road to bring up ammunition and supplies using those 2-wheeled carts of theirs. If you can destroy it, we'll make them wish they'd stayed on the other side.

13. Those coordinates I just gave you are the center of a bivouac area whose diameter is 225 yards.

14. Take a look at these points on your photograph. They're Jap revetments with trucks in them. Note that they open south. That ought to be a good target for your artillery. If you succeed in knocking them out it will be a big help to us.

15. The Japs have a series of narrow slit trenches extending from here to here in width, and here to here in depth. Under attack they usually become panicky and start running about to alternate trenches. If you can bring artillery fire down on them. I think you'll cause a lot of casualties.

16. Their mortars have been making it hot for us from defiladed positions behind that knoll covered with kunai grass. They'll fire a few rounds and then move to another position. Can you fellows do anything about it?

17. Take a look at that beach on the isle opposite. There are gun pits and dugouts along it from (coordinates to coordinates). Artillery fire ought to neutralize them as we come in to land in our water buffalos.

18. The Japs have built some tough defenses for that runway. Have a look at the heavy dual-purpose gun, heavy revetment, and two pillboxes on the east side about 250' north of the shoreline.

19. We've located a Jap supply dump at these coordinates. It covers an area about 75 yards in diameter. We've been hitting water a few feet below the surface here, so they can't be dug in more than 3-4 feet below the ground.

20. My next target is a suspected coastal gun. We picked it up from an aerial photograph of the area. It's dug into a circular emplacement with a wall of coral rock and sandbags piled 3' high around it. There are dugouts for personnel connected to it by a series of trenches.

21. At the NE corner of the airfield the Japanese have built a revetment of coconut logs and coral rock to protect the trucks, supplies, and possible searchlight which are located behind it. The revetment opens to the north. That ought to give you fellows something to shoot at.

22. The coordinates just mentioned indicate the location

of three buildings in line. They are approximately 25' × 25'. All three are occupied by Japs.

23. The Japs build their bunkers to withstand a lot of shelling and bombing. They use boiler plate, ammunition boxes filled with sand, cocoanuts, coconut log covering, and coral rock. It's going to take some accurate shooting for you to destroy them.

24. Careful scrutiny of this vertical indicates that the Japs have a barge hideout along the shore of this cove. If you can drop some artillery shells in there, we can probably sink a few of them and make it tougher for them to get supplies.

25. In the area marked here on this photomap the Japs have constructed a number of personnel shelters of coconut logs and coral rock. Request harassing fires be placed on them during the night.

26. Here is what appears to be an automatic AA or plotting station, well camouflaged. We were lucky to see that one. These Japs are clever at concealing their installations.

27. Here's a remunerative target for artillery: 6 machine guns located behind an alternate heavy antiaircraft position. That ought to be a good one for massed fire.

28. Over on the ridge there is a large Jap defense position. Don't know what all they've got there, but it's bound to impede our advance unless you can neutralize it. We think there are mortars on the reverse slope.

29. The point I have just indicated to you lies in the center of a strong defense area. Included in the area (which is approximately 500 yards long by 250 yards wide) along the east bank of the river at the north end of the air strip, are trenches and pillboxes supported by machine guns and possibly some dual-purpose light antiaircraft.

30. The Japs are evacuating the island, using barges which have been hidden in this inlet along the shoreline. Well-directed artillery fire should inflict heavy casualties.

31. Shells believed to be coming from a 77-mm howitzer battery in position here have been falling near our regimental CP. Can you neutralize their fires?

32. Large caliber guns believed to be fixed naval guns among the mangroves on the north end of this cove shown here, have been shelling us. Can you put something on them?

33. There's been plenty of Japanese activity in the coconut grove near the coves opposite our present position, particularly at night. What can your batteries do?

34. Here in this natural clearing in the jungle is a Japanese antiaircraft gun installation. There are 10 emplacements arranged in an arc pattern extending from (coordinates to coordinates). The CP of the battery is located back of the battery and approximately equidistant from the ends.

35. In this clearing is a 4-gun antiaircraft battery in a rectangular pattern. The CP is in the center of the position. The individual revetments are circular, probably built up of

sandbags. The entrances are protected and are located facing south.

36. Flanking this 3-gun antiaircraft installation in the shape of a triangle with CP or searchlight in the center of the position, on the edge of the clearing are the gun crew quarters and ammunition dumps. If you can place some artillery fire on the quarters and dumps it will certainly benefit our air support.

37. There's a big Jap medium antiaircraft battery. Note that it consists of a series of three arc patterns, the center one of the three being reversed in direction from the end two.

38. That circular antiaircraft revetment has a ramp leading down into the opening of a covered shelter, probably for ammunition storage. See how it opens directly into the revetment itself. Also notice the second revetment built around the first.

39. See that large tree that stands up above the ground on a mass of stilt-like legs? Well, that's a banyan tree, and the Japs have machine guns dug in among the roots. Have you got anything effective against such a defense?

40. For purposes of control and orientation, Japanese night attacks follow clearly defined terrain features. That wooded stream bed looks like a likely avenue of approach. Will you give us a barrage to cover the area along the stream from point to point?

41. The Japs know that positions on the reverse slopes give them better visibility up against the crests and sky. Well placed artillery fire on the reverse slope of that steep commanding ridge will make it difficult for them to hold their positions there. They may be anywhere from the crest to the bottom.

42. Japanese tanks have been observed massing for a probable attack in the trees along the west bank of the river. Do what you can to break it up before they get started.

43. Japanese troops are attempting to force the mouth of the river across the bare sand-spit here in a mass rush. Pour on your artillery!

44. This photo shows four well-camouflaged Jap guns here. They are readily discernible, however, because the camouflage does not form a complete cover. See how the ground surface can be seen, and the light sand, where the emplacement has been dug, reveals their position.

45. The beach defenses along the shoreline here consist of bunker strongpoints. Both the single and double bay type are in evidence. This large double bay type is approximately 60' × 40'. The mound of earth is about 10' high with a rear entrance well recessed into the mound. It's important that it be destroyed if our attack is to succeed.

46. We have a large body of Japs trapped in this narrow valley. They cannot get out, as our men are on both ridges and above and below them in the valley. They are quiet now, but we know they are there. They are probably hungry and desperate now and may try to break out any time.

ANZIO APPRECIATION

From the Anzio Beachhead during its last days, an infantry lieutenant writes:

"Having been a member of one of the 'roughest, toughest' infantry outfits since the days of Tunisia, I sincerely say that our artillery has been our salvation in most of our scraps. Our artillery has a much greater 'smashing force' than *most* of Jerry's ever had. I say 'most' in respect to his 88—it is terrific! On the other hand I know what he is going through when he meets our artillery barrages—they're poison."

Correction for Aiming Post Displacement

By Col. William C. Huggins, FA

Shock of firing or an extreme traverse may cause the telescope of a piece to move off the line of the aiming posts. Then the posts will appear out of line, and laying on the far post alone will produce an error in direction.

The standard method of correction is to lay on the far post, refer to the near post, re-lay on the far, and then realine the posts. This method involves changing the recorded deflection, and does not provide for the progressive displacement between rounds which occurs from the shock of firing when the weapon is situated on soft ground.

On larger weapons, such as the 240-mm howitzer M1, it is not convenient to use the standard method of correction each time a wide shift is made; and yet the apparent aiming post displacement will be considerable in extremes of traverse.

In cases where the telescope has moved out of alignment with the aiming posts, if some method could be found to lay with the line of sighting *parallel* to the line of the aiming posts, direction would be correct.

In the May-June, 1940, issue of this JOURNAL, an article entitled *Aiming Point: VP*, by Capt. Alexander S. Bennet, presented such a method. The method of correction described here is essentially the same. This method enables the gunner to lay with his line of sighting *parallel to the line of the aiming posts*. Recorded deflections need not be changed. Posts are not realigned. The method works as follows:

When aiming posts are put out, the near post is placed just halfway between the far post and the piece. The distances recommended are 100 yards to the far post, 50 yards to the near post. Distances may be adapted to the terrain, however, as long as the 2:1 ratio is maintained.

When the aiming posts appear out of line, the gunner sets the announced deflection and lays with the far post appearing halfway between the vertical hair and the near post in the reticle, measuring the angular distances on the graduated horizontal hair (Fig. 1). For training purposes, the gunner can attain this laying as follows:

- (1) Set the announced deflection and lay on the far post.
- (2) Note the position of the near post on the horizontal hair.
- (3) Traverse the piece until the far post appears in the position on the horizontal air previously occupied by the near post.

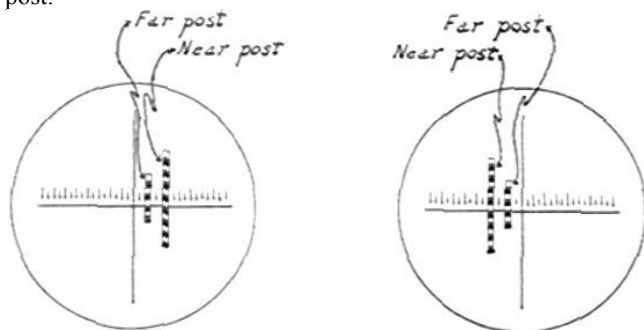


Figure 1

Appearance of aiming posts in reticle when telescope has displaced to LEFT of line of aiming posts.

Appearance of aiming posts in reticle when telescope has displaced to RIGHT of line of aiming posts.

After the gunner is sufficiently experienced he can omit the steps above and can, in one operation, lay with the proper sight picture (see Fig. 1). Even if the horizontal hair is not graduated, he can estimate the angular distances closely enough. This method can be used at night as well as in the daytime, since the aiming post lights can be used to lay with the proper sight picture. The effect of this procedure of laying with the line of sighting *parallel* to the line of the aiming posts is proved by the exaggerated diagram in Fig. 2.

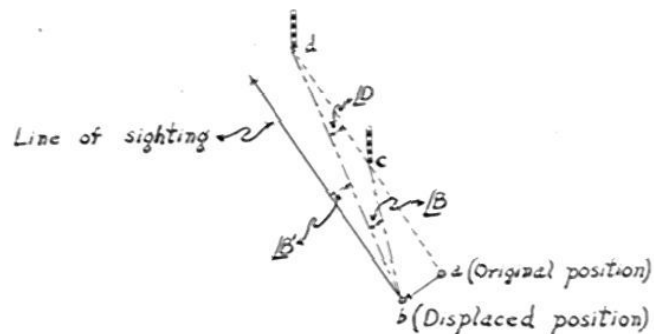


Figure 2

$ac = cd$ (spacing of posts)
 bc may be said to equal ac , since the actual displacement ab is so small; therefore—

$bc = cd$, making bcd an isosceles triangle.

$\angle B = \angle D$

$\angle B = \angle B'$ (as measured in the reticle)

$\angle B' = \angle D$

And the line of sighting is parallel to the line of the aiming posts (acd), since the alternate interior angles are equal.

The question may arise, "will the near post always be visible in the reticle when large shifts are made?" The two diagrams, Figs. 3 and 4, show the answer. Both diagrams are for the 240-mm howitzer M1, which is the weapon having the greatest distance from pintle (or center of traverse) to telescope (51 inches). Maximum traverse to either side is 400 mils.

It is seen in Fig. 3 that twice the angle D will be the angular distance required on the horizontal hair of the telescope

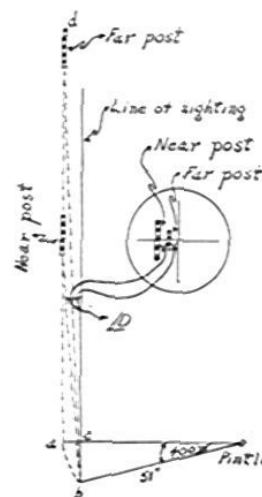


Figure 3 — Aiming posts on a line perpendicular to the line through pintle and telescope.

a is the original position of the telescope.

b is the displaced position.

ac is the amount the telescope is displaced off the line of the aiming posts.

$$ac = 51 - (51 \cos 400) = 51 - 47.1 = 3.9$$

$$ad = 100 \text{ yds, or } 3,600''$$

$$\tan \angle D = \frac{ac}{ad} = \frac{3.9}{3600} = .00108$$

$$\angle D = 1.1 \text{ mils}$$

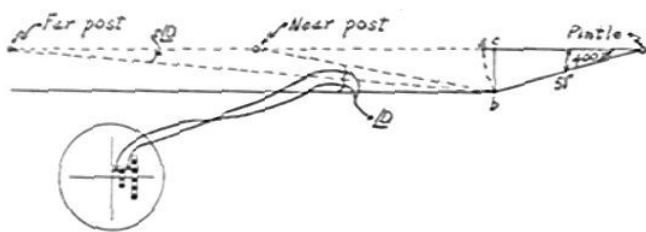


Figure 4—Aiming posts on a line in prolongation of a line through pindle and telescope.

a is the original position of the telescope.

b is the displaced position.

cb is the amount the telescope is displaced off the line of the aiming posts.

$$cb = 51 (\sin 400) = 19.5''$$

$$cd = 100 \text{ yds. or } 3,600''$$

$$\tan \angle D = \frac{cb}{cd} = \frac{19.5}{3600} = .00542$$

$$\angle D = 5.5 \text{ mils}$$

between the near post and the vertical hair. Fig. 4 shows the aiming posts on a line in prolongation of a line passing through pindle and telescope; the maximum angle *D* will be 5.5 mils, and twice that is 11 mils. In Fig. 3 the aiming posts are on a line perpendicular to a line passing through pindle and telescope; the maximum angle *D* will be 1.1 mils, twice which is 2.2 mils.

The two figures yield an idea of the degree of displacement in traverse with various positions of the aiming posts. Will our reticle accommodate angle *D*s up to 11 mils?

In the reticle of the M12 telescope used with the 240-mm howitzer M1, the horizontal hair is graduated up to 90 mils on each side of the vertical hair. Therefore the near aiming post will always be visible.

In the reticle of the M12A2 telescope used with the 105-mm howitzer M2, the horizontal hair is graduated up to 40 mils on each side of the vertical hair. Therefore this method can be used until the angle *D* (as indicated in Fig. 2) exceeds 20 mils. If the far stake is 100 yards away this would mean a displacement of 71 inches, which is unlikely even on muddy ground.

To test this method, aline the tube on a clearly defined distant point (more than 1,500 yards), using tube boresighting equipment. Line in the two aiming posts with the telescope in any chosen direction, and with the far aiming post twice as far from the telescope as the near aiming post. For smaller weapons, by hand shift the weapon laterally and to the rear, to produce a displacement of the telescope; for larger weapons, move both aiming posts an equal distance from their original positions, perpendicular to the line of the aiming posts. Relay on the aiming posts using the method prescribed in this article. Check by looking through the tube, to see that the tube is alined on the previously selected distant target point. Put out the aiming posts in various other directions and recheck as above.

Alinement can also be checked by noting that the referred readings on the panoramic telescope and aiming circle correspond when the weapon has been displaced after having been previously laid for direction with the aiming circle.

When the displacement of the sight from the line of aiming posts is due to shift in position of the weapon, it may be advisable to realine the aiming posts between problems. If section data sheets are being used, with the sight settings recorded for the several deflections to be fired, it is desirable not to disturb these readings. In this case, after establishing the line of sighting parallel to the line of aiming posts, the far post is moved to alinement on the vertical hair and then the near post moved into line. If the changing of the sight setting is of no importance and it is not desired (or is impracticable due to accident of terrain) to disturb the far aiming post, set on base deflection, establish the line of sighting parallel to the line of aiming posts, refer to the far post, realine the near post, and change the base deflection recorded to conform to the new sight reading.

Use of the above method in no way justifies the executive's failing to select a distant aiming point and record the deflection thereto for the emergency of having the aiming posts knocked down. Likewise, for use at night or when for any reason a distant aiming point is not visible, provision should be made to set up the aiming circle where it can be seen from the sights of the weapons and oriented to the basic direction.

AIMING POST DEFLECTION CORRECTION TABLE FOR 155-MM GUN M1

By Lt. Col. Frank H. Skelly, FA

Due to the fact that the gun sight is located to the left rear of the pindle center of traverse, the sight moves in an arc about the verticle axis of the pindle bearing when the gun is traversed. This results in an error of laying which is negligible when using a distant aiming point, but quite appreciable when using aiming posts.

The direction in which the aiming posts are set out determines both the error and the resultant corrections. Because of the fact that the sight moves along an arc, the corrections for traversing right and left are not necessarily the same, nor is the direction in which applied necessarily always the same. This becomes readily apparent when the displacements for various positions of the aiming posts are plotted graphically.

The accompanying table shows the amount and direction of the corrections to be applied to shifts, for any position of the aiming

posts with respect to the tube when laid on Base Deflection. These amounts presuppose that the far post will be at a distance of 100 yards and that it will be used as the aiming point.

This table makes no corrections for errors resulting from the non-alignment of aiming posts caused by movement of the carriage (shifting of the trails, etc.). Aiming posts must be aligned when the gun is on base deflection by the usual method of "Lay, Refer, and Lay."

The table is by no means so complicated as it may at first appear. If all aiming posts of a battery are placed at the same deflection reading for Base Deflection, only one line of the table is applicable. If the positions of the aiming posts vary within the battery, appropriate lines must be used for

each piece. For convenient reference the executive should extract the appropriate line or lines on a data card.

Corrections should be applied habitually *within the battery*, ordinarily by the executive, to every round fired—be it a

registration, concentration, or what-not. In this way all data from the FDC, or of record there, will be "pure" (stripped of sight corrections). This will avoid those complications in the FDC which would arise if the corrections were applied there.

155-MM GUN M1

DEFLECTION CORRECTIONS FOR SIGHT DISPLACEMENT CAUSED BY TRAVERSE WHEN USING AIMING POSTS

NOTES: Aiming posts are kept in alignment by usual method when laid on Base Deflection. Center Line (instead of BD) may be used if preferred for aligning aiming posts and as origin for applying corrections.

BDL (Shift in Mils)								Base	BDR (Shift in Mils)							
800	700	600	500	400	300	200	100	Deflection	100	200	300	400	500	600	700	800
CORRECTION (MILS)								(Front)	CORRECTION (MILS)							
6	5	4	3	3	2	1	1	R 3200 L	--	1	1	1	1	2	1	1
6	5	4	3	2	2	1	1	R 3100 L	--	1	1	1	1	1	1	1
5	4	3	2	2	1	1	--	R 3000 L	--	1	1	1	1	1	--	--
4	4	3	2	2	1	1	--	R 2900 R	--	--	--	--	--	--	--	1
4	3	2	2	1	1	1	--	R 2800 R	--	--	--	--	--	1	1	1
3	3	2	2	1	1	--	--	R 2700 R	--	--	--	--	1	1	2	2
3	2	2	1	1	--	--	--	R 2600 R	--	--	--	1	1	2	2	3
2	2	1	1	--	--	--	--	R 2500 R	--	--	1	1	2	2	3	3
1	1	1	--	--	--	--	--	R 2400 R	--	1	1	1	2	2	3	4
1	--	--	--	--	--	--	--	R 2300 R	--	1	1	2	2	3	4	4
--	--	1	1	1	1	1	--	L 2200 R	1	1	1	2	3	3	4	5
1	1	1	1	1	1	1	--	L 2100 R	1	1	2	2	3	4	5	6
1	1	2	1	1	1	1	--	L 2000 R	1	1	2	2	3	4	5	6
2	2	2	2	2	2	1	1	L 1900 R	1	1	2	3	4	5	6	6
3	3	3	2	2	2	1	1	L 1800 R	1	1	2	3	4	5	6	7
3	3	3	3	2	2	1	1	L 1700 R	1	2	2	3	4	5	6	7
4	4	3	3	3	2	1	1	L 1600 R	1	2	2	3	4	5	6	7
4	4	4	3	3	2	2	1	L 1500 R	1	2	3	3	4	5	6	7
5	5	4	4	3	2	2	1	L 1400 R	1	2	3	4	4	5	6	7
5	5	4	4	3	2	2	1	L 1300 R	1	2	3	4	4	5	6	7
6	5	5	4	3	3	2	1	L 1200 R	1	2	3	4	4	5	6	7
6	6	5	4	3	3	2	1	L 1100 R	1	2	3	4	4	5	6	7
6	6	5	4	4	3	2	1	L 1000 R	1	2	3	4	4	5	6	6
7	6	5	4	4	3	2	1	L 900 R	1	2	3	3	4	5	6	6
7	6	5	4	4	3	2	1	L 800 R	1	2	3	3	4	5	5	6
7	6	5	4	4	3	2	1	L 700 R	1	2	2	3	4	4	5	5
7	6	5	4	4	3	2	1	L 600 R	1	2	2	3	4	4	5	5
7	6	5	4	3	3	2	1	L 500 R	1	1	2	3	3	4	4	4
7	6	5	4	3	2	2	1	L 400 R	1	1	2	3	3	3	4	4
7	6	5	4	3	2	2	1	L 300 R	1	1	2	2	3	3	3	3
7	6	5	4	3	2	1	1	L 200 R	1	1	2	2	2	3	3	3
6	6	5	4	3	2	1	1	L 100 R	1	1	2	2	2	2	2	2
6	5	4	3	3	2	1	1	L 0 R	0	1	1	1	1	2	1	1

(Rear)

SIMPLIFIED COORDINATE SCALE

By Maj. C. R. Plankenhorn, FA

"Base point 300RR 400SS." Have you ever watched an HCO or VCO spin and fumble with a coordinate scale to properly position it? I have and am convinced that the coordinate square as now used (see Fig. 1) has certain definite deficiencies which tend to confuse a new operator and reduce the speed of any operator. To witness this inefficiency, watch any HCO or VCO (except an expert) try to use it when plotting a target whose location is indicated as a shift from a base point or from a previous concentration.

A perfectly square coordinate scale with graduations on each of four sides (see Fig. 2) is a more efficient tool. With this type of scale, an HCO or VCO can do any operation now performed with the present coordinate scale. It has the following additional advantages:

a. Operators can be trained to use the scale in considerably

less time.

b. Targets can be plotted more quickly.

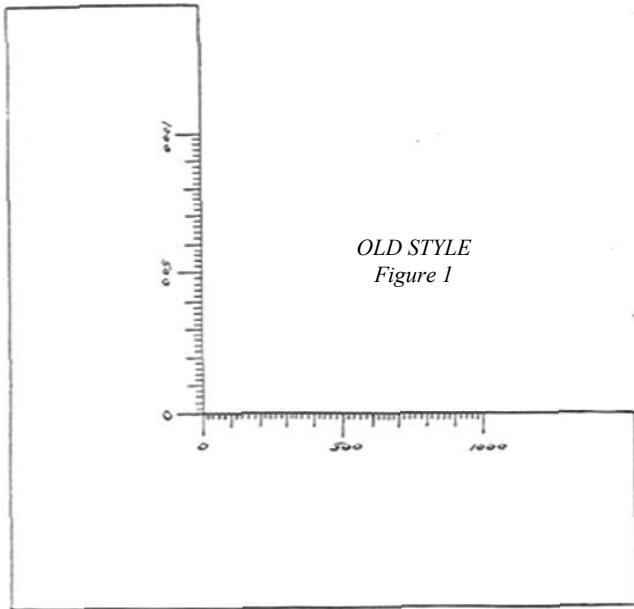
c. Fewer mistakes are made.

d. The scale is a regular shape which is easy to carry and is not easily broken.

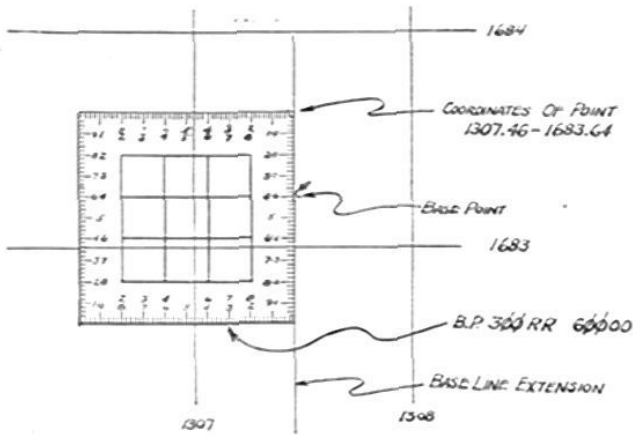
For plotting a point whose coordinates are 1307.46-1638.64 (see Fig. 3), slide the scale to the proper coordinates, square up the guide lines, place the plotting pin at the corner of the coordinate scale.

For plotting a point whose location is indicated as a shift from the Base Point, see Fig. 3. As an example, plot BP 300RR 600OO. Place the right edge of the scale on the BP, slide the scale until BP measures 600 yards over, square the edge of the scale with the base line extension, and place the plotting pin at the graduation 300 yards to the left.

One officer has suggested that the scale be made 2,000 yards



OLD STYLE
Figure 1



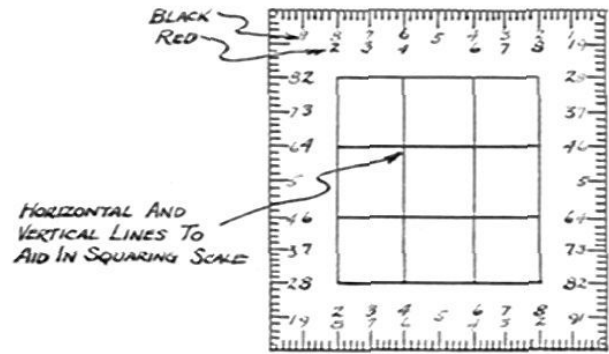
PLOTTING TARGETS
Figure 3

on a side rather than 1,000. Although this has not yet been tried, I believe that it would be an improvement as the guide lines would be longer and the scale could be lined up more easily.

Fig. 4 is a sketch of a proposed scale 2,000 yards on a side. The "Over," "Short," "Left," and "Right" are aids to reduce the thinking required of the HCO and VCO. To see how this would work, plot a target whose location is BP 500LL 700SS. Targets will normally be within 1,000 yards of the BP or check point, thus target and BP fall along the "aids" marked "Left" and "Short."

This type of coordinate square can be made out of a range

SCALE MADE OF $\frac{1}{16}$ " OR
HEAVIER TRANSPARENT PLASTIC



NEW STYLE

Figure 2

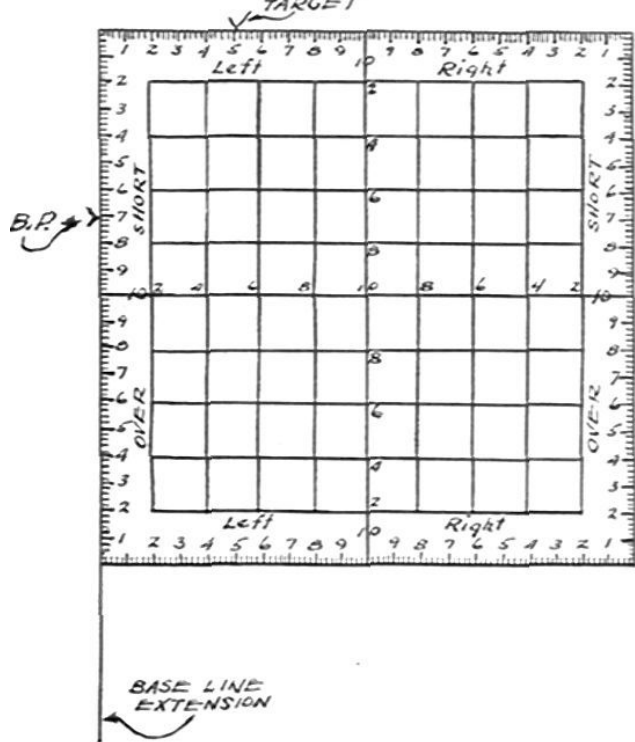


Figure 4

deflection fan, using a sharp instrument and steel straightedge to engrave the scales on the plastic. Mark the scales with India ink and clean off excess ink with crocus cloth.

This scale, incidentally, is somewhat similar to the one described by Lt. Alto E. Royer on page 700 of this JOURNAL for October, 1943.

CELEBRATIONS

On page 257 of last April's JOURNAL we described the New Year's greeting fired by our artillery in Italy. Major Franklin T. Gardner has sent us that clipping and says:

"And on Hitler's 55th birthday a swastika flying from a flagpole in a beachhead perimeter kraut-held town was given a riddling by 55 rounds of 105 time fire."

FLASH!

FM 6-100, *Field Artillery—Tactics and Technique of Division Artillery and Higher Artillery Echelons* (24 May 44), is now available at 15 cents.



INVASION:

JUNE, 1944



On D-day, 6 June 44, Normandy's beaches were aswam with men and equipment. Bulldozers were among the first vehicles ashore; part of their work was to snake from the water 6-pointed barricades of railroad rail, so that small craft could approach the beach safely at low tide. "Snow fencing" and other mats furnished good footing across soft sand. Many vehicles waded ashore from their craft, which ran aground one or two hundred yards out on the gently sloping bottom. Others, like the DUKWs, swam ashore and then continued on wheels. Still others were floated on barges from their landing ships to a point where water was shallow enough for them not to be flooded out. Infantry waded through the barriers, sometimes in water to their necks.

The entire scene was one of incredible complexity, with a detailed, smooth-flowing orderliness among what at first glance might appear to be confusion. Beachmasters handled boat and land traffic with a skill developed from many pre-invasion maneuvers. The whole was under a constant air cover, including countless barrage balloons as well as thousands of air force sorties.



PERIMETERS in PARAGRAPHS



(BASED UPON LATEST INFORMATION AVAILABLE AT DATE OF WRITING, AND SUBJECT TO CORRECTION AS MORE COMPLETE REPORTS ARE RECEIVED.)

By Col. Conrad H. Lanza

THE INVASION OF FRANCE (21 May to 18 June 44)

For a long time an invasion of France has been referred to as a "Second Front," apparently because Mr. Molotov, Russia's Foreign Commissar, at the beginning of June, 1942, urged that a Second front be undertaken that same year. Before visiting Washington, Mr. Molotov had been in London on the same mission. He so far convinced the British Government of the advisability of invading France that broadcasts were almost immediately started to the French people, warning them to get back from their coasts without delay. Mr. Churchill also visited Washington in June, 1942, but after Mr. Molotov had left. It was decided to first undertake an expedition against northwest Africa in the succeeding autumn, and to postpone the Second Front until 1944. The reason for the delay was the need for first accumulating the necessary men and materiel in the British Isles. If the African expedition was cancelled this could have been completed by 1943; with the African expedition having priority, an additional year would be required.

The invasion of France has now started—two years later than the date originally proposed by Russia. In that time the strategic situation has greatly changed. In 1942 the mission of the proposed Second Front was to relieve the armies of Russia. At that date these had been thrown back toward the Volga River, and when Molotov made his visit were still going back. Reduction of German pressure in Russia was then urgent.

In this year of 1944, Russia has long since staged a comeback; she appears to be well able to take care of herself. The mission of the Second Front is no longer primarily to relieve Russia: it is now one of several powerful attacks against Germany being delivered (or about to be delivered) from east, south, and west, converging in the interior of Germany and intended to utterly destroy German military power. The initial invasion is but one of several campaigns in being or proposed.

Germany has long been aware of the intention of invading west Europe. The British and Americans have made no secret of their intent to do so. Only the date and place were not revealed. The accumulation of landing craft in British harbors could not, however, be concealed from enemy photographic reconnaissance. This, together with a study of the terrain, indicated that the main invasion would be in north

France and the Low Countries, in one or the other of two regions.

East of the Seine River as far as Antwerp, beaches are good and numerous. At the extremities are the two excellent ports of Le Havre and Antwerp, with several minor ports in between. This section is the closest to England; it is the short road to Berlin.

The other region is west of the Seine as far as the Cotentin peninsula. This too has excellent beaches, but no good port unless Le Havre on the east or Cherbourg on the west could be taken. A landing on this coast would naturally lead to an advance toward Paris. [Note: See the article on invasion routes in this JOURNAL for December, 1943.]

In view of this situation, the Germans have had ample time to prepare. Permanent defenses were erected all along the coasts. These included batteries to fire against armored ships and landing craft, and numerous small works for machine guns and medium artillery to use after the attackers had landed. Obstacles were provided offshore, on the beaches, and back of the beaches. Other works were built to cover routes of advance from the beach into the interior, to deny the use of the better roads to invaders. According to reports of Swedish observers, the personnel assigned to coast defense duty averaged not over 400 men per mile—just about enough to man the weapons within the fixed works.

Back of the defenses, at 50 to 100 miles back from the coast, were German divisions in positions of readiness. West of the Seine was the West France Army Group, or Group B, whose commander has not been ascertained at date of writing. It contained two armies—the Seventh (under Col. Gen. Frederick Dollman) and the Fifteenth (under Gen. Salmuth). At date of invasion the Army Group had about 16 divisions, of which half were in the general vicinity of Paris.

The German General Reserve was posted in the center of France; it contained at least 9 Panzer Divisions and possibly more. Other German Army Groups, not yet engaged and held in readiness, were

Divisions (approx.)

Netherlands Army	6	in Holland, north of the Rhine,
Flanders Army Group	20	from the Rhine to the Seine, and
South France Army Group	15	also covers southwest France.

There is no reliable information as to the size of the German GHQ Reserve, reported assembled in the general area between the Vosges Mountains and the Black Forest (both incl.).

* * *

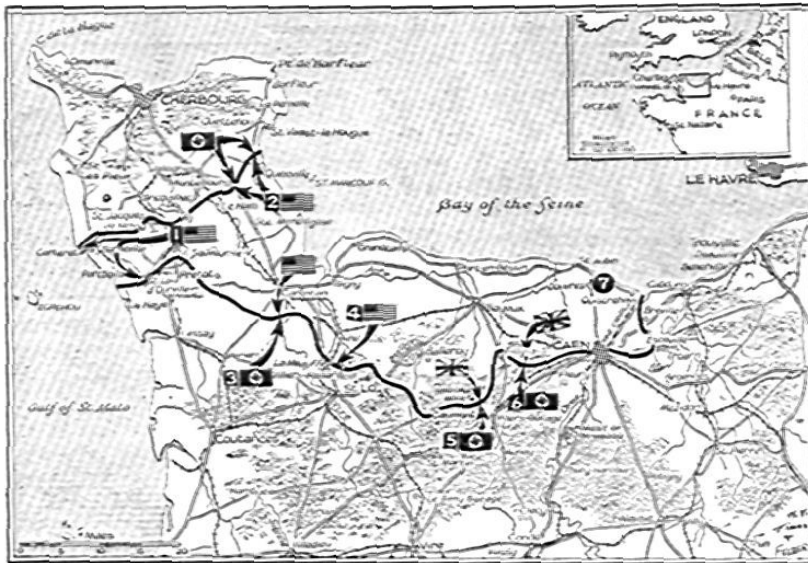
The Allied Commander-in-Chief was the American Gen. Dwight D. Eisenhower, with headquarters in England. For the initial operation he detailed the 21st Army Group, commanded by the British Gen. Sir Bernard L. Montgomery. His plan was:

An American Army was charged with the capture of the Cotentin peninsula and its port of Cherbourg, by an attack from the east side of the peninsula.

A British Army was charged with protecting the left of the Americans by advancing southward from the south side of the Seine Bay—Ultimately this army, assured of a good base by the expected fall of Cherbourg, would be in position to advance deep into France.

The American Army was commanded by Lt. Gen. Omar N. Bradley. The Cotentin peninsula was to be reduced by attacking its south end, thereby cutting it off from the mainland. Cherbourg would be reduced by an attack from its rear.





At the end of the period a slash by the U. S. 9th Div to Barneville and Carteret and south to Portbail and St. Lô-d'Ourville (1) isolated the port of Cherbourg and gave us a 7-mile stretch of the Atlantic Coast. Nearer to Cherbourg hard fighting was raging in the vicinity of Quineville and at Montebourg (2), which was not yet fully in American control. Below Carentan enemy attacks were repulsed (3). Headquarters announced that the Americans were within 6 miles of St. Lô, but German reports said they had reached La Meauffe and Villiers-Fossard (4), which are even closer. East of Caumont (5) and east of Tilly (6) enemy onslaughts were thrown back and the British wiped out a pocket of resistance at Douvres (7), which had been maintained by the Germans since D-day.

On its east side the Cotentin peninsula is generally low, with good beaches. The southern part is bordered by marshes; there were no terrain difficulties in landing. The north part of the east coast and all of the north coast were heavily fortified and had fewer beaches. The west side of the Cotentin peninsula had good beaches, but bluffs generally lined them. Many of the bluffs were sand—rather easily negotiable for men on foot, but an obstacle to vehicles. At high tide the sea came close to the bluffs, leaving but a narrow space in which landed stores and materiel could be handled. This would make an easy target for hostile artillery.

Off the west coast of the Cotentin peninsula are the Channel Islands. These are fortified, and their guns in part could fire on invasion fleets approaching the French shore. These islands have narrow beaches, not easy to land on. Consequently no landing of American forces on the west side of the peninsula was contemplated. Capture of the peninsula was to be accomplished by:

a. On the night before D-day an airborne division was to be dropped near Coutances, to cut the roads on the west side of the peninsula and advance east and northeast toward Carentan and the V Corps.

b. Another airborne division at the same time would be dropped in the area east of Sainte Mere-Eglise, with a view to covering the landing of the VII Corps.

c. The VII Corps (Maj. Gen. Leonard T. Gerow) was to land from the sea on D-day between Quineville and opposite Sainte Mere-Eglise, then attack toward Cherbourg.

d. The V Corps (1st, 2nd, and 29th Divs, under Maj. Gen. Joseph L. Collins) would land between Pt. de la Percee and Port en Bassin, advance southwest toward Coutances, sever the peninsula, and protect the rear of the VII Corps.

The British Army was to land on excellent beaches from opposite Bayeux to east of the Orne River, and advance to the line Bayeux—Caen (both incl.) as quickly as possible. To cover the left of this army British airborne divisions were to be dropped on the night preceding D-day both north and south of Caen, with special orders to seize the bridges over the Orne River. Other troops were to be dropped near Honfleur and near Rouen; their mission has not yet been made public, but presumably it was to prevent the German Flanders Army Group from sending reinforcements across the Seine to their West France

Army Group.

ORDERS FOR THE INVASION

Orders were issued on 3 June for the invasion effective on 5 June, which was to be D-day. In compliance, the RAF during the night 3/4 June heavily bombed the coast batteries along the shore to be attacked. During the afternoon of 4 June the weather appeared unsuitable, and at about 1600 hours* the invasion was cancelled. Just before midnight the weather took a turn for the better. Orders were thereupon issued designating 6 June as D-day.

Most of the landing craft and smaller vessels to be used in the invasion completed loading and cleared their harbors during the night 4/5 June, for a position in waiting at sea. The larger ships did not get under way until after 1400 hours. During the afternoon the entire expedition assembled, under protection of an air umbrella of fighters established 60 to 80 miles south of the British coast.

FIRST DAY OF THE INVASION

Over 4,000 ships were in the invasion army's fleet, exclusive of several thousand small craft. The handling of such a large number of vessels (which had a 50-mile front) was a difficult technical job. The Channel crossing was without incident.

The air forces which protected both sea and land forces employed over 11,000 planes of all types.

Air-borne troops were all dropped approximately as planned between 0100 and 0300 hours. The U. S. division dropped near Coutances met heavy opposition, but the 82nd Div (dropped near Sainte

Mère-Eglise) was able to assemble with but minor enemy interference. Similarly, the British 6th Air-borne Div (dropped north and south of Caen) was able to seize bridges north of Caen, but that part dropped south of Caen was not successful. A British air-borne division landed in the vicinity of the Seine River and met strong opposition from the beginning. Initial landings were by parachute, the immediate mission being to seize fields suitable for the arrival of gliders and transport planes within the next few hours.

Commencing at midnight more than 1,000 British heavy bombers commenced a continuous attack on German coast defenses which lasted until 0600 hours, 6 June. During this period the first airborne troops were reinforced by streams of air convoys of gliders and troop transport planes, which landed on fields seized by the parachutists.

The naval forces sent ahead large numbers of mine sweepers, which swept channels through the enemy's mine fields and marked passage ways with buoys. The main invasion force was offshore by 0400 hours, but waited until the proper time before coming close in.

At 0600 hours the British heavy bombers were relieved by an equal number of American heavy bombers, who took up the program of attacking enemy coast defenses. At the same time fighter bombers began an intensive attack of enemy batteries and lines of communication just back of the coast.

At 0630 hours the naval bombardment started. Many hundreds of warships, from battleships down to destroyers, took part. At the same time landing craft started for shore. This main artillery preparation lasted only 30 minutes; thereafter the Navy fired at targets reported by air observers or as later called for by forward observers.

The first wave of troops reached shore at all beaches close together about 0730 hours. It was broad day—a surprise to the troops, who had expected to land before daybreak. At date of writing the losses of troops has not been reported, but the air and naval preparation appears to have reduced the enemy's fire to a minimum. Preliminary reports indicate that between midnight and 0730 hours, when first

*Unless otherwise stated, hours shown are British Summer Time, local official time. This time is two hours in advance of standard time. Last light was at about 2200 hours, and first dawn at about 0615 hours.



Assault troops were able to take a breather under the lee of chalk cliffs, after gaining the shore and before moving inland. Here medics who landed with them treated the inevitable minor injuries, so the men could proceed.



Shore control parties quickly set up shop to direct naval gun fire against targets on the beach and, a bit later, inland.



Parachute and glider-borne troops gave gallant, heroic service. Their supplies followed them, in parapacks.



Some 'chutists were dropped to strengthen the positions of troops who landed by boat. Here some are coming to the aid of a British unit. Note how the M-7 105 ("Priest" to the British) was fitted with funnels for air intake and exhaust, to permit quick beaching through deep water.



Tanks were especially waterproofed. In this particular case that was an unnecessary precaution, but with all openings well scaled and special intake and exhaust ports this vehicle was all ready for a wet landing. Notice that the waterproofing does not interfere with prompt use of weapons.

Other reinforcements — both men and equipment—came in by glider, before airfields were ready for planes.



troops landed, the air force dropped over 10,000 tons of bombs while the navy fired over 2,000 tons of shells in their half-hour preparation. The total width of beaches actually landed upon was under 31 miles. This gives a weight of 387 tons per mile of front; if evenly distributed this would make 440 lbs. of shells and bombs per yard frontage.

Our 4th Div landed south of Quinéville and opposite Sainte Mère-Eglise. Reports are not yet available as to whether the 9th Div landed with it. The 4th did not meet as much opposition as had been expected; it pushed inland across marshy terrain and established contact with the 82nd Div waiting for it.

The V Corps landed in its prescribed sector with the 1st Div and part of the 29th Div. It met very severe resistance. A German division waiting just back of the beach pinned this landing down to an advance of but a few hundred yards from the beach.

The British Army of British and Canadian divisions met a mixed reception. On the right near Arromanches there was little opposition. Opposite Caen a landing was effected but it met resistance at Douvres, where a permanent fort blocked the main road. Landings east of the Orne River met considerable resistance.

In general the invasion was a great success in that it got ashore and established itself at all beaches. Landing of supplies in rear of troops started at once. The sea was rough, but not unduly so. At all beaches, tanks landed with leading waves.

DEVELOPMENT OF THE BEACHHEADS

On 7 June the first objective was to secure the beachheads. The only one in real difficulty was that of the American V Corps. The 2nd Div was thereupon landed in rear of the 1st Div, already ashore. With this additional strength progress was made toward the Aure River. The enemy retired toward Grandcamp and Isigny.

The air-borne troops which had been dropped near Coutances, heavily attacked, withdrew a short distance to the north. The VII Corps straightened its lines and advanced to near Sainte Mère-Eglise. As the two American corps were separated by hostile forces in the Carentan area, it was decided to reduce this as soon as possible.

The British Army's right met only nominal resistance. It marched into Bayeux by noon. This town was undamaged, and its people received the troops with evident rejoicing. Germans were encountered a short distance beyond Bayeux.

Strong resistance met the British left. The 21st Panzer Division counterattacked from the vicinity of Caen. This was stopped, but the British failed to connect with their air-borne troops near Caen. The latter held out. Germans attacking east of the Orne forced the British back slightly.

Special attention was given to building up the Allied forces as rapidly as possible.

The British government did not reveal the units of their forces landed. Identifications reported by the Germans indicate that on this day there were three British Corps in line, including one Canadian Corps in the center. Divisions reported by the enemy, in addition to the air-borne division, were:

Infantry Divisions	50th British, 2nd Canadian
Armored Divisions	7th and 9th British

The sea became rough, almost stopped landing of supplies by afternoon. In lieu thereof a large amount of supplies were forwarded by air. For the U. S. VII Corps four waves of tow planes and gliders were despatched from English fields, the first three being American and the last British:

1st wave—engineer troops with equipment in gliders

2nd wave—artillery with ammunition and supplies in tow planes

3d wave—jeeps, infantry weapons, and supplies in gliders

4th wave—engineer and medical troops and equipment in tow planes.

The first and third waves are reported to have lost together 12 gliders, the second 12 tow planes.

During the day and the ensuing night, very strong air raids were made into enemy rear areas.

8 June

Our VII Corps spread to the right and left and established a good beachhead about 5 miles deep extending from the low and marshy ground north of Carentan to near Quinéville.

In the V Corps, the 1st Div advanced southwestward toward Isigny. The 2nd Div pushed south.

The British right attacked but made only slight progress. The

Canadians attacked toward Caen, and had a battle between their armor and the 21st Panzer Division, which held on to Caen. The German strong point at Douvres, since known to have been garrisoned by less than 200 men, was holding out as a road block. With this aid plus a German attack launched on the east side of the Orne, the British advance in this area was held down, with slight gains in favor of the Germans on the extreme flank.

Moderation of the sea enabled the landing of supplies to be resumed at about the normal program.

A ceaseless air assault in very great strength was made south of the battle area and along the Seine River, with a view to disrupting rail lines of communication and thus preventing the assembly of enemy reserves.

According to estimates of the Allies, the Germans had 10 divisions engaged against the beachhead. According to German estimates, the Allies had 4 divisions plus an armored brigade north of Carentan and 2 American, 2 Canadian, and 5 British divisions in the Bayeux—Caen area (or 13½ divisions in all).

No further account has been found of the American air troops which were dropped early on D-day near Coutances. From German reports they appear to have been overcome.

In general the Allied progress was limited mostly to short gains by the two American corps.

9 June

The U. S. VII Corps captured Sainte Mère-Eglise on its right, while the left reached the outskirts of Carentan. With its right the V Corps captured Isigny on the way to Carentan, while its left took Formigny, which was within 4 miles of the sea.

The British Army brought into line additional armor which attacked southward between Bayeux and Caen. This met German armor attacking in the same area in the opposite direction. A confused tank fight developed which lasted all day. Self-propelled batteries aided their own tanks. The British won for a slight advance. East of the Orne the Germans made a slight gain.

In the rear areas of the Allies time was taken to reduce German strong points containing small garrisons, which were effective road blocks. A number were taken, thereby simplifying the supply problem.

The weather was cloudy and windy. This interfered with the landing of stores and limited air activity.

According to German estimates the Allied 21st Army Group had 18 divisions ashore at the end of this day: 14 east of Carentan and 4 north of that city. On their part the Allies considered that the Germans had about 10 divisions deployed in their front. German reports are that, less the U. S. 82nd Airborne Div, all air-borne Americans and British previously dropped in rear of their lines had been eliminated by this day. This included the last detachment of the U. S. division originally dropped near Coutances but the remnants of which were finally surrounded and taken near Lessay, 15 miles north of Coutances.

10 June

Generally along the left and center, the Allies made short advances.

Our VII Corps pushed by Sainte Mère-Eglise, its advance elements crossing the Merderet River. Its left pushed into Carentan. There was much artillery activity in this area.

In the V Corps, the 1st Div on the right advanced beyond Isigny and established liaison with the left of the VII Corps, thereby uniting what had been two separated beachheads. The 2nd Div attacked south from the area around Formigny to capture Trevières. It then kept on and entered the Forest of Cerisy. Considerable opposition was met. The main force of the division by-passed Trevières and went onward at once. Trevières was taken later by a combat group left behind for that purpose.

The right of the British Army was renewing the tank battle of the day before, in the same area (between Bayeux and Caen). Notwithstanding air and artillery support it was impracticable to advance the line materially. Allied warships aided the British by bringing air observed fire from heavy batteries on Tilly-sur-Seulles and vicinity; this failed to drive the enemy out.

The main effort of the air force was to aid the tank battle. Enemy airfields in Brittany and Normandy were heavily raided. Replacements and supplies were transported by air from bases in England.

11 June

V Corps's right arrived at Montebourg. They were unable to



Some airborne troops got a look at France's peaceful countryside and villages, before making contact with the enemy.



Other towns were badly knocked about, but the armored bulldozer—now apparently 'most as plentiful as the jeep—quickly pushed the debris to one side so that traffic could move without hindrance.



Soon a stream of prisoners plodded along, but not singing "We're Sailing Against England." Here a group passes some British airborne troops, whose equipment is carried on collapsible carts; they have picked up a "waterproofed" M-7 somewhere along the way.



Soon too, much German equipment was captured. This rocket launcher is well placarded. Note the open, hinged metal cover which protects the rockets' intense heat and blast. At the right are a couple of 1935 French 105-mm howitzers—the ones whose wheels turn knock-kneed when the piece is emplaced, to provide, in effect, additional shields.



In many ways life went on about as usual for many of the local inhabitants. Some of them made good use of the spoils of war: note this cart's balloon-tired wheels!



Back at the beaches, meanwhile, CPs are busy places. Here a string of prisoners is being hustled to waiting boats. Flags were good insurance against accidental shelling from our own ships.

take this place, but by-passed it on both sides. This corps had the support of strong naval fire, in addition to its own artillery and to air support. This part of France is largely apple orchards, which afford considerable cover against air and ground observation. Its small farms are usually bordered by hedges, which limit ground observation to a few hundred yards. It was difficult to locate small targets, including machine guns and infantry mortars. The country afforded many opportunities to snipers. Villages, of stone, had been transformed into enemy centers of resistance. Houses normally have large and deep cellars; these are subdivided by stone walls into compartments used by the owners for storing wood, wine, fruit, etc. When shelled, the defenders could withdraw to the cellars and remain in comparative safety until the firing stopped.

The left of the V Corps fought its way into the outskirts of Carentan. A considerable part of the country around this town was marshy, hard to attack over. Main reliance was placed on the artillery. Despite severe shelling, in which the navy aided, the enemy hung on.

Our 2nd Div (V Corps) was clearing the Forest of Cerisy. Aided by the 1st Div on its right, the forest was cleared and the line advanced to include Lison.

The British Army made its main effort against Tilly-sur-Seulles. A particularly strong artillery preparation was placed on this place and vicinity, in which two British cruisers participated. Then the British armor attacked. It was opposed by two German Panzer Divisions, the 15th and 21st. The tank battle of the preceding two days recommenced, with a whirl of fighting machines and artillery duels. The Canadian Corps advanced on the right to aid in the battle, which developed a great intensity. In the afternoon the enemy made an unexpected air and artillery preparation on the Allies, then counterattacked. At the end of the day the British were in Tillysur-Seulles, but otherwise no substantial change in the line had taken place.

To the left of Caen the British 6th Air-borne Div was now fully joined in with other troops. Attempts to capture Caen or to advance around the east side of this town were unsuccessful.

During the day the sea was calm, and a new record was made for landing replacements and supplies. Clouds and rain came during the afternoon. On this account, and the need for air support in the ground battle, air activity elsewhere was limited to attacks on railroads with a view to preventing enemy reinforcements from reaching the battle area.

German accounts indicate that on this day, for the first time, the German line became continuous around the Allied beachhead. From what was later ascertained it appears that the Germans had had only observation and coast defense forces in the area around Bayeux, opposite the right of the British Army. Details of the German deployments have not yet been learned.

12 June

Battle raged along the entire front. In the VII Corps the 4th Div attacked Montebourg. The artillery was aided by the 14" guns of the U. S. battleships *Texas* and *Nevada*. The town was heavily shelled all morning. In the afternoon the infantry closed in. By 1600 hours the town was in American possession. After dark, however, the enemy counterattacked and got back into the town. At the end of the day street fighting was in progress throughout this small village of some 2,000. From evidences of the battlefield the enemy had lost 1,200 men wounded and an estimated 2,000 killed in the two days' fight at this place.

Carentan had been similarly heavily shelled by divisions, corps, and navy artillery during the night of 11/12 June. It had been reduced in great part into a mass of ruins. In the morning it was burning fiercely. Our artillery laid a smoke screen, under cover of which the 101st Air-borne Div entered the town. Soon after the Germans withdrew.

The 2nd Div (in the V Corps) completed clearing the Forest of Cerisy, bringing the line within 7 miles of St. Lô.

For the fourth successive day the great tank battle between Bayeux and Caen continued. The Allies brought in additional air forces, but in spite of this were unable to make substantial advances. The lines battled back and forth over a considerable area. Tilly-sur-Seulles changed hands several times. Now three Panzer divisions were in line.

The Allied air force operated in great strength throughout the day. The

largest single striking force ever despatched from England was sent out in the morning to attack air fields and railroads south of the battle area. Lesser attacks were made in the afternoon against bridges over the Seine.

The Allies estimated that the enemy now had 3 Panzer and 10 Infantry divisions engaged—a total of 13 divisions. The Germans estimated that the Allies had 4 U. S. divisions in the VII Corps north of Carentan (including 2 air-borne divisions) and 18 divisions east of Carentan (including 2 British air-borne divisions)—a total of 22 divisions.

Up to this time German naval and air forces had operated nightly, and occasionally by day, against the intensive movement of ships from England to the beachheads. The Allies have made no reports, other than that attacks were repulsed. German accounts claim that there have been daily Allied losses of shipping varying between 5,000 and 15,000 tons. In the vast amount of shipping which is being used, it appears that what losses the Germans have caused have had only slightly above a nuisance value.

13 June

The Germans attacked the front of the VII Corps, recapturing Montebourg and Carentan. In between American units pushed forward to cross the Merederet River and took the hamlets of Le Ham and Pont l'Abbé. The German attacks were unexpected. They came suddenly after a short and vicious barrage. Our own artillery placed a smoke screen in front of the infantry, but this failed to stop the enemy.

There was no special change within the U. S. V Corps.

After four days of efforts in the Tilly-sur-Seulles area, the British Army decided to shift their main effort to the area of the Aure valley, extending south-southwest from Bayeux. At dawn the British armored divisions, having changed positions during the night, launched a sudden attack. This was the area where it now appears that the Germans had only a screen during the first days of the invasion.

The British armor went right through the German lines without meeting hostile tanks, and advanced to Caumont for a gain of 12 miles. Infantry followed in rear, and artillery accompanied the tanks. At Caumont the armored troops, less a detachment, turned eastward and swept to Villers-Bocage. This caught fire from an artillery preparation fired by the accompanying batteries. The tanks pushed through the flaming streets, passing through at 0730 hours. Up to this time the advance had been an unqualified success.

Soon afterward the three German Panzer divisions which had been in the Tilly-sur-Seulles area intercepted by attacking from the east and north. Under this attack the British withdrew slightly: they abandoned Villers-Bocage and established themselves on a low ridge a short distance west of the road from that village to Tilly.

An intensive battle developed around this area, which lasted throughout the day without the Germans' being able to drive the British back. The detachment which had been left in Caumont is reported by the Germans as having been completely destroyed by intercepting forces. The British infantry which followed the tanks established a line just north of Caumont, which they held. The result was to advance the Allied line more than on any previous day.

British attacks on Caen failed. A movement was commenced to capture this important road center by envelopment from the east. This crossed the Orne River, and despite considerable resistance reached Troarn. A German Panzer division was found in this sector.

The air force, in addition to aiding in the ground fighting, raided airfields and railroads. Activity was curtailed during the middle of the day because of unsatisfactory weather.

At the end of the day the line was:

Quineville (?)—Montebourg (G)—Le Ham (US)—Pont l'Abbe (US)—Carentan (G) (US corridor to north)—Neully (?)—Lison (US)—Balleroy (?)—Caumont (G)—Villers-Bocage (G)—Tilly-sur-Seulles (?)—Caen (G)—Demouville (G)—Troarn (Br)—Varaville (G).

14 June

There was little change on the Americans' front. The 101st Div reentered Carentan and advanced a short distance beyond, reestablishing good communication between the Allies north and east of Carentan. The British decided to exploit the previous day's tank breakthrough. Part of the American artillery was employed with that of the British. The navy joined in. On the front between Tilly-sur-Seulles and Villers-Bocage the resultant artillery preparation

was the mightiest of the present campaign. Part of the British artillery and the navy had enfilade fire on the German lines extending southward from the Tilly area.

Then the heavy bombers delivered an air preparation. Next fighters dive-bombed enemy positions. Then with tanks in front and guns roaring along a 10-mile front, the attack pushed ahead. The German reaction was strong. Their artillery fired back in great volume. Tanks came forward to meet ours. A terrific battle lasted all day.

British tanks entered Villers-Bocage going east. In rear of them the 2nd Panzer Division cut in, heading north. Similar maneuvers occurred at many places. At the end of the day the line had not substantially changed: the Germans still held Villers-Bocage and Tilly-sur-Seulles, two villages now reduced to blackened rubble.

Between Tilly-sur-Seulles and Caen the sector was generally quiet. North of Caen the German road block held by 200 men at Douvres, was still holding. East of the Orne the British attacked eastward, with their right near Troarn. British battleships aided the artillery on shore. The enemy was found to be strongly dug in in woods; not much progress was made.

Again the air force attacked enemy air fields and lines of communication in great force. Unloading of stores over beaches was speeded.

The battles around Tilly-sur-Seulles on 13 and 14 June were of the most modern type. Both sides used the latest models of guns, tanks, and other equipment. Artillery operated with air observation, self-propelled batteries, and all the latest accessories for fire direction and communication. Commanding generals were well forward and able to direct by radio the movements of their troops. Infantry had motor transportation and complete sets of heavy supporting weapons. At date of writing details of operation are not yet available; only the general outline can be given.

15 June

The great tank battle of six days died down, apparently through mutual exhaustion.

On the Cherbourg peninsula the VII Corps advanced its line in the vicinity of Quinéville. Montebourg remained a bloody fighting ground, with both sides having troops within that small place. Further south, progress was made west of the Douves River, where American troops reached a line through Prétot. Before Carentan, the line was 2½ miles inland.

A minor German attack near Caumont gained a small advance, and a British attack east of Tilly-sur-Seulles also gained slightly. Near Troarn the British attack was resumed in a southwesterly direction with a view to enveloping Caen; it made only minor progress.

The day was perfect, and the air force in great strength attacked railroads and air fields in a wide arc around the battle area.

16 June

Evacuation of the Cherbourg peninsula was noted by the VII Corps. Long columns of troops of all arms with trains were moving south by all available roads. Due to low clouds it was impracticable for the air force to interfere. The VII Corps attacked westward. It met surprisingly light resistance; the 82nd Div reached St. Sauveur-le Vicomte. Tanks led the advance. Due to numerous hedges it was hard to determine where the enemy was. Tanks would comb the hedges with machine gun fire to insure that no enemy was there.*

Near Tilly-sur-Seulles were minor attacks by both sides. The British made slight gains, but Tilly remained in enemy hands. Canadian troops in rear areas operated against enemy road blocks still holding out.

On account of adverse weather there was little air activity.

17 June

Our VII Corps continued to find diminishing enemy resistance. Pushing westward it reached the line from St. Jacques de Nehou (6 miles northwest of St. Sauveur-le Vicomte) to a point 5 miles east of La Haye du Puits. Advance elements were within 6 miles of the west coast, and the coast road was under fire of our corps artillery.

Although the VII Corps held Quinéville, enemy artillery prevented use of the road therefrom for shipping supplies received over the beach. Montebourg was still held by the Germans, and some Germans were close to Sainte-Mère-Eglise.

Our V Corps attacked from Balleroy toward St. Lô. It was stopped by the Germans.

The British Army resumed its offensive, but on a much reduced scale. The Germans also attacked, but not exactly in the same areas as the British. A succession of clashes followed, with neither side making gains.

Near Troarn the British dug in.

With improving weather the air force in the afternoon proceeded with its attacks on air fields and railroads in an arc over 100 miles wide about the battle area.

18 June

In the VII Corps the 9th Div leap-frogged the 4th Div late on the 17th. During the ensuing night and day they advanced straight ahead. Bypassing several enemy centers of resistance, the troops reached the sea for a total advance of 8 miles on the front Carteret—Barneville-sur-Mér—Portbail.

East of Caumont a German attack was launched northward. It was met by American troops of the V Corps now holding this sector. The German attack made headway for a short penetration but it was not followed up. Later in the day the Americans recovered the ground they had previously lost.

British attacks made on both sides of Tilly-sur-Seulles made no important advance. In the vicinity of Troarn, the Germans made a slight gain.

Air activity again reduced operations, the heavy bombers being grounded. In the afternoon fighters took over the mission of raiding enemy rear areas.

COMMENTS

1. *German coast defenses along the Normandy coast appear to have been about as they had been represented. They went down fast—not because of defects, but because of the perfection of the Allied attack.*

The Allies knew fairly well the nature and location of enemy centers of resistance and obstacles. Many of these were destroyed by the long air preparation and the artillery preparation fired by the navy. The remainder were overcome by special detachments of engineer and Commando troops, equipped with special weapons adapted to the particular mission in view. For a front of 31 miles this required a wealth of attention to details, and presumably much time in previous experimenting. That this was worth while is shown by the result.

The best German defenses were on the left of the American Army opposite Isigny and on the left of the British Army opposite Caen. In both of these areas German divisions were waiting.

This experience indicates that mobile troops back of beaches are a more important defense than a weak fortified line close to the beach.

2. *Air-borne landings made within 5 miles of the coast—near Sainte-Mère-Eglise for the Americans and north of Caen for the British—were able to hold out until their men were joined up with sea-borne troops.*

Landings at considerable distances in rear of enemy lines have so far failed, although near Coutances the troops dropped held for about 3 days. According to German reports British troops dropped east and southeast of the invasion area lasted only 1 or 2 days.

This short experience indicates that air-borne troops dropped in rear of powerful enemy forces should not be expected to last more than a few days at the outside. Whether in the instant cases the troops dropped accomplished demolitions sufficient to offset their loss is not yet known.

Prior to the invasion the German secret service (Gestapo) had reported that Gen. Eisenhower had 10 air-borne divisions within his command. The Germans therefore expected these to be dropped in rear of their lines and had taken special measures to meet this situation.

3. *German Air Torpedoes.* On the night of 15/16 June the Germans commenced to fire self-propelled torpedoes, also known as flying bombs, from the continent to England. Not much is yet known of the details of this new weapon. It has been serious enough to warrant the detachment of large forces of fighter planes to patrol the British coast, to intercept the air torpedoes in flight. Daily, large details of heavy bombers have bombed the presumed bases in north France from where the air torpedoes are fired.

4. *Strategy of the Invasion.* It was officially announced that the invasion of west Normandy was but one of several to follow. The immediate mission of the first invasion is to capture a good base, Cherbourg, only available port within its theater of operations.

Cherbourg can not be the ultimate objective. The location of the invasion points to Paris as the main objective, an advance in this direction to coincide with similar advances against other objectives to follow from succeeding invasions.

Caen is the road and railroad center immediately before the 21st Army Group on the route toward Paris. This is why the Germans have held on so strenuously to this place. The major German strength is concentrated in this area. They have preferred this, rather than to concentrate on their left flank and hold a line of communications open to Cherbourg.

The 21st Army Group attacked toward Caen on 9, 10, 11, and 12

*In the tropics this is known as "combing the bamboo."

June, without success. It is not known at this time whether the Allied High Command was then already prepared to march on Paris, had the attacks gone through. When these attacks failed the British armor—at least 2 divisions—moved near Bayeux, and very early on 13 June broke through the German lines. It then turned east with a view to attacking Caen from the rear. Due to prompt interception by German armor the Germans saved

Caen, but they lost a considerable amount of ground (over 50 square miles) south of the line Bayeux—Caen.

In view of this success, it is not surprising that the Allied High Command decided to attempt to exploit the previous day's gains by an intense attack of all arms on 14 June. When this failed it was evident that a march toward Paris would have to be delayed in any case until stronger forces could be assembled.

THE WAR IN ITALY (21 May to 18 June 44)

The current Allied campaign to destroy the opposing German Army Group under Marshal Albert von Kesselring started on the night 11/12 May. Its operation was limited to the west side of the Italian peninsula. On the left was the Fifth Army (Lt. Gen. Mark W. Clark), on the right the Eighth Army (Lt. Gen. Sir Oliver W. H. Leese). Opposite was the German Tenth Army (Gen. Heinrich von Vietinghoff). To include 20 May, the Allies had advanced along the coast about 21 miles in 9 days of continuous battle. From a point about 5 miles north of Cassino there had been no advance.

On that date the line was:

Sperlonga (Allies)—Fondi (A)—Campodimelo (A)—Pico (German) (boundary between Fifth and Eighth Armies)—Pontecorvo (G)—Aquino (G)—Piedimonte (G)—Pizzo Corno (G) (right boundary of Allied offensive)—Terelle (G)—Mt. Santa Croce (G)—Alfedena (G)—Castel di Sangro (G)—Palena (A)—Lettopalena (A)—Orsogna (G)—point on coast 1½ miles north of Ortona.

A detached Allied force, which was part of the Fifth Army, occupied a beachhead around Anzio and Nettuno. No active fighting had occurred in this sector for over two months. The line was:

point on coast 10 miles northeast of Anzio—a line almost due east to a point 2 miles southwest of Cisterna (less a German dent 1 mile deep just south of Aprilia)—a line almost due south to the coast at a point 1 mile east of the mouth of Astura Creek.

Opposite the beachhead was the German Fourteenth Army (Gen. Eberhard von Mackensen). Its artillery was able to reach all points within the beachhead, as well as shipping in the adjacent bay. Allied commander at the beachhead was Maj. Gen. Lucian K. Truscott, U.S.A.

CAMPAIGN OF ROME

The Allied plan was to drive the enemy up the west coast of Italy, against the Anzio beachhead. At the proper time the Anzio troops would sally out and intercept the enemy in retreat from the south. In the difficult mountain section and along the narrow coast land bordering the Adriatic Sea, the Allies would hold only. The Allied intent having been publicly announced in press interviews by the



Early in the period Allied attacks were launched all around the perimeter of the Anzio beachhead. The British, supported by guns of American warships, stormed into German positions along Moletta Creek (1). The Americans struck toward Cisterna and reached Lake di Fogliano (2). On the front to the east U. S. forces were moving on Terracina by way of Mount Croce (3) and advanced beyond Fondi to Mount delle Fate (4). Pico (5) was evacuated. Allied troops were in the outskirts of Pontecorvo (6) and on three sides of Piedimonte (7).

commanding general, the enemy was aware of it.

The German mission was to delay the Allies as much as possible and to inflict higher losses than their own. Their Army Group was not to engage in operations that might require reinforcements. All German reserves, less minor detachments, were retained to meet expected major attacks by an invasion of western Europe or by an advance of Russian armies. South and central Italy were neither military nor economic assets to the Axis; they were a political asset, particularly if Rome could be held. If required this would be given up. A withdrawal (if and when necessary) as far as a line across the neck of the Italian peninsula, was envisaged. The German Army Group had about 25 divisions. Of these about 13 were on the south front, 6 opposite Anzio beachhead, and 7 in reserve.

On 21 May the Allies attacked all along the active front, but with main effort on the right. The American corps on the left succeeded in entering Terracina with small advanced elements. An attack by the 29th Panzer Grenadier Division drove them back 3 miles. At this point is Lake Fondi, 2 miles from the coast. The Americans stopped the advancing enemy at the isthmus between the sea and lake, on low ground.

North of Lake Fondi the terrain is hilly. The Americans attacked on a front of 5 miles. Notwithstanding rough country, advances up to 5 miles were made. The line was pushed forward to Mt. San Biagio (2200' high, just north of Lake Fondi), northwest to Mt. Autone (2060') and Mt. Capiccio (1920'), northeast to Mt. Marino (2850') and Campodimelo—all to U. S. This was the biggest advance of the day.

Pico is a small village which was on the boundary between the Fifth and Eighth Armies, within the zone of action of the Americans. The enemy was defending it with considerable vigor. Our right corps was the French Army Corps of Gen. Alphonse Juin. As there was a lack of French tanks, American tanks were attached. An attack was launched due north from the area just east of Campodimelo, on a front of 4 miles. It received strong artillery support.

The enemy resisted strongly. Enemy armor struck south from Pico. The French swept the Germans back and entered into Pico, but were unable to go beyond the village. On both flanks they advanced 1½ miles beyond Pico and seized Mt. Leucio (to east) and Mt. Palinferno (to west). Pico changed hands several times. The Germans recovered Mt. Leucio; the French retook and held it. At night Pico was in German possession, but in a pocket, hemmed in by French on hills on both sides.

To the right (east) of Pico a British Corps attacked Pontecorvo. This fight was almost a duplicate of that at Pico.

On the extreme right the Polish Army Corps of Gen. Wladyslaw Anders attacked in a northwesterly direction, with axis through Piedimonte, which its center reached. As in the other cases the wings went on further.

The battle was renewed on 22 May. The Americans made their main effort toward Lenola. No change occurred on the left near the sea. Our attack was to straighten the line between Mt. Marino and Mt. Palinferno, a distance of 11 miles. The enemy's principal center of resistance was as usual in a village—Lenola. On both sides the Americans made progress but the village itself held our until night despite all efforts to take it; the enemy then abandoned it.

Pico, Pontecorvo, and Piedimonte were bombed and shelled, and each of them was attacked from three sides. Nevertheless the enemy held on to all of them. Only at Pico did he give in: after nightfall he abandoned this town.

Now the beachhead force was ordered to attack on the 23d, with main effort to the east. At the same time the battle in the south would be continued on the same line as before, with principal effort on the Allied right in order to push up the Liri valley, through which

ran Route 6 (Via Casilina), the enemy's life of communications with Rome.

In the south the left of the Americans failed to take Terracina but advanced in the hills to the north, capturing Mt. Santa Croce, 2 miles north of Terracina.

Near Pico the Germans attacked; they made no progress, but neither did the Allies. An additional Canadian division entered line, and with the one already there attacked in the Pontecorvo sector. They made a dent in the enemy's line east of the town. This was the first time in this war that a complete Canadian Army Corps operated. However, part of its artillery and tanks were loaned by the other Allies. Further to the right the Polish Corps made slight advances in the Piedimonte sector.

Troops from the beachhead attacked in two directions. An artillery preparation preceded the assault. On the left a British corps attacked on a front of over 5 miles extending westward from the Anzio-Aprilia road (incl.). On the right an American corps made the main effort on a front of about 6 miles, northeastwardly through Cisterna. A secondary attack was launched due east against Littoria, about 7 miles away.

The British had Moletta Creek just in front of their lines. It was not a serious obstacle, but leading into it were numerous gullies, making it difficult for vehicles to operate. The British broke into the enemy's forward positions and took 300 prisoners.

The main attack against Cisterna started off in mist which prevented observation. The troops had occupied their line of departure at midnight. Tanks led. Heavy resistance was encountered, and mine fields caused numerous delays. As in other cases, the attack against Cisterna failed but on both flanks the attacking troops went on beyond. On the right they reached the Appian Way southeast of Cisterna, on a front of 2,000 yards. As the Germans had foreseen the attack, their artillery had been withdrawn to beyond the doubletrack electric railroad through Cisterna. It delivered very heavy fire.

The attack toward Littoria was stopped for a considerable time by a combination of mines, artillery, mortars, and machine gun fire. During the afternoon it got under way, and kept going until dark. It seems to have made a total advance of about 2 miles.

During the day the air force had been extremely active. About 750 heavy bombers and fighters pummeled enemy rear areas behind the Anzio front, with main effort around the Valmontone and St. Alban hills area.

At the end of the day the German Fourteenth Army ordered its wing extending from Cisterna through Littoria to the sea, to withdraw by wheeling to the rear with Cisterna as a pivot. A new line would extend eastward from Cisterna. The German Tenth Army was to keep in touch with this movement and to withdraw, clearing the new left of the Fourteenth Army, which would be on the ridge between Route 6 (Via Casilina) and the Appian Way (Cisterna to Terracina).

On the 24th the Americans failed to take Cisterna or to advance appreciably southeast of the town. They advanced northwest of it to across the Appian Way, taking some 1,100 prisoners. Some advance was made toward Littoria, due to the enemy's withdrawal.

In the south the Germans withdrew from Terracina and the area north of it. The right of the Americans pushed forward through the mountains and reached the line Sonnino — Mt. Alto — Lenola — Pico (all incl.). The Germans withdrew from Pontecorvo, and the Canadian Corps advanced as far as the Melfa River. The enemy did not withdraw in the Piedimonte sector; he held the Polish corps before that place.

The withdrawal of the Germans from Terracina was almost due north, so the right of their Tenth Army should clear the ridge line between the Appian Road and Route 6. Junction of the two

German Armies was made north of Roccasecca.

On the 25th the Allies found the coast clear of the enemy. Motor patrols advancing south from the beachhead and north from Terracina found no opposition. Liaison between the two detached forces was established by a good coast road.

By the end of the day our troops entered Cisterna. More progress was made on the left, with axis of attack toward Velletri. The enemy's wheel of his former beachhead troops south of Cisterna to their left rear, uncovered Littoria and part of the Appian Way.

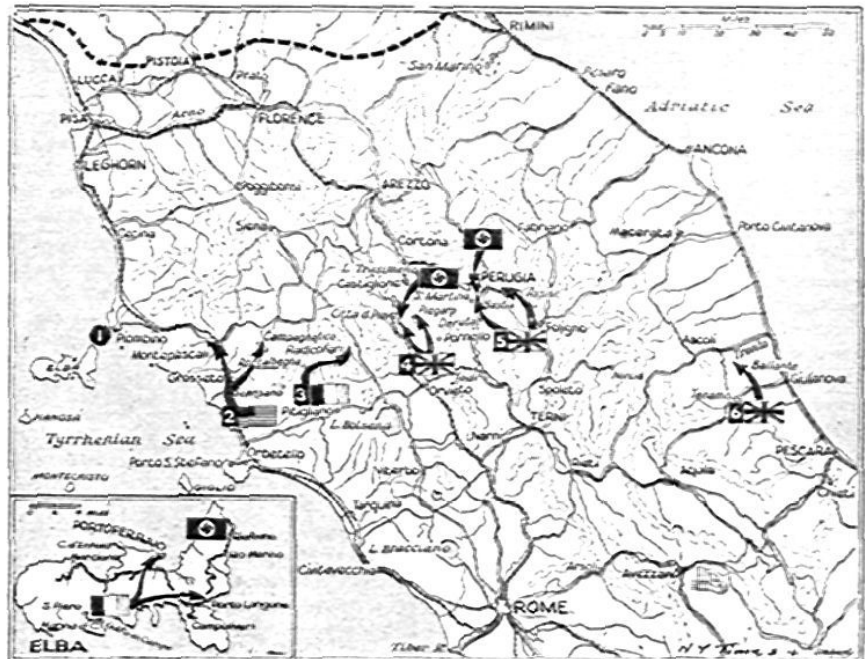
Of the main Allied force, the left of the Fifth Army entered Terracina and the right arrived at Roccasecca.

The Eighth Army had severe fighting throughout its zone of action. Armored troops sought to breach the enemy's front, astride Route 6. According to German accounts this attack had only moderate success and lost over 50 tanks, but the Canadians, further to the right, established a bridgehead across the Melfa River. The enemy held on to Aquino and Piedimonte.

On 26 May the weight of battle was on the flanks. On the extreme left the British who had attacked from the beachhead were not far from where they had jumped off on the 23d. The enemy still held Aprilia. The right of the former beachhead troops, Americans, were wheeling to the left in a follow-up movement to the enemy's withdrawal. Covered by attacks by armored troops, the front was extended from Cisterna 6 miles to the northeast to Cori, at the foot of the Lepini Mountains. The enemy's new main line of resistance ran in front of Aprilia—Velletri—Valmontone. Strong armored reconnaissance detachments thrust against this line at several places as far as east of Velletri.

Fighting was not so severe on the front of the Eighth Army. The Allied front was advanced to include San Giovanni, Aquino, Piedimonte, Mt. Cairo (an excellent OP), and Terelle.

On the 27th a British corps (on the left) entered Aprilia and Carroceto, after five days of severe fighting. An American corps from the beachhead extended the line to opposite Velletri. Strong efforts were made to capture Velletri. Armored troops repeatedly attacked; they advanced the line but little. It was, however, extended



By 19 June organized resistance ceased on Elba (1) after the French had seized the capital. Porto Ferraio, and Porto Longone (inset), driving German remnants to the northeastern corner of the island. On the mainland the Fifth Army took Campagnatico and pressed on to a point ten miles above Grosseto (2). The French were approaching Radicofani after having occupied Roccasecca (3). The British were heavily engaged at Citta della Pieve (4) and were converging on Perugia after having captured Assisi and pushed through Bastia and after having occupied San Martino (5). Near the Adriatic the British took Ballante (6). The broken line indicates presumed enemy defense positions to the north.

eastward to south of Valmontone. The French Corps was to the right and south.

The left of the British Eighth Army made a strong tank attack astride Route 6, using one armored division on each side of the highway. At Ceprano it met a counterattack by a Panzer division also astride Route 6. The town finally remained in British hands, but an advance beyond did not succeed because of unusually effective enemy artillery fire at the town exits.

Further to the right the line was advanced to Arce (excl.)—Roccasecca (incl.). During the previous night the Polish corps had been withdrawn from line, being replaced by New Zealand troops who advanced to just before Belmonte.

On 28 May the Germans were holding the Velletri—Valmontone line against increasingly violent American attacks. The British cleared Aprilia.

East of the Lepini Mountains the French corps of the Fifth Army and a British corps of the Eighth attacked astride Route 6. The intention of the High Command was to secure this highway, thereby cutting off the retreat of German troops to the east. Only a slight advance was made, notwithstanding determined efforts. On the right the New Zealand troops entered Belmonte.

On the 29th the Allied main effort was shifted to the left flank. The British Corps attacked inland from the sea, against the enemy holding the line Ardea—Campoleone—Lanuvio (all to Germans). Several breaches in the hostile front were secured, but some were subsequently lost.

The advance east of the Lepini Mountains made better progress. About 8 miles were gained along Route 6, without meeting severe opposition. Ceccano was passed. In the mountains New Zealand troops made progress.

On the 30th the German Tenth Army continued to withdraw, while the Fourteenth held their line. The main Allied attack was made against Lanuvio by an armored division, with full air and artillery cover. This reached the German line but was unable to stay there. According to German accounts 78 Allied tanks were knocked out.

East of the Lepini Mountains the main German forces had been withdrawn by this date. Rear guards covered the detaching movement. This part of Italy is an almost ideal terrain for causing delays by destruction of but a few key points. In a continuous fighting advance, the Allies reached a line exclusive of each of the following towns: Capineto—Frosinone—Sora—Alfedena.

On 31 May the Allied main effort was against Velletri, a small town lying at the foot of the Laziali Hills, often called the Alban Hills. This is an extinct volcano, the slopes of which rise just back of Velletri to an altitude 2,000 feet higher, or 3,000 feet above sea level. The diameter of the volcano is nearly 10 miles. In an enormous crater rise several cones. There are also two lakes—Albano and Nemi—northwest of Velletri, inside the volcano and filling old craters. Both inside and outside slopes of the volcano are densely cultivated; orchards, vineyards, and gardens afford good camouflage to defensive positions. From the upper slopes the enemy had excellent observation over the surrounding country.

In an all day battle the British on the left captured Ardea. British armor penetrated beyond Campoleone RR station to the town of Campoleone. American attacks against Lanuvio failed in front of that town, but advanced to the east. Part of the gain was subsequently lost, but the Americans secured a foothold across the road from Lanuvio to Velletri. They commenced an attack against Velletri by pushing eastward along the road.

The direct attack on Velletri, notwithstanding strong artillery and air support, failed—as had been the case before numerous other stone towns. East of Velletri the major gain of the day was made: American infantry passed the highway from Velletri to Valmontone, just beyond Velletri. They then continued up the slopes of the volcano and during the afternoon reached the edge of the crater at Mt. Peschio (3100 feet high, 2½ miles due north of Velletri). This town was thereby nearly encircled.

Attacks towards Valmontone failed. They met an enemy attack headed due south toward Ardena; it was stopped before it reached this objective.

The Eighth Army (delayed by demolitions and enemy rear guards) reached the line Carpineto—Frosinone—Sora (all incl.) for an average advance of about 3 miles.

On 1 June determined attacks were made against Velletri on an arc extending from Mt. Peschio on the north, around by the east and south to due west of the town. The Americans held on to Mt. Peschio and at dusk captured Velletri. About 100 prisoners were taken, the main part of the garrison having withdrawn toward Genzano.

On 2 June the Americans on Mt. Peschio descended into the crater and advanced westward. At the same time attacks were made northward against Valmontone and west thereof, aided on the left by a British attack west from Lanuvio. This latter made little progress, but the American attacks advanced at all points. Against considerable resistance the troops fought down the inside slope of Mt. Peschio (on the rim of the main crater), then had to fight upward against a volcanic cone of Mt. Faete (in the center of the crater, and about 2,900 feet high). The Germans were driven off this mountain.

Valmontone was taken in the morning. Thereafter severe resistance was met.

At the end of the day the line in Colli Laziali (Alban Hills) sector was: **Ardea (British) — Campoleone (Br) — Lanuvio (German) — Lake Nemi—Mt. Cavo (G)—Mt. Ceraso (4 miles northeast of Rocca di Papa) (G)—point 1 mile south of Palestrina—Cave (G).**

The Eighth Army gained about 2 miles to include Ferentino, taken by the Canadian corps.

Early on 3 June Americans attacked Lanuvio, after an artillery preparation using considerable smoke. At 0300 hrs. infantry entered the town, to find that the enemy had previously evacuated it. The German main body commenced to retire to beyond Rome.

As far as is now known, neither German troops nor trains used the city of Rome for military movements, the bulk of troops passing south of Rome. The main rear guard held the line Mt. Cavo—Rocca di Papa. It seems to have consisted of only about one battalion, had the advantage of terrain, fought until late afternoon, and then withdrew.

South of the Colli Laziali the German withdrawal involved no considerable fighting. North of these hills severe fighting lasted all day along the line Zagarolo—Palestrina—Cave. In spite of strong attacks the Americans attacking this line failed to capture the three pivot villages.

The Eighth Army followed the retreating German Tenth for a gain of 6 miles along Route 6, reaching a line through Agnani and Sora. From Agnani patrols established liaison with the Americans at Valmontone.

On 4 June the victorious American Fifth Army entered Rome. There was only sporadic enemy resistance, along Route 6 and the Appian Way, but it delayed the Americans until afternoon.

The Germans held a line from Rome to the sea, nearly due south. This was not materially altered during the day. German artillery was very active.

During the night 3/4 June the Germans north and northeast of the Colli Laziali had withdrawn by routes mostly going north of Rome. The right of the Fifth Army and the left of the Eighth, against strong rear guard opposition reached the line Palestrina—Cave—Paliano—Fiuggi—Guarcino—Sora (all incl.).

THE GERMAN WITHDRAWAL

The next German maneuver has been characterized by a minimum of fighting and a maximum of demolitions. The mission seems to be to conserve German men and materiel. Now that Rome had fallen there was no further reason to hold central Italy, which had little in economic resources justifying fighting a major campaign. There was always the danger that the Allies might land an amphibious expedition in north Tuscany in rear of any German line south thereof. The withdrawal was to be beyond the area where a hostile landing in rear of German lines could expect to be easily put ashore.

On 5 June the German withdrawal commenced about Palena in the center of the Apennine sector. On the 6th the Fifth Army attacked on both sides of Rome. South of Rome was hard fighting. British armor penetrated into the German lines. On the north the Americans attacked toward Tivoli; they neared that town, but were unable to take it. During the ensuing night, the Germans fell back.

On the 7th the Fifth Army advanced, meeting no resistance until it reached the line Civitavecchia—Lake Bracciano—Civita Castellana.

Violent fights took place at both ends of this line; Civitavecchia was left in British possession.

On 8 June the Germans on the coast withdrew to beyond Tarquinia. On the opposite Adriatic flank the Germans commenced to withdraw. There had been no Allied pressure on this coast nor in the central mountain section.

On the 9th, on the west the Allies reached the line Tarquinia—Viterbo—Castellana (all incl.), a 35-mile advance from Rome in 5 days. On the east the Allies entered Orsogna and Guardiaagrele for a 5-mile advance without having to fight.

By the 13th the Allies with only minor fighting reached the line

Point on coast 11 miles south of Orbetello—Lake Bolsena—Civita Castellana (Br)—point 6 miles south of Rieti—Avezzano (Br)—Pescara River.

Lake Bolsena divided an American corps on the left (west) from a British one (east) on the right. This was a reversal of the previous arrangement of corps within the Fifth Army. By 15 June the line had advanced to **Point on coast 10 miles north of Orbetello (US)—Magliano (US)—Pitigliano (US)—Orvieto (Br)—Terni (G)—Rieti (G)—Aquila (?)—Pescara River and city (Br).**

On 16 June the American corps on the left attacked along the whole front. Not much resistance was met near the coast; the troops passed Grosseto and captured large airfields near that place. Their right met considerable resistance near Lake Bolsena, but pushed the enemy back. The Eighth Army followed the enemy's continued withdrawal.

On 17 June the major engagement was by the British Eighth Army in its advance against Perugia. This encountered severe resistance and continued on the 18th.

As this account closes the line was:

Bruna River—Paganico (German)—Orcia River—Citta della Pieve (A)—Perugia (German)—Assisi (A)—Foligno (A)—Mt. Aspro (?)—Tronto River (G).

On 17 June a French amphibious expedition landed on Elba Island, garrisoned by a German force estimated as 2,000 men. The resistance encountered was more than had been expected, but a beachhead was secured. During the 18th the enemy withdrew gradually to the northeast end of the island.

Since 5 June, in 13 days the Allies advanced just about 100 miles along the west side of Italy, and 50 miles along the east side.

COMMENTS

1. On 21 May, with a view to aiding the Allied advance, the Italian Government headed by Marshal Badoglio issued a General Order prescribing the organization of enemy-occupied territory for sabotage purposes. Areas were established as follows:

a. All of Italy north of the neck of the peninsula.

b and c. South of the neck of the peninsula, respectively on east and west sides of the Apennines (less Rome).

THE WAR IN RUSSIA (21 May to 18 June 44)

There have been numerous reports that the main Russian armies were being rested, reorganized, and regrouped, with a view to a general large-scale offensive to be launched in conjunction with the invasion of west Europe by the Americans and British. During the period no such offensive developed. German reports are that Russian regrouping has resulted in the accumulation of a mass of reserve divisions south of the Pinsk Marshes. German reserves estimated at 30 divisions have been reported opposite, in south Poland.

The Axis has similarly readjusted its forces. Their total strength is estimated as:

German divisions	
In Finland	7
In Russia	200
Finland divisions	15
Slovakia divisions	2
Romania divisions	28
Hungary divisions	20
Total divisions	272



105-mm howitzer in position on the outskirts of Rome, 5 June 44

d. The Apennines between sectors b and c.

e. Rome.

f. Area adjacent to battle area.

To date no sabotage of importance has been noted.

2. On 5 June King Victor Emanuel III of Italy, in accordance with a previously-made agreement, and following the fall of Rome, appointed his son Crown Prince Humbert as Lieutenant General of the Realm, with full power to act on all matters. The King thereupon retired from active duty.

The new Lieutenant General of the Realm proceeded to Rome. In accordance with instructions from the Allies he organized a new government on a broader basis. He first directed Marshal Badoglio to undertake this mission. This effort failed. He thereupon appointed Ivanoe Bonomi, who did form a new government composed of individuals who had never been associated with the Fascists or with Mussolini. Consequently all individuals lack any recent political experience. Bonomi has been inactive since 1922.

The new Bonomi Government refused to take an oath of allegiance to the Lieutenant General of the Realm, and made it plain that he was not needed. They did take an oath to serve the interest of Italy. The Lieutenant General of the Realm was then excused from sitting with the Government, and withdrew.

3. The campaign in Italy indicates that stone villages make excellent centers of resistance. They have withstood most extensive shelling and intensive bombings. It is very difficult to reach defenders, who can retire to cellars below ground. Fire will force the defenders out, but after the fire is out the ruins may be a better defensive center than before.

The number of Hungarian divisions is reported as to be increased, but it is doubtful whether this can be accomplished before the end of the summer campaigns. No Polish divisions have been formed, but Poles have been incorporated into German divisions. No divisions have been reported from Estonia, Latvia, or Lithuania. Minor units from the first two of these small states are in line. A considerable number of Baltic citizens are serving in German ranks.

The number of Russian divisions is unknown. It is certainly over 300.

MAIN RUSSIAN FRONT

On 21 May a force of several German and Romanian divisions started an operation to capture the Dnestr River bend between Dubossari and Grigoriopol. This was practically accomplished by the 22nd, mopping taking one day more. This minor offensive gives the Axis a bridgehead on the east side of the Dnestr, but the main reason for the attack seems to have been to shorten the line and thereby



On the coast of the Gulf of Finland the Red Army swept into Koivisto (1), while just inland it captured Maklahti (2), only 17 miles south of Viborg. To the east Siprola (3) and Parkkila (4) fell as the Finns' 3d defense line was breached. In the longest advance of the day the Russians took Valkjaervi and then went on to Oravaniemi (5). Near the shores of Lake Ladoga the towns of Rautu and Vaskela (6) were seized.

release troops for other duties.

At the same time, German troops commenced a mopping of areas north of the Pinsk Marshes, in the woods and swamps of which were large numbers of Russian guerrillas and partisans. This was reported completed by 27 May.

On 31 May, German and Romanian divisions, with strong air forces from both nations, commenced a limited offensive just north of Iasi to drive the Russians off high ground held on the southeast side of the Prut River. The mission of the entire operation seems to have been to obtain slightly better positions for the Axis line, which was done. A secondary mission may have been to train Romanian troops.

FAR NORTH FRONT

Starting at the Arctic Ocean the line was:

Liza River (30 miles east of Petsamo)—Notosersk (R)—south branch of Lake Nuot—Lake Pyavo—Magovoritsk (Ax)—Lake Yushk—Onda River—Lake Vyg—Lake Onega—Svir River—across Lake Ladoga—Saaroinin (Fin)—Sestroretsk (R).

THE WAR AGAINST JAPAN (21 May to 18 June 44)

(DATES IN THIS SECTION ARE FOR EAST LONGITUDE)

SOUTHEAST ASIA

The rainy season started at the beginning of the period. This practically stopped military movements in Arakan and markedly reduced operations in the other areas.

Manipur

The British III and IV Corps (of the Fourteenth Army) have been actively engaged in driving the Japanese out of Manipur. This army is part of the 11th Army Group under Gen. Sir George J. Giffard, who recently inspected this front.

The III Corps (with two divisions) was based upon Dimapur, on the

On 9 June the strong Russian Leningrad Army (Gen. Leonid A. Govorov) attacked just north of the Gulf of Finland, on a front of about 30 miles from the vicinity of Sestroretsk on the Gulf to astride the railroad from Leningrad to the west shore of Lake Ladoga. The first day's operations, of a limited nature, left the Axis in doubt as to whether a major offensive would follow. The Finn commander was Lt. Gen. Hjalmar Siilasvuo.

Next day the Russians fired a powerful artillery and air preparation, then attacked using considerable armor and a large number of attack planes. The main effort was on the left. The battle lasted all day and into the night. The defenders—all Finns—had a strong position. The Russians penetrated it close to the shore.

On 11 June the attack continued. The Russian left, driving hard, pushed on into Terijoki. The center headed up the main Viborg (Viipuri) highway, toward Kivennapa. The heaviest fighting took place in this area, with the line at the end of the day about 10 miles southeast of Kivennapa.

Using armor to lead the advance and with strong artillery and air support, the Russians advanced into Kivennapa on the 12th. An attempt to continue next day was met by fresh Finn divisions; it made but slight progress.

On 14 June the Russians fired an artillery preparation astride the Viborg highway, using (according to Moscow despatches) an average of 200 guns to each kilometer of front. As this extended 28 miles on this day, it would seem that the Russians had 5,600 guns. Presumably this includes AT and AA weapons, and possibly infantry mortars. Again the Russians made but a slight gain along the highway. South thereof and north of the railroad they advanced some 6 miles to Kuuterselkae.

The battle was renewed on the 15th. The Russians were stopped in the Kivennapa sector. Further south they attacked west from near Kuuterselkae—Uusikirkko, and arrived close to the latter place.

On 16 June the Finns withdrew their line next to the Gulf. The Russians made their main effort astride the railroad to Viborg. This made considerable progress. At the end of the day the line was approximately Jorola (?)—Uusikirkko (R)—Kivennapa (R)—Korkiamacki (?)—Saaroinen (?).

Next day the Russians again attacked, with main effort astride the railroad. The Finns fought rear guard actions at favorable sites and fell back, abandoning Perkjaervi.

On the 18th the Russians continued to advance. They were now opposite the Mannerheim Line. The Finn commander decided not to defend this, so at the end of this day the Russians had reached the line: Koivisto (R)—Summa (?)—Leipacsuo (R)—Lake Muolaa—Lake Vuoksi—Lake Suvanto—Rautu (R)—Taipale (Fin).

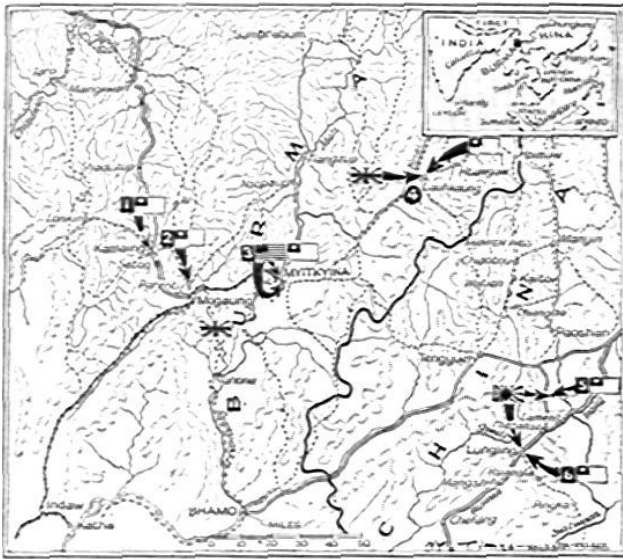
COMMENTS

According to Finn accounts the Russian offensive has at its disposal so much stronger forces than Finland that the only strategy available is defensive. The Finn Army has fallen back. According to its accounts it has, from several favorable positions, inflicted heavy losses upon the Russians. The Russians have not claimed taking any number of prisoners.

No German ground troops are reported present in south Finland. German air forces are aiding the Finn air force, which is small and handicapped by having few late-model planes. German light naval forces are operating with similar Finn forces in the Gulf of Finland.

Bengal & Assam RR. Its advance elements were in close contact with the Japanese 31st Div at Kohima, 46 miles southeast of Dimapur. Its mission was to advance toward Imphal, 67 miles away and due south from Kohima.

The IV Corps held a considerable area of the Manipur plain. Its advance elements were 11 miles north of Imphal on the road toward Kohima and 55 miles from the III Corps, with the enemy in between. Its mission was to cooperate in opening the road to Kohima. This was even more important for this corps as it was surrounded by the enemy, who was attempting to advance from Tamu against British positions in front of Palel, along the Tiddim road against British-held Bishenpur, and along the road from Ukhrul southwest toward



Chinese troops took Kamaing (1), principal Japanese supply base in northern Burma, and seized Parentu (2) to tighten the trap around Mogaung, which is menaced by British Chindits from the south and east. American and Chinese forces edged forward in the northern, western, and southern parts of beleaguered Myitkyina (3), 60 miles northeast of that city Chinese guerrillas and British-led Kachin troops effected a junction at Lauhkaung (4). The Chinese captured hills north and west of Lameng (5) and blocked Japanese reinforcements sent from Tengyueh to the Lungling area (6).

Imphal. Other Jap forces had road blocks on trails leading west and northwest from the Bishenpur—Imphal plain. Since 1 Apr the IV Corps had been supplied by air. As enemy air forces were weak, there was no supply difficulty.

The net result of the month's fighting has been that the III Corps materially improved its position, the area around Kohima was cleared of the enemy, and a good start made on an advance toward Imphal. The IV Corps held all its positions and made a slight advance north toward Kohima. The distance between the two British corps had been reduced to about 29 miles.

North Burma

At the beginning of the period the situation was:

a. A force of two Chinese divisions and some American detachments (of the command of Lt. Gen. Joseph W. Stilwell) was attacking southward in the Mogaung valley and had reached a line about 14 miles north of Kamaing.

b. A force of Chinese and American troops (under Brig. Gen. Frank Merrill) was besieging Myitkyina.

c. A force known as the Chindits (under the British Maj. Gen. W. D. A. Lentaigne), entirely supported by air, was in enemy rear areas south of Mogaung and Myitkyina.

d. A force of Kachin and Gurkha troops was about 45 miles north of Myitkyina, attacking an enemy post at Tiangzup.

The general result of the month's campaign was that the Mogaung valley was cleared as far as Mogaung, which is yet held by the enemy. This was a net gain of 35 miles. The Ledo road is being constructed down this valley, work continuing notwithstanding the rainy season. The road is partially open for supply purposes. Eventually it is to be continued on into Bhamo, there to unite with the Burma road to Chungking.

At Myitkyina the only change of the month was to constrict the siege lines around this small village. To the north the Levies appear to have made a net advance of about 7 miles.

The enemy has not been completely cut off from access to Mogaung and Myitkyina. Their Japanese garrisons have received some aid from outside.

Salween River Front

A Chinese force had on 10 May initiated an offensive along the Salween River. Its mission was to open the Burma road across the Salween as far as Bhamo. At this place it was to unite with the troops advancing along with the Ledo road project. By 21 May the 11th China Army (Gen. Sung Hsi-lien) had crossed the Salween River without opposition and was in contact with hostile forces holding the

passes of the Kaolikung Mountains just to the west. Chinese patrols had by-passed the passes and at places were at the Shweli River. The Chinese were operating in three columns; north, center and south.

The results of one month's operations have been that, against weather and terrain, the China 11th Army had not cleared the mountain line between the Salween and Shweli Rivers.

SOUTHWEST PACIFIC

At the beginning of the period the U. S. 41st Division was mopping that part of New Guinea near Hollandia, just west of the boundary between British and Dutch New Guinea. Near Sarmi, 125 miles still further west, an expedition had landed on Wakde Island on 17 May and had not yet reduced this post. Scattered enemy forces remained on the north shore of British New Guinea in the vicinity of Wewak. On 21 May the operation against Wakde was completed by the destruction of the last of the enemy forces. The total number of enemy killed, including some on the mainland opposite the island, was computed as 835.

On 27 May a new operation commenced by an attack on Biak Island, which is about 50 miles long from northwest to southeast and is somewhat egg-shaped, being 30 miles wide near the south end. It is 200 miles west from Wakde, and across the entrance to Geelvink Bay on the main island. It was defended by a part of the Japanese 36th Div.

Under cover of a naval and air preparation troops debarked on the small village of Bosnek, at the center of the southeast shore of Biak. The first objective was the Mokmer airdrome, 7 miles to the west. The landing was almost without opposition; only a few men were wounded, and none killed. The troops then proceeded to organize and advance westward.

On 28 May the advance passed Mokmer village, on the coast. The two leading battalions had cleared this place when heavy artillery and machine gun fire fell on them from high ground parallel to the beach road, along which the advance had been made. This stopped the advance. Losses were serious. It was impracticable to withdraw under enemy fire. Ammunition was forwarded by amphibious Buffaloes, which went out to sea (out of range of the enemy) and then one at a time dashed to shore.

Next dawn the enemy attacked. The American lines had been withdrawn to Paral, about 2 miles east of Mokmer. Japanese tanks met American tanks. Both sides used artillery. A hot battle lasted until after 1000 hours, when the enemy seems to have taken Paral, 11 enemy tanks were destroyed or damaged.

The enemy renewed his attack on 31 May, but it was less strong than before and had no success. Now the Americans proceeded to clear the heights back of their beachhead about Bosnek, with a view to renewing the advance toward Mokmer over the high ground instead of along the shore.

On 3 June, naval and air forces shelled and bombed presumed enemy positions, including the village of Paral, which the enemy held. Next day the troops resumed their advance. They moved with caution, on both the high ground and the beach. In this manner they arrived at Mokmer airdrome on 6 June. A wide encircling movement was made, and the airdrome was taken on the 7th by an attack from its rear. Operations were now commenced against detached enemy centers of resistance. Many of these were in caves overlooking the shore road. On 13 June Mokmer airdrome was available for the use of our own planes.

The advance was resumed against two remaining enemy airdromes at Boroku and Sorida, 8 and 9 miles west from Mokmer. These were finally captured on 20 June without major fighting. It was estimated that the enemy had lost over 1,800 killed in this campaign.

The enemy has continued to maintain himself in the jungle mountains back of the Hollandia and Aitape areas, and along the coast on both sides of Wewak. At the first two areas the enemy is being slowly reduced by bombing and patrol actions. Around Wewak the coast is daily bombed or shelled by naval forces. It is believed that the enemy has no line of supplies open to his scattered troops in these areas, and that he will be eventually starved into death or submission.

The capture of Biak, now nearly completed, will likely conclude the New Guinea campaign, which started in June, 1943. In not quite a year the Allied advance along the north coast of New Guinea has moved 1800 miles westward and nearly 700 miles northward.

Bases have thereby been secured for development for future operations, either north against the Philippines or west toward Java.

New Ireland and New Britain Islands are held by the enemy with main bases respectively at Kavieng and Rabaul. These are almost daily bombed by Allied planes, and are occasionally shelled by naval forces.

Bougainville. The Allies maintain their beachhead about Empress Augusta Bay. It has been slightly extended. The enemy holds Buka and Buin at the north and south ends, Kieta on the southeast coast, and the Shortland Islands off the south tip of the island. All enemy-held positions are frequently bombed and shelled.

CENTRAL PACIFIC ISLANDS

Caroline Islands. The Japanese naval and air base at Palau was attacked by air for five successive days commencing 10 June. This was part of the preparation for the attack on the Marianas Islands in order to neutralize enemy naval and air forces at Palau. No enemy naval forces were reported seen there.

Truk was bombed on 17 days between 23 May and 15 June, and Woleai on 7 occasions.

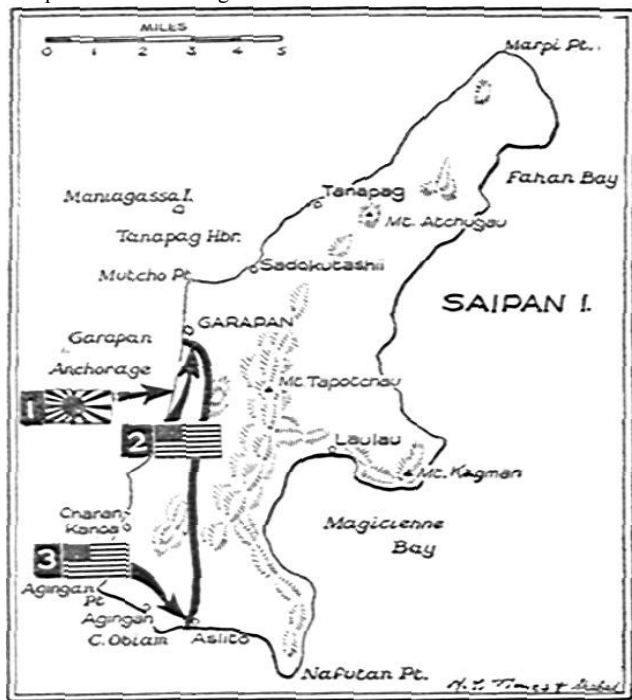
In the eastern Carolines, Ponape has been bombed 14 times.

Nauru has been bombed 9 times. Some other islands were attacked a few times.

Marshall Islands. The islands still in enemy possession, including Wotje and Mili, have been bombed 11 times.

Marianas Islands. A large American Naval Task Force arrived near the Marianas Islands on 11 June with the mission of capturing the twin islands of Saipan and Tinian. On this day an attack by carrier fighter planes was made against these two islands and against Guam. An extensive air battle followed. The enemy's search planes had located the Task Force while still far off; it was therefore useless to hold off the attack of our planes. Preliminary reports are that the enemy lost 124 planes against a loss of 11 American planes.

On 12 June heavier planes were launched and Saipan was attacked. A considerable number of small ships were found there; 3 were sunk. Other ships had already left Saipan. These were located and 11 were reported sunk and 10 others damaged. 16 enemy planes were lost; 4 own planes were missing.



A Japanese amphibious attack was launched south of Garapan (1) on Saipan Island in an apparent attempt to divide the American forces. The effort was repulsed; 13 enemy barges were sunk by our landing craft. Americans are just below Garapan (2) and at the edge of the Aslito airdrome in the south (3).

On 13 June battleships, cruisers, and destroyers shelled Saipan and Tinian. An air attack was also made. Other planes proceeded to Pagan Island to the north, but nothing was found there.

During the night 14/15 June, the invasion fleet of transports arrived off the west coast of Saipan. This island is about 17 miles from north to south, with greatest width (near the south center) of 7 miles. It is a volcanic type, with extinct volcanoes not over 1,500 feet in altitude. A large part of the island is sugar land.

At dawn the naval and air forces fired a strong preparation against the beaches. The troops had been transferred to landing vessels and soon afterward they started for shore. Marines and infantry composed the invasion force. Notwithstanding the preparation the troops met a very severe fire, and it was necessary to delay the landing until a further preparation was fired on the enemy's positions.

About 1200 hours the landing was effected on two 2-mile fronts on each side of Charan-Kanoa. The civilians had been evacuated from this town, but the enemy held it. It was at first by-passed, then attacked from the rear. The Japanese resisted strongly but the landing succeeded in obtaining a fair beachhead. After dark, in view of strong and persistent Japanese artillery and mortar fire, the front line was withdrawn slightly; naval forces thereupon shelled the enemy's lines.

During the day the naval air force raided the Bonin Islands to the north. Air opposition was met. 33 enemy planes were reported downed while 14 others were reported destroyed on the ground. 2 medium and 4 small enemy freight transports were sunk. 4 own planes were lost.

On 16 June, the north beach force attacked northward and the south beach force to the south. The enemy attacked with tanks, westward to Charan-Kanoa. The latter attack was repulsed with the help of the naval guns and air force. After this had been disposed of both of the American attacks made progress, the north attack reaching Garapan (excl.) while the south attack made an advance of about ½ mile, to include Agingan Point.

Early on the 17th the enemy attacked again, lost 25 of his tanks, then withdrew. Our attacks were then renewed. An advance inland was made to deepen the beachhead about Charan-Kanoa to about 2 miles. On the south the advance reached the Aslito airdrome, but was withdrawn from there due to severe enemy fire. Everywhere the enemy, estimated as about 2 divisions, was fighting strenuously.

Before daylight on 18 June the enemy attacked again. This time an amphibious expedition attempted to land in rear of the American line south of Garapan. This failed, the enemy losing 13 barges.

JAPAN

After an interval of over two years American planes, including super-bombers, bombed the Yawata steel works at the north end of Kyushu Island on the night of 15/16 June. The planes came from China, and all but 4 returned. The damage accomplished is not known, but appeared to be considerable.

NORTH PACIFIC ISLANDS

Operations have been limited to bombing of the Kurile Islands by American Army or Navy planes. Special attention was given to Shimushu, which was bombed 9 times. Paramushiru and Matsuwa were bombed twice each. There is no information of the damage caused. Enemy air opposition was lacking. There was a strong AA fire.

CHINA

At the beginning of the period the enemy had been engaged for over a month in a campaign in Honan (South River) Province.

During the month which followed, Japanese columns have moved back and forth without much change in the general situation. The Japanese continue to hold Chengchow, junction of the north-south Peiping & Hankow RR and the east-west Lung Hai RR. West from Chengchow the enemy is holding the railroad to beyond Loyang. To the south his advance remained near Siping. There is no evidence that the Japanese are trying to reopen the Peiping & Hankow RR.

A new Japanese campaign started on 27 May in Hunan (South Lake) Province. This was the annual campaign which the Japanese had regularly made southward as far as Changsha. In previous years the main mission was to destroy or capture food and other supplies, and break up Chinese troops which had been organized and equipped since the last annual raid. The campaign this year

has not exactly followed the plan of former ones.

The initial Japanese advance was in five columns based on the Yangtze River, starting from Kungan, Owchilkow, Yochow (on the Hankow & Canton RR), and Tsungyang. From the latter place there were two columns; one heading southwest, the other southeast. Total forces employed were estimated as 5 divisions.

Chinese troops opposed the Japanese from the outset. As on previous occasions, despite reported heavy fighting the Japanese kept right on. Lake Tungting was crossed by boat, and by 3 June the Japanese front was: south shore L. Tungting—Milo River.

The advance was renewed on 5 June toward the line Changsha—Liuyang. Chinese concentrated at both of these cities. On 11 June the Japanese passed between them. Leaving detachments behind, they continued on southward—which was a departure from the preceding campaigns, which had stopped at Changsha.

Changsha was attacked from the southeast and Liuyang from the southwest. Both places fell on 18 June. At this date the leading enemy elements had arrived at the line Ningsiang (China)—Siangtan (?)—Chuchow (Jap)—Liling (?). This was 30 miles or more beyond Changsha.

According to Japanese statements, the mission of their campaigns in Honan and Hunan has been to destroy Chinese troops raised in these areas. Due to lack of transportation these forces can resist but can not go elsewhere. Thinking that if the Allies arrive this unsatisfactory condition might be quickly remedied, the Japanese wish to remove this possibility in time.

Little is known as to the success of the Japanese toward accomplishing their mission. The movements of the Japanese forces as given in China and Japan communique agree. There is no agreement as to losses inflicted.

COMMENTS

1. Japan is on the strategical defensive, and on the tactical defensive everywhere except in Burma and in China. At date of writing the Japanese appear to be winding up their invasion of Manipur and are showing no signs of new offensives in southeast Asia.

Numerous reports indicate a regrouping of Japanese industries, including the transfer of plants to the mainland. According to Japanese reports, they expect to resume the strategical offensive as soon as they complete a program of industrial expansion and consequent increase of their air and naval forces. This program has been under way for nearly two years; results should soon appear.

2. Economic conditions in China are reported as becoming rapidly worse.



The Japanese drive to cut China in two and obtain an interior railway route has resulted in the capture of Changsha (1). The Japanese hold Siangtan, 25 miles southwest of Changsha, and have crossed the Lu River, sixty-five miles from Hengyang, which appears in peril. The Chinese had one victory at Ningsiang (2), thirty miles west of Changsha, where the Japanese were driven from the town.

3. The Communist Government has been in negotiation with the Kuomintang Government at Chungking with a view to mutual cooperation. After more than a month no agreement has been reported.

4. Operations of the British air-borne troops, dropped in rear of enemy lines in Burma, have now been under way for several months. In the territory of jungle and mountains where operations are going on, these troops (known as Chindits) have maintained themselves. They have seriously interfered with enemy communications.

The Chindits have had to move rapidly at times to escape capture. So far they have always found a way to accomplish this. The main danger to the Chindits is interdiction of the planes which bring them replacements and supplies. Due to the inferior Japanese air force, Allied planes can be attacked only by artillery fire. If this can be brought to bear near landing strips where planes come down, it may be most effective.

PERTINENT IDEAS, OLD AND NEW

From the F.A.S.

A FORWARD OBSERVER with a seasonably dyed and camouflaged sheet has a better and more useful present, with less chance for immediate eternity.

A well-placed sandbag may insure FUTURE ENJOYMENT. Have one handy.

A cross between a panoramic sketch, range card, and rapid plot has great utility to an ALERT FORWARD OBSERVER.

LOST?—A system for use of engineer tape to mark command post installation will facilitate night installation.

Duplicate firing charts set up in fire direction center will facilitate PLANNING FOR FIRES WHILE FIRING.

The supply of maps, photomaps, and photos for TARGET FIXING is not automatic. Top must foresee need and get them. Bottom must constantly stir top.

A command post which has practiced conventional PLAYS AND FORMATIONS for protection against attack will not be surprised.

A good battalion WITHOUT TARGETS is not much better than a poor one.

Get help from your supported units in TARGET GETTING. They are interested. Lined-in machine gun flash direction, together with photographs, will help.

Well-placed 155-mm projectiles fired with delay fuze and a low charge will give our infantry a LEG UP ON CONSOLIDATION OF A CAPTURED POSITION. Plan with your infantry.

AMMUNITION is never so plentiful that it can be fired carelessly. Obtain the most effective use from the ammunition available.

Artillery fires must be delivered with all the ACCURACY AND PRECISION that time, forethought, intelligence, and accurate technique that the tactical situation permits.

DIRECT LAYING—Vertical displacement in feet for 100-yard range change at 300-yard target range for 105-mm howitzer, Mark 2, Charge 6 (the nearest thing to HE AT shell) is about 3 feet; at 500 yards, 5 feet.

CONFUSION—99% of our soldiers understand and can execute a RIGHT HOOK. 75% at least have to stop and figure on what is meant by "Envelop the enemy's left."

"VICINITY of a terrain feature" is not ordinarily clear-cut enough to throw much fire at except in exceptional cases. Pin it down closer. Example: "In vicinity of the top of that hill is an OP; flashes from field glass and movement have been noted near that light-colored rock 5 miles down the side."

Maintenance Problems with Tractor M5

By Capt. Edmund J. Murphy, FA

These comments are based on findings in the processing per POM of 17 tractors that operated for 6 months as prime movers for the 155-mm howitzer, M1. This period included one month in the Louisiana Maneuver area. Tractors' average age at the time of processing was 224 hours or 984 miles. They had been subjected to practically all types of difficult operation with the exception of extremes in sand and rock. Regardless of the fact that no parts resupply was available during this period, performance exceeded expectations.

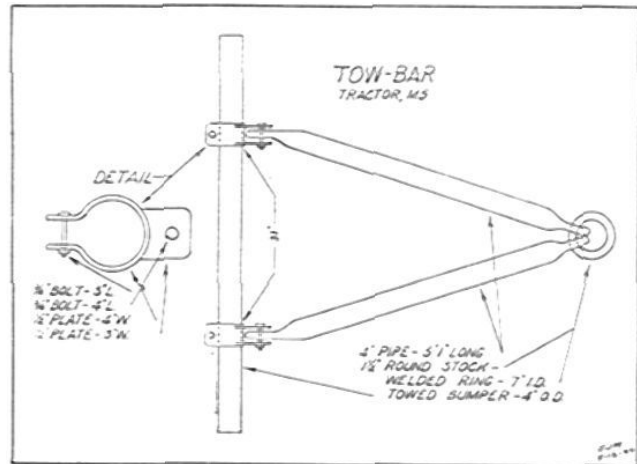
During the period in question, only 4 major parts failures occurred: one engine failed due to shearing of a connecting rod bearing cap attaching bolt, and in 3 cases the starter motor armature wiring failed. Automotive engineers may differ, but we believe that this wiring is too light for the current load put through it. This observation is made not as an argument on design, but for the benefit of officers responsible for driver training: the starter must not be abused.

Minor parts failures of frequent occurrence should be considered too. Some trouble has been experienced with the handle, ratchet, transmission oil filter. The only way to check this is by removing the filter case. Failure of the ratchet will cause clogging of the filter element, especially on new tractors, so it has been found advisable to perform this check on each 50-hour maintenance.

Common failure of the release button on the control, hand throttle has been noted, but it is believed that this failure is caused chiefly by rough handling. Proper use of the control (depressing the foot accelerator before using the hand control) will prevent this trouble. Loss of the windshield wiper hand operating lever may too appear to be due to driver carelessness, but in early models it was due to the fact that the set screw was too short to bear fully on the shaft. Later tractors have a pin threaded and countersunk in the handle and extending through the drilled shaft; this type will not be lost if checked regularly.

High mortality of the low pressure buzzer and the hour meter pressure switch has been observed, but it is not critical. The buzzer can be replaced with a Diamond T unit, and the pressure switch can be simply by-passed. Remember, however, that when the switch is by-passed the hour meter will operate whenever the ignition switch is on, regardless of engine operation. Another frequent though not serious trouble is irregularity of the tachometer at low speeds, accompanied by a slight knock in the cable behind the dash; no way to eliminate this knock has yet been found.

Service of the track suspension proved to be the major problem in processing these vehicles. In considering track maintenance, however, one must keep in mind the effect of special operating conditions. No serious track maintenance problems were evidenced prior to the Louisiana maneuver, but evidently somewhere in the swamps the tracks were operated in brackish water which caused every shaft to "freeze" solidly to its mate. This condition required extra expenditure of an estimated 250 man hours and correspondingly heavy parts mortality, due to the extreme difficulty in disassembling bogie and rear idler assemblies. It was further noted that, for ordinary training purposes, track overhaul would be unnecessary until



reaching an estimated minimum of 1,500 miles of operation. Up to and including processing, only three dead blocks were found.

Although no tires have been "blown out," a 48% replacement of bogie wheels and a 9% replacement of track support rollers was made. Excessive grooving was an important cause for replacement. For this reason suspension systems should be checked regularly, and particularly "at the halt," for presence of any foreign object which might bear against and groove a tire. Packed mud must not be allowed to collect on bogie frames or around support rollers.

Because of the extreme difficulty of driving out bogie shafts, 30% of those removed required replacement. In one case, the application of heat and a pressure of 62 tons in a hydraulic ram were not enough to remove the shaft from the bogie assembly. This operation served only to deadline the ram. Thereafter it was necessary to cut and drill out six shafts for removal. Even under such unusual conditions, however, only a 5% replacement of the oil seal, bearing, bogie wheel was required. This seal was used interchangeably with the oil seal, track support roller. As is to be expected, nearly a 100% replacement of the ring, sealing is required, but it has been found that pieces cut from 1 3/4 radiator hose make an excellent substitute.

Effectiveness of the bogie wheel lubrication and sealing system was proven beyond any doubt. Despite the heavy concentration of harmful water that attacked the track suspension, no bogie shafts showed any evidence of rust within the sealed zone and only one bearing of 130 examined was found unserviceable. It is considered most likely that this one was damaged in the process of disassembling the wheel.

As an indication of the extent to which corrosion can attack parts within a short period of time, it was found that after less than one month's exposure all guides were frozen to trailing idler arms. All trailing idler spring retainers were frozen in set positions. This seriously impeded action of the trailing idler and in many cases progressed to such a stage that the volute spring was unable to overcome the resistance. In these cases the trailing idler would not return to its normal position after rising in crossing a ditch or rough spot.

All rear idler assemblies were disassembled, and here too,

as in the case of the bogie shafts, joint application of heat and hydraulic pressure was necessary. If the facilities of a machine shop are not available, heavy parts mortality may be expected in this operation. It is believed that the condition of "freezing" may be prevented in part by drilling the trailing idler adjusting rod above the spring link bolt and installing a lubrication fitting. Although unsealed, no damage should occur to the bolt if chassis lubricant is used often enough to force out any dirt; once a day should be sufficient, even under the most difficult conditions.

These remarks must not be taken to show normal conditions. Only the *problems* of operation have been discussed here, and it must be remembered that in most instances they were due to unusual operating conditions. The Tractor M5 is much easier to

maintain than, and will outperform, any wheeled vehicle capable of towing the howitzer. You will probably have some of the troubles brought out in this report, but don't expect clutch trouble—you won't have any.

No provision, outside of the practically useless chain issued with the tractor, has been made for rowing after a major breakdown. A tow-bar (see sketch) which will tow forward around a circle of 21-foot radius, has been designed and tested in our organization. This device has been proven in cross-country operation, and a 21-foot towing radius should be adequate for any road. Such a device is a necessity in recovering vehicles that cannot be steered.

"Shift 'em fast, keep 'em revved up, and they'll last forever."

FIGHTING THE UNCOMMON COLD

Winterization Kits for Army Vehicles Now Available

What the Common Cold is to men, the Uncommon Cold is to motor vehicles—that paralyzing cold of steady, below-zero temperatures we so often have to cope with in this "global" war. Just how much time can be lost when vehicles are left to the mercies of the weather overnight, is well illustrated in the incident of two vehicle companies operating in a cold weather area during the early days of the war.

At the end of one particular day, one unit commander issued orders for each driver to drain the oil and coolant from his vehicle and to remove the battery. These items were then stored in a heated building overnight, since a temperature drop had been predicted. The other commander took no steps further than having the coolant in his vehicles checked to see that it contained sufficient anti-freeze for the expected temperature drop. Next morning, within a comparatively short time the first unit was operating full force, the heated oil and coolant and warm batteries having enabled the drivers to start their vehicles immediately. The second outfit had only three vehicles in operation by early afternoon!

Naturally, the process used by the first unit, though very commendable in this instance, is not a particularly efficient method, as it takes considerable time and effort. And that's why the army has developed an imposing array of winterization equipment to help you fight the Uncommon Cold. Result: you can make things a lot easier for yourself just by filling out a few requisitions, for the winterization equipment that is now available will help you get your vehicles going on the coldest mornings and keep them from struggling through the winter. You may be numb as a mummy yourself—but your truck has a foot-warmer, your tank has snow shoes, and your tractor wears a poncho for a nightgown.

For general purposes this winterization equipment is grouped into two general classes. Class A items are termed "improvements to the basic vehicle which will be made on all applicable vehicles for future production." That means your vehicles may already have them, but if they don't they can still be installed. For example, the brackets needed to install windshield and door port hole covers must be attached to the vehicles as permanent installations, and therefore are called Class A items. The covers themselves, however, are Class B items, or "items which may be quickly and easily installed and

which are necessary for vehicles which are expected to operate in sub-zero temperatures."

What you will actually order is one of the Winterization Kits, Interim Kits, or Auxiliary Starting Aid Kits, depending on what vehicles you have. The Interim (or "quickie") Kit is simplest of all. It's the granddaddy of the other winterization kits, whereas the Winterization Kit is a much more recent development. The "quickie" kit contains an underchassis heater and a shroud, and all you have to do when you requisition one is to tell the kind of vehicle it's to be used with. In general, these kits are used for vehicles for which no other winterization equipment is provided.

The Auxiliary Cold Starting Aid Kits, or "slave" kits, are more elaborate than the "quickies" but are not so complete as the Winterization Kits. "Slave" kits contain heaters, auxiliary batteries, and other electrical equipment which is used as an aid to starting in cold weather. Their prime use is for servicing groups of vehicles which have no specific winterization equipment of their own.

It is the Winterization Kit which will be of most value to personnel operating vehicles in areas where the temperature stays below zero consistently. These are usually very complete, and are designed for specific vehicles. Basic equipment included in a Winterization Kit consists of a battery heater, a cab and engine compartment heater, and radiator and louver covers—all of which are permanent installations and thus are always ready for use with a minimum of preparation. Depending on the vehicle, numerous other items are found in the various kits. Therefore, when requisitioning one of them you will have to look up the listing given in War Department Supply Bulletin 9-16 (SB9-16), dated 2 Mar 44, to find the number of the kit you must specify for your particular vehicle. Incidentally, this bulletin also lists territories for which winterization equipment will be furnished, so you will have to refer to it to find out if you're eligible.

Probably the best way to give an idea of the items you'll find in the various kits is to cite a few examples of the equipment available for a number of different types of vehicles. The GMC 2½-ton 6 × 6, for instance, is supplied with a Winterization Kit which contains the following items:

- Primer system.
- Battery and water heater.
- Auxiliary fuel tank.
- Battery heating tank.
- 180° thermostat.
- Radiator and hood louver covers.

Prior to installation of these items a number of preparatory steps must be taken. One is the installation of the crankcase ventilation system, which, by the way, is included in the winterization kits for some vehicles. Full instructions for the necessary preparation are given in the winterization equipment manual.

Before operating the vehicle it is necessary to warm the motor and the battery to a point where cranking is made easy. This is accomplished by the battery and water heater system. The type of heater provided in this case contains a small gasoline burner of the pot type, which is fed by gravity from the auxiliary fuel tank. Air for combustion comes from the draft produced by a small flue, and installation of this flue (or stack) requires cutting a hole in the hood. This type of heater is lighted with a "torch" and may be burned continuously for hours.

Another kind of engine coolant heater, which operates in a different manner, is used in some vehicles. In this type, the heater is controlled by an electrical switch from inside the vehicle, and the installation includes a fuel pump unit for supplying fuel from the vehicle's fuel tank to the burner, a blower for supplying air for combustion, an ignition transformer to provide automatic ignition of the fuel, and a motor generator unit (operated by a storage battery) to drive the blower and fuel pump and to supply current to the transformer. Since this heater is much quicker acting than the one mentioned above, it should be burned only for periods of 15 minutes at a time, according to instructions given in the manual. This is to prevent overheating. An added feature of this heater is its possible use in portable form as a winter aid in thawing out frozen brakes, tank treads, or other parts, or in servicing vehicles not having heaters of their own.

When starting the 2½-ton 6 × 6, the primer system provides a rich fuel mixture which is injected directly into the intake manifold. In some vehicles addition of the primer system calls for installation of a new manifold, designed to accommodate the primer nozzles, along with a new accelerator rod and a new metering rod.

During operation the engine temperature is controlled by the 180° thermostat and the adjustable radiator cover.

Two items not supplied for the 2½-ton 6 × 6 are included in the winterization equipment provided for the 6 × 6 Diamond-T Truck. One is the air-brake alcohol bleeder system, which prevents freezing of moisture in the air brake lines and valves by introducing alcohol into the air-brake system. The other is the set of metal louver covers for the fender shield and hood louvers.

Some winterization installations call for the use of an engine oil dilution system. This enables the vehicle operator to dilute the motor oil with gasoline after operation, thus helping to keep oil in a fluid state while the vehicle is idle. The crankcase ventilating system serves to take this gasoline out of the oil when the vehicle is next operated and the oil has become warm enough to flow as it should.

Items that provide for the convenience or comfort of the operating personnel may often be equally vital to efficient

operation of the vehicle, so they are often provided as components of the winterization kits. Most common of these are windshield defrosters, hot water heaters for the cabs, and brackets and straps for stowage of various items when they are not in use.

Winterization equipment for a gun motor carriage is somewhat more elaborate than that so far mentioned. It includes a gasoline-driven motor with fuel tank, control box, and heater box. Heat is forced to the exterior of each of the lube oil tanks and to the battery compartment through flexible tubing and ducts, and four shutter sections serve to retain heat in the engine compartment. The oil cooler is protected by a heavy fabric cover with a roll-up flap. Also included are air intake and outlet shutter assemblies. In this case, as in some other installations, it is necessary to make some changes in the wiring system.

Miscellaneous equipment includes such smaller items as plastic windshields for armored windshield slits, ice grousers, half-track idler scraper blades and brackets, and cut-out snow shoes for tractors.

Needless to say, the installation of winterization equipment, no matter how complete it may be, is not a panacea for cold weather operating problems. Without the proper attention to other phases of operation, no equipment can be expected to perform effectively. Instructions in OFSB 6-11, *Cold Weather Lubrication and Service of Combat Vehicles and Materiel*, must be faithfully followed in connection with the use of winterization equipment. This involves use of winter grade of gasoline and lubricants and checking of mechanical features to be sure they are all in proper working order.

Brushes, commutators, and bearings on the generator and starter must be clean. The large surges of current which occur when starting a cold engine require good contact between brushes and commutators. Wiring must be cleaned, connections tightened, and all electrical equipment kept free of ice. The distributor must be cleaned and points replaced and checked frequently. Spark plugs must be cleaned and adjusted and timing must not be unduly advanced or retarded. Batteries must be kept fully charged, and care must be taken not to add water until the battery is to be put on charge, since added water will stay at the top and freeze before it can mix with the acid, if the battery is not charging.

Brake bands have a tendency to bind when very cold. Vehicles should be parked with brakes released and wheels blocked, instead.

Oil lubricated speedometer cables should be disconnected at the drive end when the temperature is below —30°, as they often fail to work properly and sometimes break due to excessive drag caused by the high viscosity of the oil with which they are lubricated.

Operation of vehicles on hard, frozen ground causes strain and jolting which may result in screws' breaking or nuts' jarring loose, as low temperatures greatly reduce the shock resistance of metals. Therefore, these items must be checked regularly.

Storage of fuel requires special attention also. Due to condensation of moisture from the air, water will accumulate in tanks, drums, and containers. At low temperatures this water will form ice crystals that will clog fuel lines and carburetor jets unless the fuel is strained. To prevent as much as possible the formation of ice in fuel containers they should be kept as full as possible, since the more fuel there is in the tank the smaller will be the volume of air from which moisture can be

condensed. Addition of denatured alcohol to the fuel tank each time it is filled will reduce the hazard of ice formation. Closures of containers should be kept tight to prevent snow, ice, dirt, and other foreign matter from entering. Dispensing equipment must be kept clean.

There are many more important details covered in OFSB 6-11 with which you should be familiar—even to knowing that you should park a vehicle so it does not face into the wind,

when there is no shelter available, so as to reduce chances of freezing. So remember to give your copy of OFSB 6-11 a good going over.

Meanwhile, get your SB 9-16 and get busy! Give yourself plenty of time to get the requisitions through and the equipment on its way. And allow time for installation, too. After you've got your vehicles "winterized" there's one more important thing to do—see that the equipment is used!

WHEN YOUR OUTFIT MOVES BY RAIL

By Capt. Lauren K. Soth, FA

The orders come through: your outfit must prepare to load all its weapons and vehicles on flat cars for shipment to your new station. Sooner or later that kind of news is coming to you. If you know how to load your equipment, it won't bother you more than another day's work. If you don't, you're in for some real trouble.

As with any other military operation, railway loading requires advance planning.* Find out, if at all possible, the lengths of the cars assigned to you—then you can figure your space and what you have to put on that space before you begin to load. The best way to do that is to cut out pieces of cardboard in exact scale of the railroad cars assigned to you. Then cut other pieces of paper in the exact proportions of the vehicles and weapons you have to load. By experimenting with this jigsaw puzzle, you can find the best way to load the stuff.

Another essential step in advance planning is to prepare all the blocks, cleats, and stakes well ahead of the day of loading. Also be sure you have the required amount of 8-gauge, black, annealed wire to secure all the equipment—four strands of wire are used for wheels of all types, six strands are used on trails.

The width of your load must not extend beyond clearance limits of the railroads over which the train is to be moved. As a general rule, no part of the load may project beyond the end sills of the car nor over the stake pockets on the sides. No part of the load may be within 6" of the handbrake wheel. Any overhang beyond these limits must be approved by railroad officials.

If you're lucky enough to have at your station a permanent ramp for loading railroad cars, it's a simple job to build spanning ramps between the cars, lower the handbrake wheels, and drive the vehicles on the train. If you don't have a

*Technical manuals for individual weapons and vehicles give information on preparing equipment for rail transport. Staff Officers' Field Manual 101-10 also gives information and data for loading.



When making a ramp by lowering one end of a flat car, support the coupler on the axle of the truck while moving the jacks.



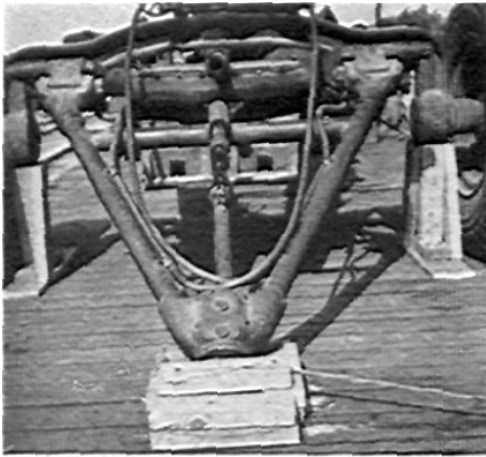
Wires should cross at top of wheel to prevent turning in transit.

permanent ramp—and the chances are you don't—you'll have to build one. A flatcar itself makes an excellent ramp, and more to the point, that's the easiest way to make one. Eight men can remove a truck from one end of the car and make a ramp in about 20 minutes. If possible, have the end cars spotted with the brake wheels in, toward the center of the train, so you can make a ramp on either end without taking off the brake staff. This staff can be dropped flush with the car floor but is difficult to remove altogether, and digging a hole between the ties deep enough to clear the staff is a hard job.

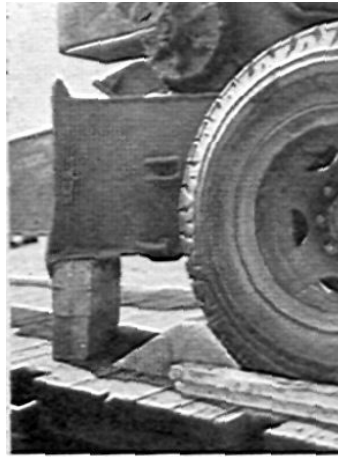
Block all the wheels, front and rear, except on the truck to



An alternate method of securing the 1/4-ton truck is to turn the vehicle crossways on the car by manpower, and secure by cleats and wires as shown here. By removing the spare wheel and gasoline can carrier, the overhang is reduced enough to pass railroad inspection.



Left: Here is one method of fastening down the lunette on the limber of the 155-mm gun M-1 and 8" howitzer M-1 carriage.



Center and right: These photos show how blocks can be used to support the 155-mm gun or 8" howitzer carriage, and take most of the weight off the tires.

be removed. Dig holes about 6" wide, 12" long, and 6" deep underneath the steps on either side of the car. Disconnect the horizontal brake rod and the air hose fitting. Then you're ready to jack up the end of the car and roll out the truck.

Using heavy jacks, such as those with 155-mm guns, jack the car high enough to remove the pintle pin. If it can't be removed you'll have to jack it high enough for the pin to clear. Then roll out the truck. In this operation use the truck to limit the fall of the car in case the jacks slip. First pull the truck out until its center is beneath the coupler. Then place the inner axle under the coupler and continue the lowering. If necessary to move the jacks, you can support the car in either of these positions on blocks.

Place 6" × 6" blocks parallel to and against the rails under the end of the car so that the weight of the car is not on the coupler when lowered.

After the car is lowered, build an approach with railroad ties, scrap lumber, or just earth.

In loading the vehicles and weapons, remember that you're going to have to unload—so put them on in the order in which you plan to take them off. Then you can drive them off speedily at the other end of your journey. It's usually best to have all vehicles facing in the same direction and in the direction of travel.

All 4-wheeled vehicles are secured by blocking the wheels and wiring to stake pockets. The wires should be fastened to

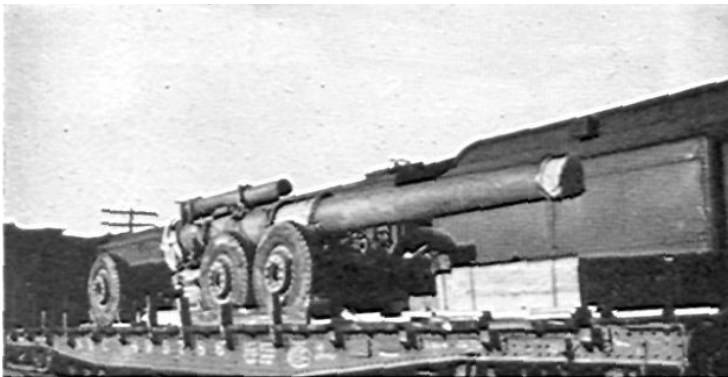
the wheels in such a way as to prevent the wheel from turning, and so as to pull against each other. Cleats alongside the wheels help hold the vehicle against side movement. Brakes are set, of course. The wires are twisted tight enough to remove slack but not enough to cause tension. Long wheel timbers may be used in place of blocks, with cleats in back of them to hold them in place. Chamfers are notched out to fit the tires.

Artillery weapons are secured by placing supports under the axle, blocking the wheels and trails, and wiring down much the same as a vehicle. The supports under the axles should be ¼" longer than the distance from the axle to the floor of the car—just long enough to take part of the weight off the tires.

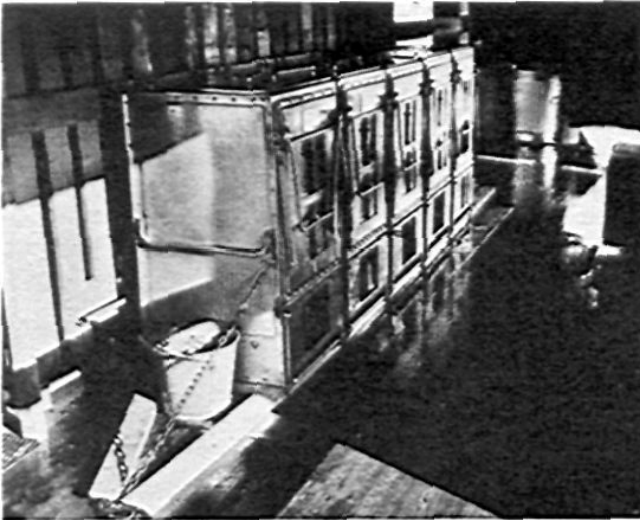
Full-track vehicles are easy to load. Simply put blocks in front and rear and cleats along the sides; then wire from bogies to stake pockets, or use bolts which come with some vehicles for railway loading. Heavy tracked vehicles must be blocked with extra care and made doubly secure, because they may jerk loose when the train is started or stopped quickly.

And while we're on that point, each car should be placarded "Do not hump." Military personnel are required to see that no cars are switched off the train while the train is in motion.

All tires should be at maximum pressure to minimize bouncing in travel. Maximum pressure depends on the size of the tire and is considerably more than road pressure for most vehicles and weapons. For example, the road pressure for the 105-mm howitzer, M2, combat tire is 55 lbs.; its pressure for rail transport, 70 lbs. For the 2½-ton truck, however, the transport pressure is the same as road pressure—55 pounds.

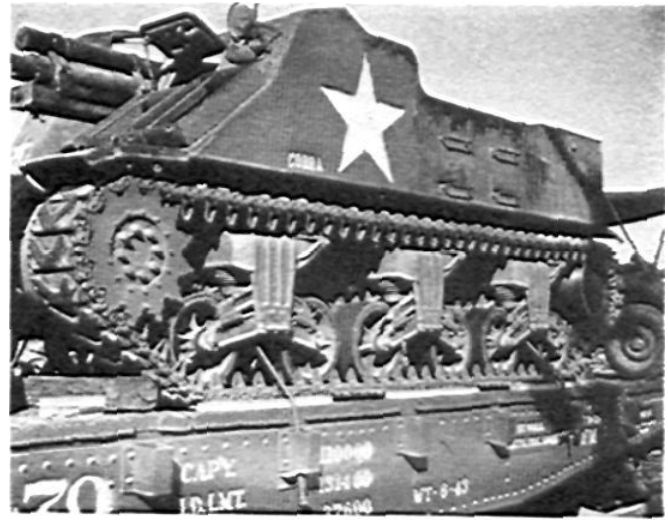


These pictures show the 240-mm howitzer and carriage M-1 blocked for rail transport.



View of five field ranges secured in a baggage car for messing en route.

For messing en route, field ranges may be secured in either a box car or baggage car. The ranges are placed on a sheet iron base, extending at least 4" from the base of the cabinet. Cleats are nailed on each side and spikes driven through links in the chains to hold the chain firmly against the outer ends of the cleats. The chains are then tightened by the turnbuckles. Ranges must be at least 2" from the wall of the car. Not more than three 5-gallon safety-filling gasoline cans may be carried for each range—with a maximum of nine for each car. Gasoline cans are placed in individual wood bases secured to the car floor as far removed from the



Blocks or timbers front and rear and cleats along the sides are used for the 105-mm howitzer motor carriage M-7. Bolts to stake pockets are not essential, but they do give added assurance of safe transport.

ranges as practical.

A 1-quart carbon tetrachloride fire extinguisher and a bucket of sand should be in the car for each range of three cabinets. The units may not be refueled while there is any fire in the car not while the car is in motion. Fire units should be moved to the opposite end of the car for re-fueling or, better, taken outside the car. This operation must be supervised by an officer. Installation and use of equipment for heating water in the field is prohibited on troop trains. Water for washing mess kits may be heated in a G.I. can in one of the range units, however.

A (TK), B, C

A	stands for ANTITANK, the Regiment's youngest sons.
B	BATTERY, ¹ a total of twelve guns.
C	CAMOUFLAGE—the gunners' chief protection.
D	DEFILADE, the antitank conception.
E	EFFECTIVE RANGE, so <i>wait</i> and don't be vague
F	FRONTAL FIRE—avoid this like the plague.
G	GUNNER, on whom the show depends.
H	HULL-DOWN TANKS, a target Heaven sends.
I	INTERLOCKING, the ares of fire do this.
J	JERRY TANKS, we hit and seldom miss.
K	CUCUMBER, ² we're cool as this and more.
L	LAYOUT, the guns upon the floor.
M	MOVEMENT, the No.'s 1 forbid.
N	NETTING, beneath which we are hid.
O	OP, which spots the slightest thing.
P	PHEASANTS, ³ which are never on the wing.
Q	QUARTERMASTER, the symbol of the queue.
R	REVERSE SLOPE, the side that's best for you.
S	SURPRISE FIRE, which good results demand.
T	TROOP, ⁴ which is the subaltern's command.
U	UBIQUE, the star by which we steer.
V	Lord knows what—I've simply no idea.
W	WAGON LINES, for horse or truck or mule.
X	EXCEPTION ² —They say it proves the rule.
Y	YEARNING; to fight and so to kill.
Z	ZEROING, a most important drill.

—G. D. W. C.

¹U. S. Battalion

²Poetic License

³17-Pdr. (Middle East Nomenclature).

⁴U. S. Battery

EMERGENCY WIRE LAYING BY LIAISON AIRPLANE

By Lt. Col. Gordon J. Wolf, FA

The communications officer is up against it. The OP is near the crest of a high bluff at the foot of which runs a sizable, swift-running river a quarter of a mile across. A wire must be laid down the bluff and across the river—and laid *now*. The bluff and the river represent a formidable obstacle to the completion of an otherwise swiftly laid wire net—but if prior preparation has been made, he can close the gap with wire laid by one of the battalion's organic light airplanes.

The method developed by the writer permits two unconnected lengths of W-130 wire, each piece not longer than half a mile, to be laid successively on a single flight. This permits the rapid establishment of wire communication in situations where, because of natural obstacles, too much time would necessarily elapse before an installation could be expected to be made by the normal ground methods.

A reel unit, equipped with brake and quick spool release, is bolted to the inboard end of the lift struts of the liaison type field artillery airplane, two pieces of sponge rubber being inserted to dampen vibration and to protect the struts. It consists of a U-shape mechanism with a short metal spindle, turning on a sleeve bearing, inserted at each point of the U. A standard spool of W-130 wire is fitted between the points of the U onto the squared and tapered ends of the spindles. This permits the spool to turn freely (see Fig. 1).

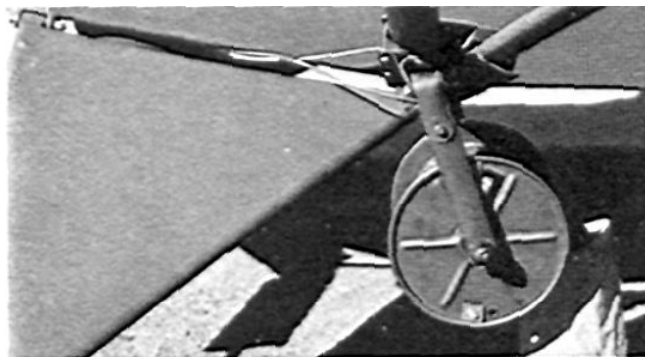


Figure 1—Left side view

The outboard arm of the U is hinged. When the spool is in place a heavy spring holds the outboard arm in position to support the reel. At one end of the spring a link holds the spring in tension, and at the other end is a Bowdoin cable (see Fig. 2).

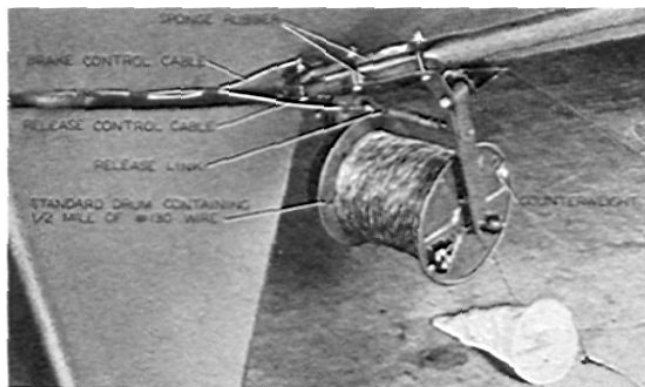


Figure 2—Left front view

The spool can be dropped from the airplane in flight by actuating the Bowdoin cable (spool release), thus releasing the spring link and permitting the release arm spring to move the hinged arm outboard (see Fig. 4). At the inboard end of the inboard spindle a brake drum and brake shoes are fitted (Fig. 3). Both the reel brake and the spool release are controlled by Bowdoin cables actuated from the cockpit by the pilot (Fig. 5). The wind sock is

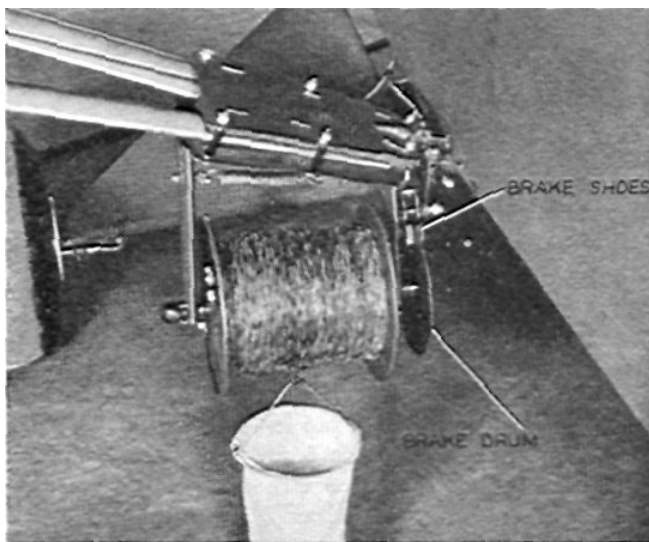


Figure 3—Left rear view

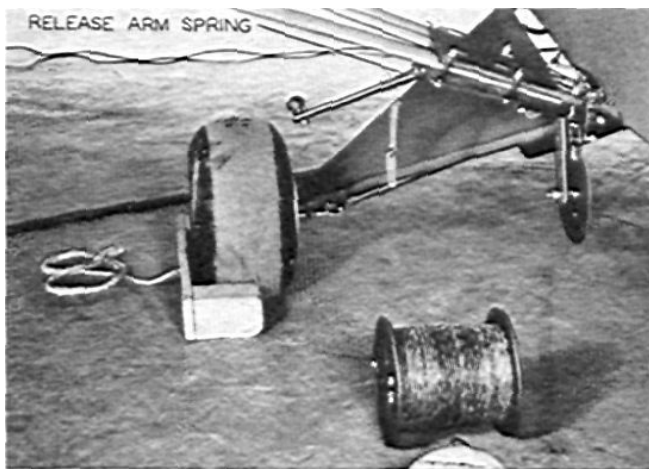


Figure 4

12" in diameter, 32" long, and tapered to 9" at the trailing end.

In operation the standard issue spool DR-8 (containing 1/2 mile of W-130 wire) is inserted in the holder, the free end of the wire is made fast to the wind sock, and the release brake is locked. After the pilot has taken off and gained altitude he flies toward the area or terrain feature which it is desired to bridge with wire, releasing the brake and permitting the wind sock to unreel the wire behind him. As the reel is well below the airplane tail surfaces in flying position, no gyrations of the sock or tendency to interfere with the tail surfaces as it passes them has been noted. Sufficient wire is unreeled to cover the desired distance plus approximately 100 yards on either side.

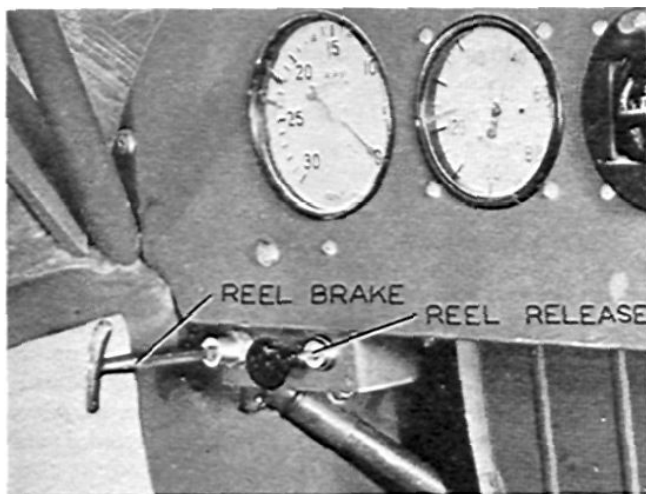


Figure 5

If the feature to be bridged with wire were a river ¼-mile wide the pilot would unreel about 1,800 feet of wire, fly across the river, and (as he reached the farther bank) pull the spool release and drop on the far side the spool with the remaining wire.

While unreeling the wire the pilot flies at sufficient altitude so that the wind sock, whose relative speed is less than that of the airplane, will not drag the ground. At an altitude of 1,200 feet the entire half-mile of wire can be unreeled safely. When the desired amount of wire is unreeled and the brake is set, the sock will not fly more than 300 or 400 feet below the airplane at cruising speed. With shorter lengths of wire than half a mile this drop is materially decreased. The reel brake should again be released just before actuating the spool release to insure immediate dropping of the spool.

Wire may be laid as easily cross-wind as up-wind, and with great accuracy between two points—under cross-wind conditions easily within 40 or 50 yards of the terminal points

selected. It is only necessary that the pilot estimate his drift with reasonable accuracy, start his run at the proper distance up-wind of the initial point, and fly parallel to the desired

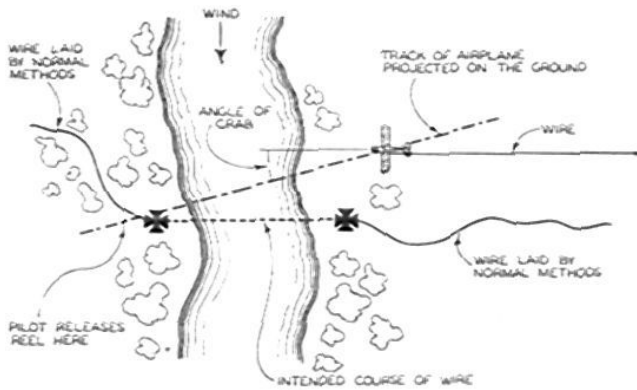


Figure 6

course of the wire when laid (see Fig. 6).

The reel unit as constructed weighs only 9 lbs.; complete with spool, ½-mile of wire, and wind sock it weighs but 17½ lbs. If it is desired to fly two wire laying missions consecutively a similar "right hand" device can be constructed and fitted on the right side of the airplane.

With the wire fully unreeled no noticeable parasite drag results. When released from the airplane the entire length of wire drops almost vertically: it is not dragged through brush or across rocks or projections with resultant damage. The spool is usually dropped from comparatively low altitudes and when dropped on soft ground has in most cases suffered no damage. By unreeling the wire "at leisure" in the air, excessive reel speeds are not built up. While a simple counterweight is bolted to spool flange (see Fig. 2), finely constructed bearings, extremely accurate balancing, and heavy construction are not required. In case of attack by hostile aircraft the pilot can immediately release the spool and have his airplane fully maneuverable.

FDC AND THE ARTILLERY AIR OBSERVER

By Maj. Ivan E. Jackson, FA

The air observer in a Cub plane is a busy man. He must keep himself oriented, read his map, operate his radio, be on the alert for the approach of enemy pursuit planes, and act as artillery observer.

While he is firing a problem he should receive the maximum help from the officer at FDC who is conducting fire. Air observers often observe for battalions other than their own. Battalion FDCs use a variety of procedures, and sometimes poor results are obtained because observer and officer conducting fire do not understand each other. Unnecessary delay sometimes results from this lack of mutual understanding, and the plane stays in the air longer than is necessary.

Experience has shown that observers in Cub planes are usually too far from the target to determine when the adjustment is sufficiently accurate for fire for effect, unless they have gotten a bracket. Experience has also shown that observers often sense exactly what they see without considering previous rounds: one observer, firing on a target on

a reverse slope, sensed his first round in an adjustment 200 short, the next round was sensed 300 over, so the third round landed 100 yards short of the first round. Similar incidents happen daily. The officer conducting fire at FDC can help the observer by keeping the rounds within the bracket. He has a record of all rounds fired and can easily establish a sufficiently small bracket, split it, and go into fire for effect. The observer can continue to call the shots just as he sees them and let the FDC put him on the target.

The following procedure has been used with excellent results. The observer locates his target and designates it to the FDC with which he is working, requesting bracket adjustment or precision adjustment. The nature of the target and the exactness of location will determine the type of fire requested. If the target is a point target such as an enemy gun, and the observer can actually see the gun or the gun pit, he will request precision adjustment.

BRACKET ADJUSTMENT

The method of fire during adjustment is center-right (100-yd. sheaf). The observer sends in his sensing and the officer conducting fire at FDC keeps the record of sensings, gives the observer a bracket, and keeps him within the bracket. When a sufficient bracket is established fire for effect is started, all guns of the battery firing (battalion may be fired if warranted). If during the adjustment the observer is sure that he has sensings that warrant going into fire for effect he may request it. The observer sends in his sensings on fire for effect and requests additional fire for effect or reports mission accomplished.

PRECISION ADJUSTMENT

The observer sends sensings to FDC and the officer conducting fire keeps a record of the sensings and causes the observer to establish a 100-yd. bracket. In one mission the observer sensed the first round 100 right, 200 short. An appropriate deflection shift was made and the range was increased 200 yards. This round was sensed 25 short; the range was increased 100 yards. The third round was sensed 100 over. This established a 100-yard bracket, which was split by the officer at FDC and three rounds were fired. It had not been necessary for the observer to remember previous sensings and he knew that a 100-yard bracket had been split when he received the transmission, "No. 1 on the way. No. 2 on the way. No. 3 on the way. Rounds complete." He then sensed, "Over, Target, Short." Three more rounds were fired at the same elevation and the observer sensed, "Target, Target,

Over," and reported mission accomplished. Three target hits in the first group of six rounds in fire for effect is a rare happening. The results of the problem were confirmed by two additional observers who saw the hits.

Target hits are nearly always obtained in the second and third groups of six rounds. Rounds are fired in groups of three until the observer senses target hits or deflection correct. After each group of six rounds the adjusted elevation is computed at FDC and fire for effect continued until the observer reports mission accomplished. Observers have very little trouble with deflection because they always know the location of the gun firing and the G-T line is easy to pick up. 25 precision adjustments have been fired recently using the above procedure. In the 25 adjustments, 67 target hits have been recorded and numerous rounds have been recorded near enough to have effect on the target.

* * *

Results much less favorable than these are obtained when the guns follow every sensing and the bracket is disregarded. Observers like the above procedure—but whatever the procedure, if the observer and the officer who conducts fire at FDC do not understand each other time is lost and results are affected. In order to assure that missions are accomplished promptly and efficiently more frequent conferences could well be held between the air observer and the officer conducting fire at the battalion FDC. A general conference of air observers and battalion S-3s would be very beneficial if properly conducted.

THE AIR OP IS HERE TO STAY

By Capt. John W. Oswald, FA

ABOUT THE AUTHOR

Capt. John W. Oswald completed the Pilots' Training Course #2 at Fort Sill and came overseas to join his division in the early part of the Tunisian campaign. Since that time he has flown 110 "Fire Missions" Sorties for a total of 171 hours, and has flown a total of 850 hours overseas.

He has done all the things which he tells of in this article. He has dodged enemy ack-ack and been chased by Messerschmitts. He has done an excellent job and come through to fly again, not because of luck but because he has studied and overcome all these problems. Not being satisfied to just know his job, he has had the foresight to learn all he could about the jobs of the people he has to work with—and against.

Maj. R. M. Christie, FA

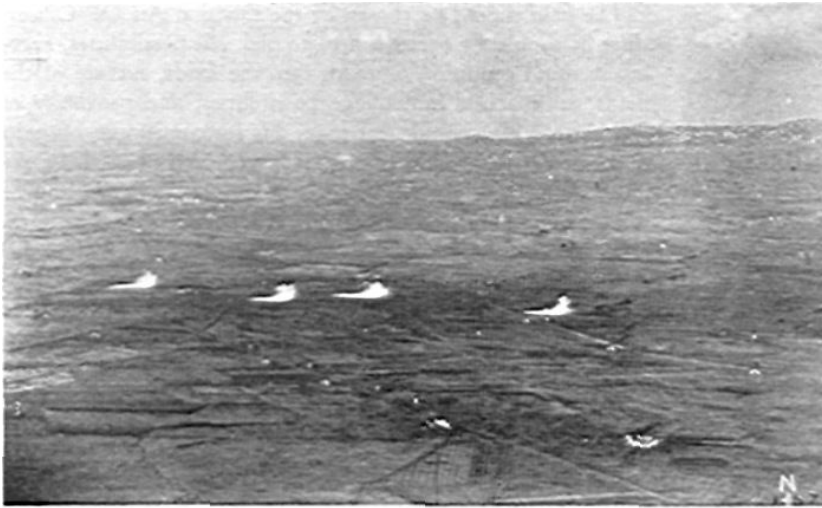
USE OF THE AIR OP

We are humorously called the Division Stukas, the Butterfly Boys, or Winged Mercury, but we think that most artillerymen will agree that the Cub, along with the automobile, is here to stay. Many old artillerymen have on occasion said, "If it weren't for you boys we wouldn't have fired any observed fires today." It is becoming habitual for the battalion to call for the Cub to register the batteries after a displacement.



Observation is quicker and more accurate from a Cub. Any error in deflection or range is more easily corrected. One battalion commander in the division enjoyed shooting from a Cub so much that he fired over forty missions himself in the Tunisian campaign.

The way in which the Air OPs are used has changed considerably in a year and a half of combat operations. Artillery commanders no longer think of Cub observation as a last resort: in the present situation our Air OPs are firing over 50% of all observed missions. The Air OP field is located well forward and used in conjunction with terrestrial OPs. Targets picked up by one means are frequently also picked up by the other and verified. Here, then, is the key for coordination between the two. Let us say that the terrestrial observer is only able to tell approximately where the bothersome enemy battery is located. The Air OP is then called and given certain blocks of coordinates to watch for the enemy activity or gun flashes. The aerial observer can then focus his attention on an area and become thoroughly familiar with it. He may soon be able to pick out things not initially obvious. Changes are easily noted. When observation is hazy, the observer's eyes must be focused generally near to where the flashes may appear to quickly orient the position to the map and take the target under fire.



A perfect sheaf of 155-mm howitzer smoke as seen from 2,000 feet. Rome can be seen indistinctly in the left background.

fired, friendly air bombings observed, and other matters of interest. This information is passed on to the Div Arty S-2.

Finally, the Division Air OP Section should be given missions of a more general nature than those given the battalion air sections. Division pilots should fire corps artillery or heavier guns on targets out of reach of the division artillery.

FUNCTIONS OF THE BATTALION AIR OP SECTION

The functions of the Battalion Air OP Section are generally better understood and do not need lengthy explanations. These sections furnish the men required by the Division Tech. Sgt. for details. Pilots and observers fly the missions required by their battalions, but during their flights Div Arty may call them to request specific observation or missions which require immediate attention. The battalion mechanic can call on the division for help from its mechanics on major overhauls and repairs; the division will also furnish the spare parts and special tools.

THE OBSERVER

In being initiated, a new aerial observer must first become used to flying. If the pilot will fire a few missions with the observer along as a passenger it will help considerably. Some new men lose their sense of direction by a few gentle turns. Generally it takes a half dozen orientation rides before the new observer becomes accustomed to the difference of perspective, relative distance, and the feeling of flight.

An observer should have the following information before leaving the ground:

1. Know the situation thoroughly, including no-fire line, infantry line, and proposed attacks or counterattacks in your sector.
2. Know what you are being sent up to look for, whether it be enemy tanks, enemy batteries, or targets of opportunity.
3. Know the battalion position, its base point, check points, and previous concentrations. Keep yourself up to date on these.

If no targets are picked up, do not come down without offering to register or check-register the batteries.

Be aggressive in your observation. If Fire Direction does not call you for some time, call them and tell them you believe

you'll go up for a look around, everybody agreeable. We can't win the war squatting in the shade under the wing of the plane.

OBSERVER AIDS

After you have picked up a target and called for a fire mission, give coordinates and nature of target. Be as specific as possible. Next request one round of smoke or give a deflection and range change from a previous concentration or check or base point. If your target is in close and little other fire is falling in the area, request HE and save your smoke for distant targets or hazy days.

It should be added here that in firing on soft ground HE is frequently more visible than smoke, since smoke often buries itself. Generally observers will find it difficult to adjust on distant targets with the Tank Destroyers or the Navy: neither has smoke and the bursts of the former are small.

If the initial round lands much over a thousand yards in range or deflection from the target, don't try to sense it—give its approximate coordinates.

When firing on a group of tanks or vehicles use a battery right or left and adjust each gun individually, making precision adjustments on each tank simultaneously. Many times tank tracks are more easy to pick up than are the tanks themselves. After a good rain or snow watch for any sort of tracks: they will be black and very obvious.

After you have adjusted accurately on your target and have fired a couple of zones of HE, try some air bursts. Height of burst is hard to observe from a plane, but it is easy to tell if rounds burst on the ground. If they burst too high there will be no fragment pattern on the ground. If you get one graze and three airs with a fragment pattern on the ground you have about as good effect as you can hope for from Cub observation.

On a close front with plenty of artillery the occasion may arise where all sorts of smoke and HE are falling in the general locality in which you are trying to observe. In such a case it will be wise to call for two rounds of smoke at the same setting or to call for a volley and ask for a "splash" when it is to land.

Aerial photos or mosaics are a great help in picking out and locating targets from the map. These should be used to supplement your 1/50,000 map (which is generally the best scale from which to fire in a Cub)—the 1/50,000s are not always up to date on house locations, roads, or tree lines. Things seen indistinctly far out can be more accurately located by



A ground crew is just finishing a 20-hour check.

referring to a photo. A 1/25,000 mosaic or some wide angle obliques are very good if available.

Generally speaking, the use of field glasses from a Cub is very limited. After picking out a target you may be able to get a little better look at it with glasses, knowing pretty definitely its location. This is good for identifying tanks, in particular. The view that you get, however, will be a shaky one due to plane vibration and movement. Rough air adds to these difficulties.

People connected with the Air OPs talk for and against the merits of the observer riding facing to the rear. Some observers become nauseated when in this position and find orientation more difficult. On the other hand, the observer can observe the approach of enemy aircraft more easily and tinker with the radio if necessary.

It is possible to adjust accurate artillery fire on more than one target at the same time if the targets are in the same general area. The targets cannot be spread too far or sometimes you will be caught observing rounds on one target while rounds are falling at the same time on another target. We have observed fire on as many as three targets at a time successfully. This should not be thought of as an impractical stunt. Many times during enemy attacks the Air OPs pick up more targets than they can fire on in one flight if undertaken one at a time.

After an accurate adjustment is made on an enemy position and fire for effect is completed, a wait of a half-hour will allow the enemy to crawl out of his hole. In the meantime the Cub can adjust on other targets. Then with adjusted data the first target may again be taken under fire, with perhaps the battalion or the division firing.

If a target is picked up which is out of reach of any of the battalions in the division artillery, call the Div Arty S-3 either through the Air OP ground set or by getting the Div Arty channel. The S-3 will then contact the heavier caliber guns for you and make arrangements for them to call you on a common channel. This latter channel may be a common Corps or Army channel. By working through battalion or division artillery S-



Oblique observer's views from a Cub, taken from about 2,000' with a 14" lens. This type of photo reads well under a magnifying glass.

3s, the Air OPs have fired British 25-pounders, M-10 tank destroyers, M-4 tanks, M-8 assault guns, 75-mm pack howitzers, 105-mm howitzers, U. S. and British cruisers and destroyers, 155-mm guns and howitzers, and 8" howitzers by radio-phone relay. (Our own division artillery is equipped with the M-7 105-mm howitzer.)

NIGHT FLYING

Ever since the Air OPs were introduced there has been experimentation on flying and firing at night. It can be done successfully under certain special conditions. In order to observe at night the pilot must fly as close as possible over the target area, but this requires flying high enough to stay out of MG and small arms fire. The terrain must have points of reference or "fixes" easily identified from the air (i.e., prominent road junctions, railroads, towns, rivers, etc.). Terrain features prominent in the day become indistinct at night. Having the moon behind the observer helps considerably by reflections on such light objects as houses, roads, water masses, etc. A round of smoke on a previously fired concentration in the vicinity helps a great deal. Sensings frequently are more easily started from a previous concentration than from a set of coordinates indistinctly picked up. An aerial photo will help, as it shows the woods, roads, tree lines, and houses in their proper relative locations.

The following conditions must be satisfied before night flights will be successful:

1. There must be a bright moonlight with little ground haze.
2. The field flown from must be 100% longer than is necessary for daytime flights, and must be more smooth and have no high barriers or dangerous obstructions on the approaches into it.
3. The target area must be such that there are frequent points of reference on the ground easily picked up from the air by which the pilot and observer can orient themselves and their targets to the map or photo.
4. Night flights should not be attempted when there is much wind. Drift on landings cannot be easily judged and corrected.

Air OP pilots should be instructed in night flying. Those who know how to fly safely at night have learned by experimenting while in rear areas. Air OP pilots should



A low-angle oblique of a blown bridge taken from 1,000 ft. This photo was one of many requested by the division engineers; they want to know not only IF a bridge is blown but HOW it is blown. Note reflections from water in innumerable shell holes.

not fly night missions in combat until they have tried it back of the combat zone.

THE PILOT

The altitude at which the pilot flies is determined by a number of things. First it is fixed by haze. When flying low, you may be trying to observe through a layer of haze a number of miles deep while if you were to fly higher you could perhaps see easily through some 400 feet of vertical thickness. Many times ground observers find it impossible to observe to any great depth while the Air OP has perfect visibility from a 2,000-foot altitude. This is not only true of haze but also of drizzle, rain, and snow flurries. In mountainous country, early in the mornings ground fog frequently lies in patches on the floor of the valley. This again may make terrestrial observation impossible. Do not suppose that because your battalion or Div Arty positions are fogged in that no one else can observe. Give the Air OPs a try.

Second, the altitude at which the pilot chooses to fly is determined, of course, by enemy air activity or ground fire. One area or sector may continually have a great deal of enemy air activity. In such a place it is naturally discreet to fly as low as possible and still perform your mission. In another sector the enemy may be touchy with small arms fire or air bursts. A favorite trick in the latter case is for the 88s to be registered on a crossroad or prominent group of buildings. Then when the Cub flies over this point the enemy fires a group of air bursts above the check point. The best way to combat this is to be always gradually changing direction and altitude. Ease the throttle back a little and lose a thousand feet or so in a half dozen pattern turns. Then push the throttle forward for awhile and gradually pick up a couple thousand feet. The best way to avoid small arms fire is to take a look at the Division Air Section operations map before taking off. Know where the main line of resistance is, and if you are flying low stay behind it; if the mission should require crossing it, fly high.

We find from dry run attacks by friendly fighter planes and by actual attacks by enemy aircraft that the poorer flyer is the best flyer in evasive maneuvers. The enemy pilot expects a coordinated turn and anticipates a conjunction of his cone of fire and your seemingly intended flight plan. Start your turns normal, then slip or skid them. If there is a cloud cover below four or five thousand feet, a good trick is to cruise some 500 feet below it. When your air warning system calls in a "red alert" climb up and hide in the clouds: the enemy can't shoot you if he can't see you. The enemy considers the Cub dangerous enough to cause him to dispatch his fighter planes specifically at them. In special situations the Jerry directs these pilots to the bothersome Cub by ground radio stations on the side of some prominent mountain. Coming at a time when the enemy needs his fighters so much in so many other places, it is indeed a left-handed compliment to us.

The pilot should make the flight pattern as long as practical in order that less time is spent in turns, more time can be spent searching for new targets. To meet the threat of enemy fighter planes the Air OPs have need of a good air-ground warning system. Battery FOs should keep alert for low-flying aircraft.

* * *

In putting an end to this dissertation, let me say that the more you as an observer can do to make fire missions seem alive and interesting to the men who load or direct the guns, the harder they'll try to give you what you want. Let them know about vehicles knocked out or burning. Let them know if ammunition or gasoline explodes, or if Jerries scurry in all directions out of a house or off the road that you are shelling. Let them know that they're getting a crack at the devils who shelled them some fifteen minutes ago. If they feel they're doing their part to win the war it'll put iron in their backs and red fighting blood in their muscles.

TO ALL UNITS

Right now it is impossible for security reasons to publish too many details of unit experiences, and unit histories. Time will correct this situation, of course—and it probably will not be very long before such narratives can begin to see the light of day.

Your *Journal* is extremely anxious to capture the vast amount of field artillery battle experience while it is still fresh in the minds of participants. What we want is just straight narrative, mentioning people, units, dates, places. Professional lessons can be left for inference from the *facts* as presented.

Articles of this sort should contain what the *veteran* wants to read—straight accounts of himself,

his unit, his buddies—who they are, where they went, what they did, how they went about it, what they accomplished. In the years to come this material will be invaluable. Let's start the ball rolling now while things are still happening.

Such articles can very appropriately be sent through official channels, to us in care of Requirements Section, Headquarters, Army Ground Forces, Washington 25, D. C. Needless to say, they will be carefully safeguarded so they will be available when publication is possible. And of course all prescribed clearances will precede publication.

Will you help by sending detailed accounts of *your unit*?

OBSERVATION IN SUPPORT OF ARMOR

By Maj. Sydney S. Combs, FA

The observer has, in general, the same problems and the same missions in the support of armor that he has when supporting infantry. His most obvious mission is to keep fire in front of the attacking elements wherever they may go, wherever they may need it. Here are a few small points which may help him when he starts to work with tanks.

1. An observer should have a knowledge of tank tactics and an understanding of such terms as "the base of fire, supporting the maneuvering force." He should understand the meaning of the tanks overwatching the infantry, the infantry overwatching the tanks, and the artillery overwatching both tanks and infantry.

2. The observer's preparation for the support of the tank attack must be very complete, for the only time he has to think and to act conservatively and deliberately is during the preparation phases, in which he plans out and maps out the whole plan of his action and the plan of the support. By being in a position where he can reconnoiter the terrain and talk with the tankers as they prepare their scheme of maneuver, he can foresee all eventualities and take steps to be ready for a counterattack there, an antitank gun there, an infantry line here, and other such items—any one of which may be so important as to govern the success of the attack. The exploitation of all commanding ground and the immediate adjustment of carefully placed concentrations are vital. These concentrations can be called for by any platoon or company commander at a moment's notice, for the observer tells every one of them the position and number of these concentrations.

3. Communication is a very important item. It should be exploited to the fullest. Every tank in the attacking force has a radio that can reach the company commander and be relayed to the battalion commander. Hence, the observer can have targets pointed out to him by any tank in the whole force. He can also monitor their nets and understand their proposed movements and actions. Every tank commander should know how to adjust fire and aid the observer in every way possible in the application of artillery. Duplication and triplication of communication is to be sought; if the observer's tank is knocked out he must be ready to continue his mission through other alternate communication sources. Remember, the armored observer has 10 channels for his radio set—one for each battery, one for fire direction, one for each tank company in the battalion, and one for each infantry company.

4. Prearranged fires, to neutralize possible enemy at positions, are prepared by the observer. A full utilization of smoke, being careful of its limitations, is one of his primary considerations. The observer must remember that the tank carries a direct fire gun which can immediately neutralize (if not destroy) any target which presents itself, but the tank killers are targets which do not obviously present themselves for they withhold their fire until dead kills are assured. Hence, the observer must not become engrossed in the fire fight, but must keep his fires on the flanks and on spots which could not be reached by the tanks' direct fire guns. The umbrella of time fire must be adjusted on the objective in order to neutralize the enemy when fighting becomes "close in."

5. An arrangement must be reached between the observer and the supported element so that he will support them with fire while they are moving, then when they come to a place

where they can support themselves by direct fire they may wait until the observer has adjusted his fires in preparation for continued action. The tank is most vulnerable when it is moving: at that time it is very difficult to see from it and pick up targets of opportunity. This problem of visibility and vision must be remembered by all observers. As one cannot see well from a tank that is buttoned up, often it behooves observers to leave heads sticking out so they can see what is going on.

6. When tanks have reached their objective it is most important that the observer be among the first there, so that he can adjust protective barrages and insure the security of their reorganization positions. It is often necessary for the tank commander to assign a security platoon to the observer to insure that he reaches the objective for this most important phase.

7. The speed of application of mass fire is a very important item in tank warfare, as an enemy tank attack will lose its effect if mass fire gets it before it closes with our forces. Since the tank commanders are busily engaged in conducting their attacks it is very difficult for higher headquarters to know what is going on and make plans accordingly. Hence, the report of the progress of the battle from the observer is most essential so that every eventuality can be counteracted.

8. Observers should always stay out of the fire fight, and preferably remain on the windward side of the attack so that the explosions, confusion, and smoke do not cloud their vision.

9. It is absolutely essential that observers be able to identify enemy vehicles and not confuse them with our own. Identification of enemy antitank guns, even though only a small portion may be visible, is also very important.

10. The observer should be out in front of his tank during the initial phases of the battle—the preparation and jump-off. Thus he can see the progress of the attack and make all his plans. When outside the tank you can hear the report of an AT gun and get your eyes in its general direction, in readiness to pick up the flash of subsequent rounds. You should contact all foot troops in the vicinity and arrange for mutual identification of enemy "armor crackers." Remember that our doughboy with his rifle can neutralize a close-in antitank gun just as well as you can with a 105 howitzer. He can show its position by using a tracer bullet. A method which I used to locate enemy antitank guns was to crawl up to a knocked-out tank and sight back through the hole the gun made. It is very difficult to spot an antitank gun simply by looking for the flash. Another little trick of the trade is to use a spare tank periscope to see out of the slit trench or foxhole when the bullets are flying fast.

11. Prepare maps or sketches with all concentrations clearly shown and distribute these to all tank platoon and company commanders so they can call for fires in an emergency. Navigation and map reading must be second nature, as it is very easy to become lost in armored action.

12. The marking of phase lines, boundaries, and time intervals may allow the observer to help control the direction and progress of an attack. As navigation is very difficult in a tank, it would aid greatly to have prominent index points marked with smoke from time to time.

13. The only way you can correctly support tanks is to explain to the tanker that no one element can win the battle alone—success can only be accomplished by cooperation. In other words, the tanker should not do a thing without the artillery's helping him. The observer must also remember that he can identify a spot target to a tanker and often have it knocked out in two seconds with a single shot.

14. In the 1st Armd Div we were very lucky to have dances and parties. Tankers and doughboys came to the artillery festivities, and vice versa. We artillerymen would go down and eat chow with the doughboys and tankers. The friendship built up between our people proved a wonderful adjunct in combat

because when Jim, Johnny, Tex, Ham, Ben, Popsy, or Red jumped off, there wasn't a man in the artillery that wasn't really behind him all the way. Our forward observers—led by the example of the artillery battalion commanders, who were usually with the reconnaissance elements—helped their chief control the "bang" or forward end of the artillery trajectory, while the executive stayed back to control its "boom" or starting end.

* * * *

Never let the tanks attack without all the artillery within range helping them. No gun should remain silent expecting a target to present itself.

USE OF RANGE DRUMS IN MEDIUM TANKS

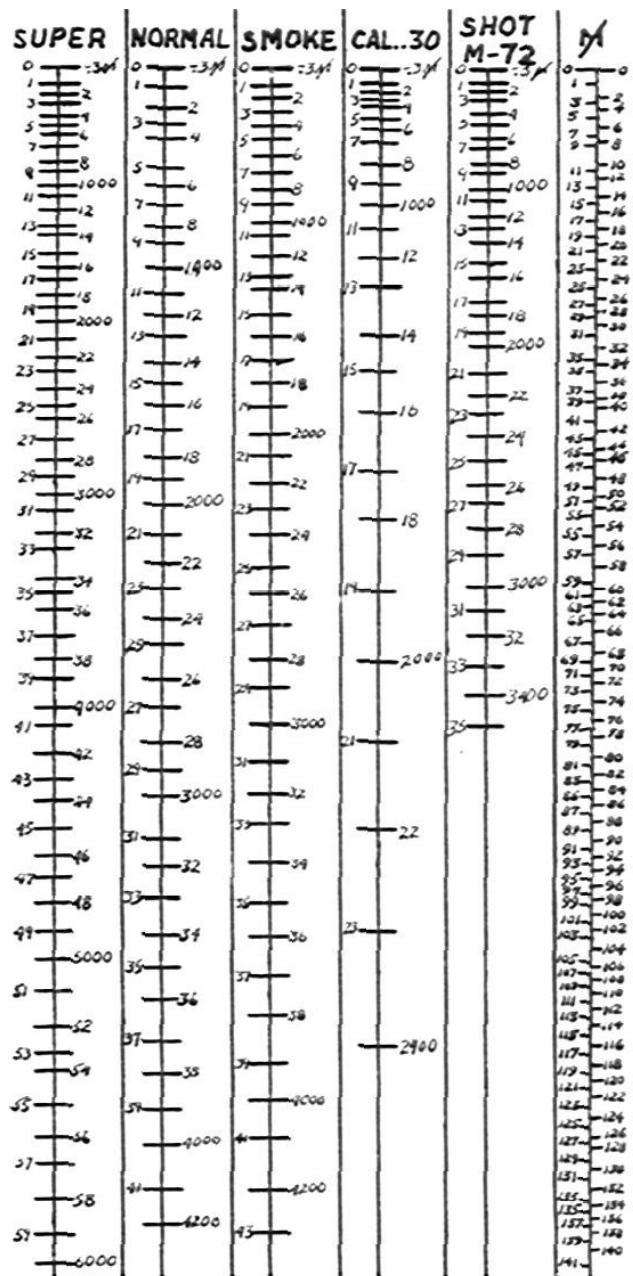
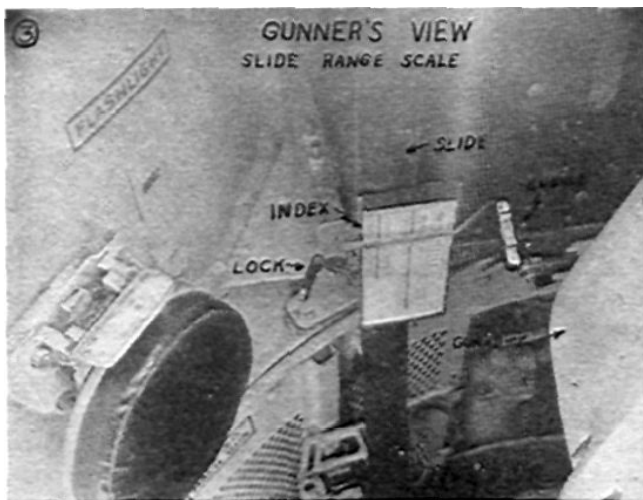
By Maj. E. D. Lucas

The accompanying range card shows the locations for any range of the pointer on the rear of the recoil guard. These ranges were initially set by actually using a quadrant and a range book. Orient the range card by putting zero range (quadrant —.3) opposite the pointer, when the bubble is level. Once a target is registered, any other type of ammunition can be placed on the same target by reading in the new range column the range found from the first ammunition, opposite the pointer. Thus your conversion between ammunition is quickly and accurately done.

In case of great changes in the angle of site, considerable error in range will result if this is not added or subtracted before placing zero on the card opposite the pointer. This may be done by leveling the bubble, going down or up on the graduated handwheel the mils equal to the estimated angle of site, and then orienting card and adding the range.

The gunner need not look through his periscope while firing by the above method. The tank commander gives the order for the proper amount of deflection and corrects the range by giving the command in yards. While bracketing, the tank commander should give the new range rather than saying down or up so many mils or yards.

Deflection is accurately obtained by putting a sight vane on the turret, which is sighted in the vertical axis of the tube on a distant aiming point. The tank commander can then correctly lay the gun for deflection for the first shot.



This method of firing is excellent for all type targets except moving targets and those that can be clearly seen at short ranges. Fine results can be obtained even at ranges in the neighborhood of 6,000 yards.

A small hole should be cut in the canvas breech cover for the pointer to pass through when gun is not used.

The attachment cannot stand much abuse and because of its efficiency it is due a certain amount of care and respect.

Are You Getting Full Elevation on Your 3" Gun?

REPUBLICATED BY COURTESY OF "ARMY MOTORS"

Gunners in the M10 and M10A1 gun motor carriages who've been cussin' every time the breech block on the 3" gun hits the interphone terminal box (see Fig. 1), can shift their cud and come up for air. If your vehicle has the interphone box mounted on a bracket about 16" above the floor on the front side of the center floor receptable housing, here's how to shove the schnozzle of that gun up past the 20° elevation you've been getting. And you don't need new parts or tools.

First, open both battery switches. Then remove the screws holding the interphone box cover. Those three screws holding the box to the bracket also have to come out. Give with the gentle touch so you won't bend or damage the contact prongs. Take out the two 5/16" capscraws holding the bracket to the floor-receptable housing and remove the bracket.

Everything under control? Now cut 5½" off the bottom of the bracket and drill one 11/32" hole (see Fig. 2). Drill and tap a new hole in the floor-receptable housing 3¾" above the lower one. Put the interphone box back on the bracket (using the original screws) and replace the terminal-box cover. Remove the upper wire clip from the cable and bolt the bracket to the housing with the original screws and using only the lower clip. Push the excess phone cable down through the hole in the floor and leave slack (see Fig. 3).

All right, gentlemen, the sky's the limit.

Lower the M10 and M10A1 interphone box—and cut down the interference

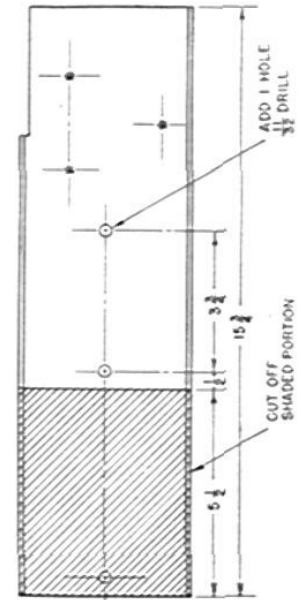


Figure 2 — Now's your chance to cut off the offending part of the bracket (shaded).

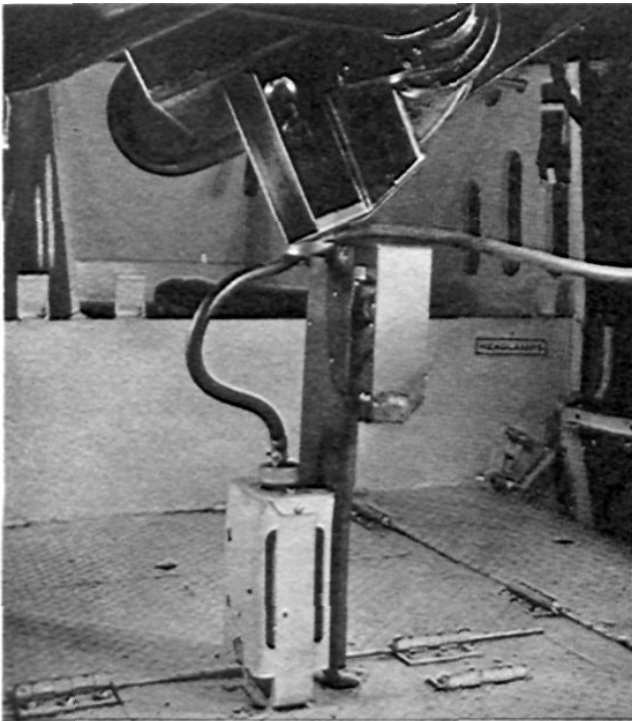


Figure 1—Here's how it looks if the interphone box is on a bracket 16" from the floor, making you gnash your teeth when you throw open the breech block anywhere above 20° elevation.

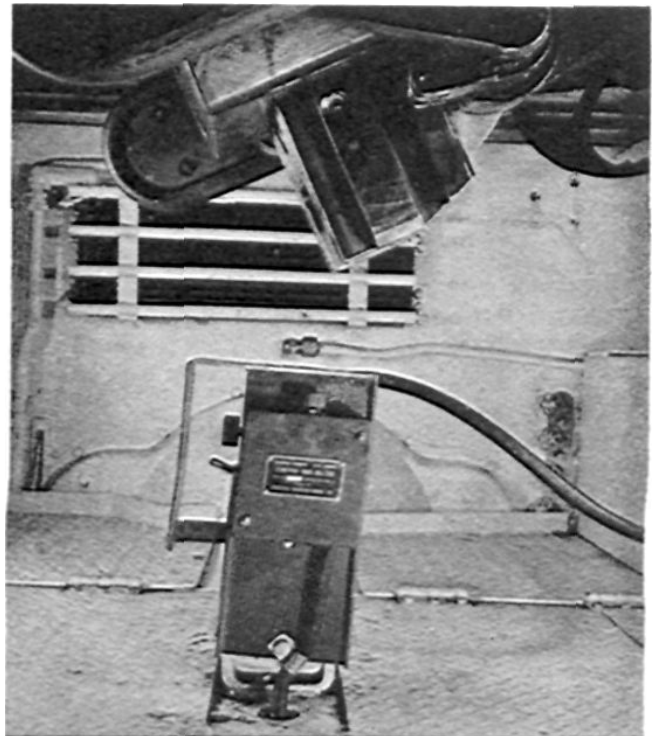


Figure 3—Here she is—ready and waiting for you to grind her up to top elevation.

NEW ANGLES ON DETERMINATION OF DIRECTION

By Lt. William S. Livingston, FA

During maneuvers our battalion survey section was able to develop a method of determining direction under peculiar circumstances. The method is not exclusively our own brainchild, but was assembled by various personnel in division artillery.

The "peculiar circumstances" themselves are these: we were able to occupy a station for which we had control data, as far as location and altitude were concerned, tied in accurately to the division or corps grid. But the absence of another control point visible from the occupied one precluded the direct establishment of a line of direction. Hence we had to seek out another point in the vicinity to which control had been carried and determine our direction from these two points even though they were not intervisible.

Our division artillery survey section was in the habit of carrying corps control along the principal road nets of the area which our battalions were to occupy, leaving control stations at convenient points along the way. For many reasons some of these control points would frequently be obliterated and the data supplied by them lost. Also, upon occasion, the courses of separate traverses by corps or division artillery would come fairly close together, leaving two control points in the same vicinity but not useable for establishing direction because they were not quite visible from each other. Again, in one instance two well defined points in the target area (neither of which could, of course, be occupied) were visible from a station convenient to our new position area. This occurred during a rearward displacement and control had already been obtained for these two points while occupying the forward area. The new method was very readily applicable to this situation and proved a most handy implement in tying into the corps grid.

Briefly, then, the situation is this: one point whose coordinates and altitude are known can be occupied¹ but no line of direction is available. Another point whose coordinates are known is available, but cannot be seen from the first point.

IF A THIRD POINT CAN BE OCCUPIED FROM WHICH BOTH POINTS ARE VISIBLE (FIG. 1)

Set up the instrument on the third point (A). By stadia, taping, or other means, determine the distance AX or AY (one but not both of these distances must be measured). Measure the angle (1). Since the coordinates of both X and Y are known, both the azimuth (by the tangent function) and the length (by the sine function, having determined the azimuth, or by the Pythagorean Theorem) of the line XY can be computed. Now by using the law of sines, angle (2) can be determined, for

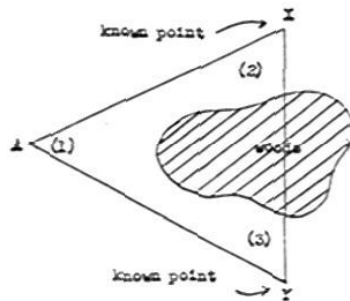


Figure 1

¹It will be seen, as the discussion progresses, that neither station need actually be occupied, provided that the distance to one of them can be short based

$$\frac{\sin \text{angle (2)}}{AY} = \frac{\sin \text{angle (1)}}{XY}$$

Finally, by applying angle (2) to the computed azimuth of the line XY, the azimuth of the line AX is determined.

If point X can be occupied, sufficient information has now been obtained. The line XA can be used as an origin for direction and point X as the initial point in the survey. If, however, neither X nor Y can be occupied, then the coordinates of A must be computed. This is most easily done as follows: angle (3) is found by subtracting the sum of angle (1) and angle (2) from 3200. Apply angle (3) to the computed azimuth of the line XY, and the azimuth of AY is known. The distance AY has already been determined by short base. Using this azimuth and this distance, the coordinates of A can readily be computed. Point A now can be used as initial point, and the line AY (visible on the ground) can be used as a line of origin for direction in the survey.

It is important to note that this method can be utilized *when neither X nor Y can be occupied*, providing only that a suitable base can be located for short base computation of the length of one side of the triangle. This is particularly adaptable to a situation in which in the target area two points can be seen whose coordinates are known.

Assume, for example, the following situation. From higher headquarters survey control has been secured for two points, one or both of which are in the target area and neither of which is suitable as a base point for the battalion (the base point is, of course, the primary objective of the target area group). Let C and D represent these two points in Fig. 2.

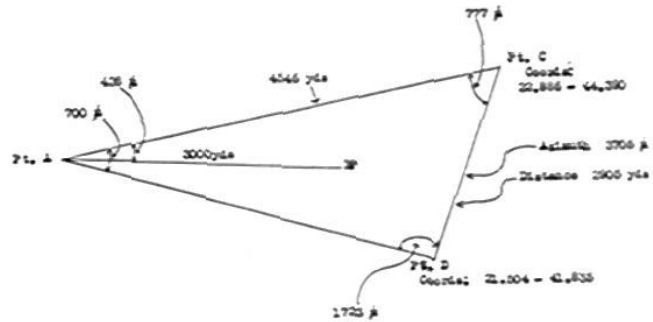


Figure 2

Azimuth and length of the line CD are computed as follows:

Coordinates C = 22.886 — 44.390
Coordinates D = 21.504 — 41.835

1.382 2.555

AZIMUTH

DISTANCE

$$\tan \text{azimuth} = \frac{dx}{dy}$$

$$\text{distance} = \frac{dx}{\sin 3705}$$

$$\log dx = 3.14051$$

$$\log dy = 3.40739$$

$$\log dx = 3.14051$$

$$\log \sin 3705 = 9.67735$$

$$\log \tan \text{azimuth} = 9.73312$$

$$\text{azimuth} = 3705 \text{ mils}$$

$$\log \text{distance} = 3.46316$$

$$\text{distance} = 2905 \text{ yards}$$

The angle at Pt. A is measure and found to be 700^m. The distance AC is determined by short base methods to be 4546 yards. The angle D is then computed from this information:

$$\frac{\sin \text{angle D}}{4546} = \frac{\sin 700 \text{ m}}{2905}$$

$$\log \sin 700 = 9.80236$$

$$\log 4546 = 3.65763$$

$$\log 2905 = 3.45999$$

$$= 3.46315$$

$$\log \sin \text{angle D} = 9.99684$$

$$\text{angle D} = 1723^{\text{m}}$$

Since we now know angles A and D, angle C can easily be found to be 777^m. By applying this angle to the computed azimuth of the line CD, we find the azimuth of the line AC to be 1282^m. Thus, by knowing the azimuth and distance of the line AC, we compute the coordinates of Pt. A from those of Pt. C to be 18.560 — 42.994.

Now, by measuring the angle C-A-Base Point and adding it to the azimuth of AC, we find the azimuth of the line A-BP to be 1710^m. Next the range from A to the Base Point is short-based and the coordinates of the base point computed by regular sine and cosine procedure. If this distance is assumed to be 300 yards, the coordinates are 21.542 — 42.671.

IF NO THIRD POINT CAN BE FOUND FROM WHICH THE TWO KNOWN POINTS CAN BE SEEN (FIG. 3)

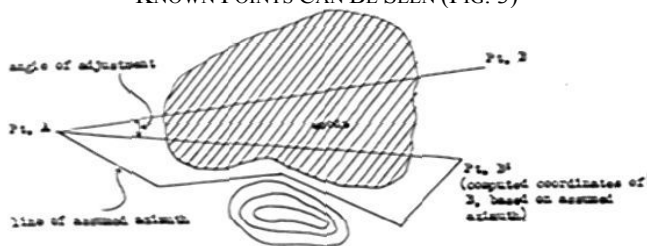


Figure 3

Here the solution is a little more difficult. Start at one known point (A) and run a traverse to the other known point (B), carrying both distance and direction. Assign an arbitrary azimuth to the first leg and compute the traverse, determining the coordinates of Point B, based upon this assumed azimuth. Naturally, due to the false azimuth of the traverse, the coordinates of the computed point B will be different from those of the true point B whose coordinates are known; this computed point B will be called B'. Now compute the azimuths of the lines AB and AB', as in the first solution (above). These two lines form a hypothetical angle at point A and this angle can be determined by a comparison of the azimuths. Now by adjusting the assumed azimuth of the first leg of the traverse by the amount of this angle, we can determine the actual azimuth of this line which is materialized on the ground. If the azimuth of AB is greater than that of AB', add the angle to the assumed azimuth; if it is less than that of AB', subtract the angle from the assumed azimuth. As in the first solution, *neither A nor B need actually be occupied*, providing that the first and last legs of the

traverse can be determined from short base triangulation, and this method also may be used for two points in the target area.

Assume, for example, the following traverse between points A and B (in Fig. 4), assigning an azimuth of 1800^m for the first leg of the traverse. The computation of the coordinates of B', based

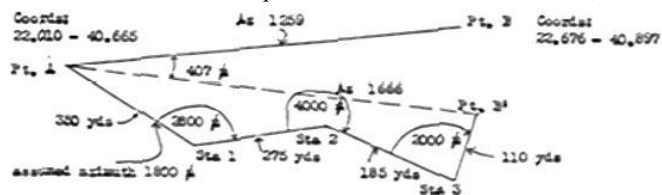


Figure 4

upon this azimuth, is shown below. The azimuth of AB is found to be 1259^m and that of AB' to be 1666^m, both being determined by the tangent function from the known and computed coordinates. Thus the angle formed by these two lines is seen to be 407^m and, since the azimuth of AB is less than that of AB', the angle is subtracted from the original assumed azimuth and a line of known direction with an azimuth of 1393 mils is materialized on the ground. Again, as above, if A cannot be occupied, the coordinates of station (1) on the traverse are computed and this point used as a point of origin for the survey.

COORDINATES OF POINT B'

Leg	Distance	Angle	Azimuth	dx		dy	
				+	-	+	-
A-1	350	—	1800	343	—	68	—
1-2	275	2800	1400	270	—	54	—
2-3	185	4000	2200	154	—	103	—
3-B'	110	2000	1000	91	—	61	—
				+858	+115	-171	—
						+115	—
							-56

$$\text{Coordinates Pt. A } 22.010 \text{ — } 40.665$$

$$+ 858 \quad \text{— } 56$$

$$\text{Coordinates Pt. B' } 22.868 \text{ — } 40.609$$

$$\text{AZIMUTH AB'}$$

$$\text{Coordinates Pt. B' } = 22.868 \text{ — } 40.609$$

$$\text{Coordinates Pt. A } = 22.010 \text{ — } 40.665$$

$$\log 56 = 1.74819$$

$$\log 858 = 2.93349$$

$$\log \tan \text{ Azmth } = 8.81470$$

$$\text{Azimuth } = 1666 \text{ mils}$$

AZIMUTH AB

$$\text{Coordinates Pt. B } = 22.676 \text{ — } 40.897$$

$$\text{Coordinates Pt. A } = 22.010 \text{ — } 40.665$$

$$\log 666 = 2.82347$$

$$\log 232 = 2.36549$$

$$\log \tan \text{ Azmth } = .45798$$

$$\text{Azimuth } = 1259 \text{ mils}$$

$$\text{Azimuth AB' } = 1666$$

$$\text{Azimuth AB } = 1259$$

$$\text{angle of adjustment } = 407$$

$$\text{assumed azimuth } = 1800$$

$$\text{angle of adjustment } = 407$$

$$\text{true azimuth of first leg } = 1393 \text{ mils}$$

²Note that this angle at D can be either 1723 mils or 1477 mils (3200-1723). Since the origin of the survey will be at point A it is essential that the angle at D be the correct one or both the coordinates of point A and the azimuth of the line AC will be in error. The correct angle at D can be determined by obtaining the distance AD in addition to the distance AC. Knowing the length of AC and AD and the angle at point A, the correct angle at D can be determined by using either the law of sines or the law of tangents.—Ed.

A CP Table for DivArty Operations Section

By Lt. Col. R. B. Shreve, FA

Fire missions and reports of targets taken under fire coming in to the DivArty S-3 from the battalions always contain intelligence information. Likewise, most intelligence reports to the S-2 (on enemy dispositions, enemy artillery fire, etc.) contain information of interest to the S-3 as possible targets. The advantage of having the S-2 and S-3 work side by side and practically interchangeably is obvious. In addition, when working thus, either one is able to cover both jobs, furnishing much-needed relief in a prolonged operation and providing for those inevitable occasions when one of the two must be absent from the command post.

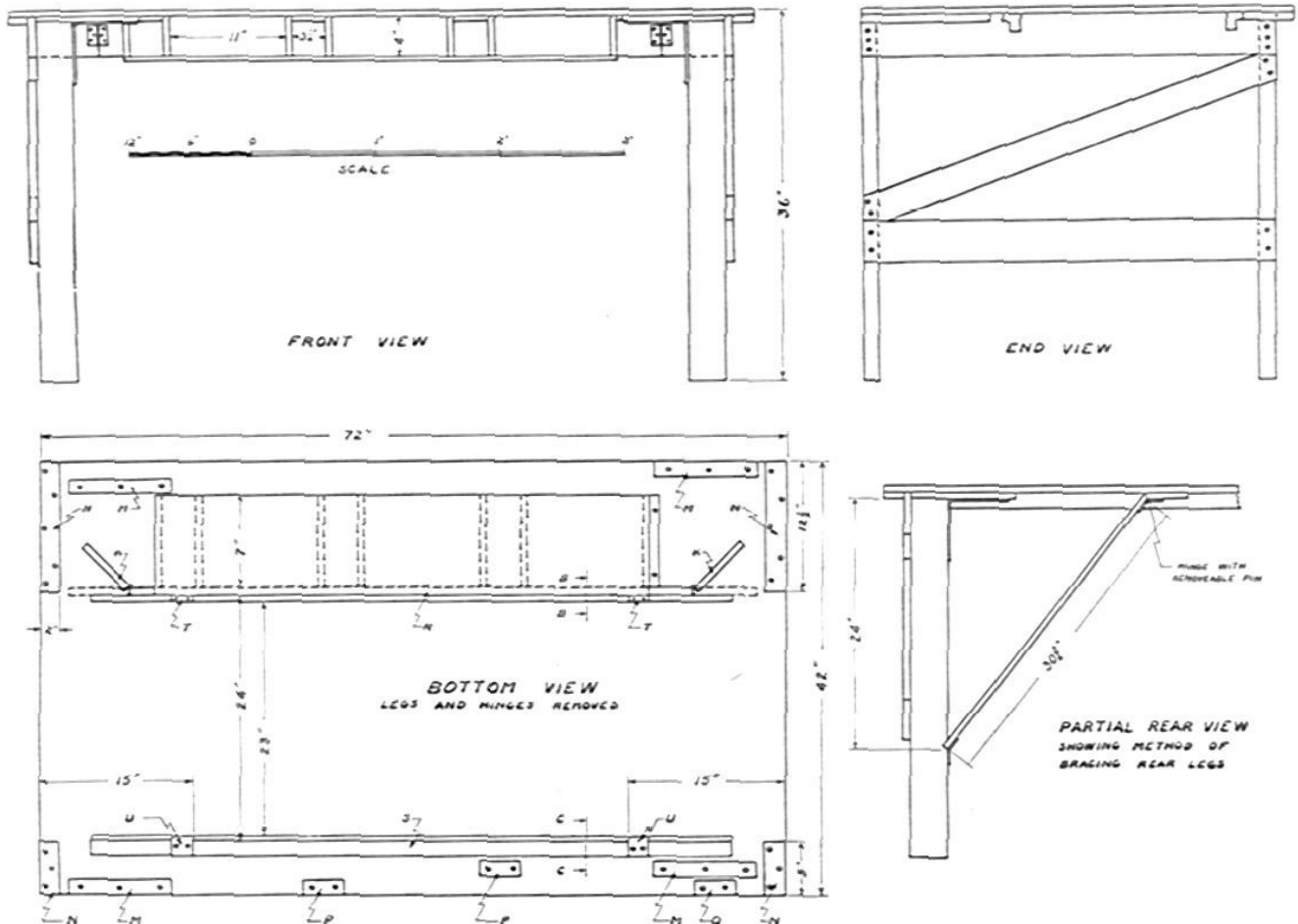
To permit the S-2 and S-3 to work side by side with their respective situation maps, and to provide a convenient location for their telephones, the CP table shown in the accompanying drawings has been constructed and is in use by one DivArty headquarters. It is designed from suggestions made by the S-2 and S-3 of a Division Artillery which took part in the African and Sicilian campaigns. The writer's thanks are hereby tendered to those officers, who must of necessity remain anonymous.

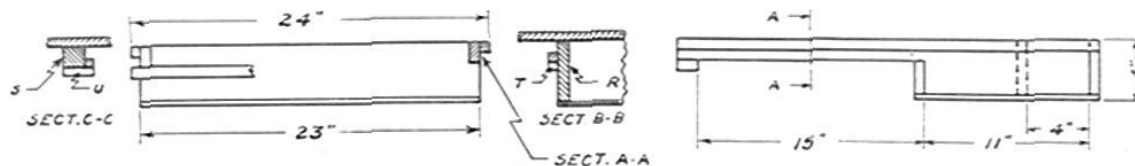
Certain special features of the table are worthy of comment. Folded, it makes a unit 6' x 3' 6" and about 6" thick. Set up it is stable and rugged, and offers space for both S-2 and S-3 to

work on their maps and charts. S-2 works on the left, and has on his map the situation, with separate overlays showing observation possibilities of all artillery OPs, location of and information on all known mine fields, and a cumulative record of all enemy artillery activity. These three overlays are kept separate from the situation overlay, as the information they contain changes less frequently; they are rolled back off the chart until needed. Alongside S-2, on the right, S-3 keeps his situation map, with separate overlays showing fire possibilities of the division artillery, corps artillery, and artillery with adjacent divisions. Thus he can tell at a glance what fire can be brought on any target, and on whom to call for additional fire when needed.

Telephones are in three convenient compartments under the front edge of the table. The left compartment holds the S-2 phone, and the right the S-3 phone. In the center is a direct line to the division G-2—G-3 section. An additional phone for fire direction lines stands in the drawer at the right end of the table.

The drawers, which are held open when the legs are extended, provide a convenient place for the pencils, plotting equipment, message books, cigarettes, and all other little impedimenta which are wanted ready at hand but which clutter





Details of drawers, with section views of ribs to stiffen table top, showing slides and stops for drawers.

up the table if left lying around where they can get in the way.

When the table is in use the table cover serves as two map boards. Standing on their own legs, they furnish a convenient means of mounting small-scale maps on which are kept the general situation, location of ASPs, and other data not easily recorded on the local large-scale situation map. When moving, they can be replaced on the table with all maps, overlays, etc., still in place, and the precious charts become the filling in a plywood sandwich, protected from weather and damage and ready for use as soon as the CP is again set up. They are held in place by four bolts, one through the end of each leg and passing through the other board and the table itself.

The table is easily made by a good battery carpenter—the only item hard to obtain is the plywood top. This, and the accompanying map boards, require two sheets of 1/2" plywood, 3 1/2' x 6'. Two sheets 4' x 6' will leave enough extra for the miscellaneous small pieces used in the construction.

To give it stiffness, the plywood table top is reinforced by two ribs, R and S in the drawing. They also serve as a mounting for the rails on which the drawers slide. R serves also as the back of the telephone compartments, and its two end sections, lettered K, hinged, help to brace the legs by locking out against the crosspiece which connects the top of each pair. They are folded back when the legs are to be folded. These reinforcing strips R and S are glued to the table top, and also held in place by screws through the table top—the only screws which show on the surface.

The blocks marked M are an extra thickness of plywood, glued and screwed to the top to provide a firm base for the hinges, which must be strong and well-mounted. All these plywood blocks are screwed to the table and glued with waterproof casein glue. The blocks marked N are of the same material; they reinforce the corners of the table, and also help hold it steady when set up, the crosspiece on the top of the legs bearing against their inner surface.

The blocks marked P are part of the bracing for the rear legs, which gives the table its steadiness. Note that the brace (which is more of the plywood) is inset at the lower end into a notch in the leg, and hinged. The upper end seats against the

block P, and when the table is up is held by a hinge with a removable pin. When the legs are folded the braces project beyond the lower end of the legs, flat against the table top. A duplicate of the block P is mounted at Q, with half a hinge to fit the one on the end of the brace; this proved necessary to keep the brace from slipping out beyond the side of the table and getting broken while the table is in transit. (This is due to play in the lower hinge, and a better hinge might make it unnecessary.) The blocks T and U are on the lower surface of the rails on which the drawers ride. They engage the crosspiece on the rear of the drawer side extensions, and keep the drawers from being pulled out too far. Experience in setting the table up in blackout shows that if the drawers slide too far they are easily broken, even by a careful CP crew! The section views shown in the drawing of the drawer will help to convey the idea of the mounting.

As for dimensions, every man to his own taste. Our table has a top 6' x 3' 6", and is 36" off the ground. We like it, but both our S-2 and S-3 are six-footers; it would be pretty high for a shorter man. One caution: don't make a low table and try to work sitting down—you can not reach the back of the chart, and you'll never have time to sit down while you're working, anyway. The drawings show the other dimensions where they are critical to permit parts to fit together, or to permit mounting phones, etc. The rest of the dimensions depend on the materials available.

The telephone compartments are designed to take a standard

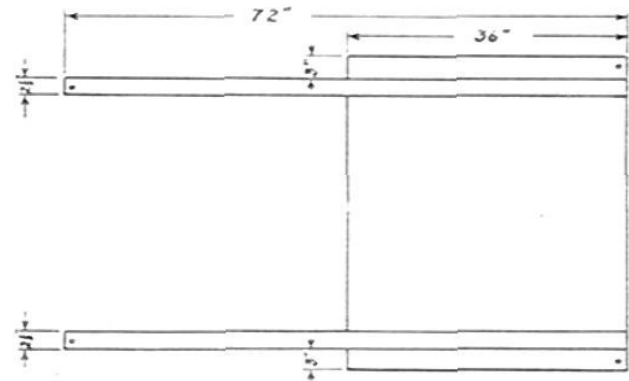
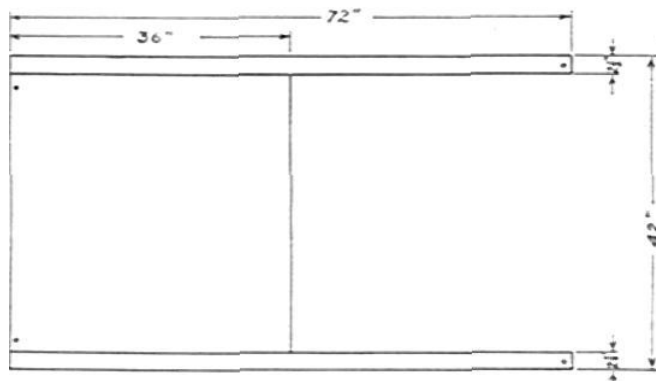


TABLE COVER WHICH SEPARATES TO FORM TWO MAP BOARDS

EE-8-A phone in its leather case. When not in use, the instruments rest in the smaller compartments alongside. Be sure the inner edge of the right wall of the right compartment clears the end of the table M, otherwise the phone will not slide

in and out. The upper edges of the partitions between compartments are nailed to extra thicknesses of plywood screwed to the underside of the table top, to prevent having additional nails in the table surface.

IDEAS ARE WEAPONS

By Lt. G. B. Vail, FA

As it is good sense to try to figure whether a weapon is a good weapon before we take it into action, so it is good sense to try to check an idea before we give this idea a military application. It is the aim of the writer to try to test the validity of the idea of indoctrinating our soldiers with hatred for the enemy.

There is no doubt that we are going to win this war. Thus the strategic problem facing us is even clearer than it otherwise would be: that strategy is best which brings about the unconditional surrender of the enemy at the least cost to ourselves in terms of men, natural resources, and time. The pursuing by us of any policy that will increase our casualties, waste our materiel, or extend the duration of hostilities, does not seem good sense. And does not hate-indoctrination amount to such a policy?

When you teach men to hate, you teach them to enjoy killing. And when they enjoy killing, they may (to put it euphemistically) tend to kill somewhat more of the enemy than is militarily necessary. The trouble with this is that, despite his indoctrination, the individual enemy soldier is no different from any other animal, human or otherwise: the more convinced that he is that death at our hands is a certainty, the longer and more fiercely will he resist. And the more fiercely he resists, the higher becomes the cost of our victory.

By way of analogy and with no intention of casting personal reflections upon an enemy for whom the writer has a healthy respect: a cornered rat will put up a pretty good fight. To pursue this further: if a sensible man is going to catch rats, the first thing for him to do is to try to understand what goes on inside the rat's head. It is conceivable that an ardent hater of rats could achieve a veritable blitzkrieg over them by burning down his own house around the ears of his enemy rats, but such an attitude would be a trifle costly; scattering a little cheese in the right places is more cerebral. To kill is all right; to kill and hate is like marching north on a south-bound treadmill: the more you kill the more you have to kill. An efficiently attained victory should be our aim. Eugenics and war don't mix.

Not only does the singing of a hymn of hate work against us in that it makes the enemy harder to overcome, but it is not at all clear that a hating soldier is a good soldier. Despite the Rockne tradition, the good football teams are made up of men who know their business and go about it in a calm, serious manner. The luxury of hating old Siwash should be reserved for the rooters. The man in the ring who gets himself all worked up is not going to last long. The job of the soldier steadily becomes more complicated; is it not logical to conclude that he can better perform his job if not distracted by hysterical notions? With all respect to famous dicta, the boy in question should concentrate on the killing, the wounding, or the capturing of the man he is up against. The enemy's rating with the deity, his political affiliations, or the marital status of his parents—all these are quite immaterial and possibly distracting.

A detachment on New Britain was recently cited by the Emperor of Japan. The citation ended with these words: "Each and every officer and man should overcome all difficulties and accomplish your mission with the determination *not to be taken alive*" (italics mine). Is it not strange that the Japanese command at this late day should be inveighing against surrender, especially as the troops in question were veterans of Bataan? The only explanation is that the Japanese command realizes that this greatest of military assets, the fanatical will to resist, is not so deeply ingrained into the average Japanese soldier as we occidentals imagine. If there is a possibility of the deterioration of this fanatical attitude, should we not try to hasten this collapse rather than to store it up by becoming in the eyes of the Japanese soldier merciless killers bent on his extermination?

Once the individual Japanese soldier is convinced that his leaders have lied to and exploited him, and that we will treat him decently if he does surrender—when we have gotten these two ideas into the Japanese soldier's head, the end is in sight. The attaining of this indoctrination will be extremely difficult. A lot of good, clean, efficient, and sporting killing will be helpful, especially in the early stages. We should show the enemy that we can dish it out, but if we do not also convince him that we are fair and humane, we will not have obtained the full results of our killing.

We should look at the problem of atrocities committed by the Japanese with the same jaundiced eye that we use in assessing a poker hand. The Japanese command knows what it is doing. If by butchering our fliers it can get us started upon a war of extermination, the Japanese High Command can count on last ditch resistance by its ten million troops. This in turn will mean higher costs to us than we would have had to have paid had Japanese morale cracked sooner.

The only way out for the Japanese military is to get us started upon a path of activity that will prove, once we are well into it, too costly. We are in no position to indulge in such luxuries as "the only good Indian is a dead Indian." Japanese military equipment is somewhat superior to the bow and tomahawk; also, there are too many Japanese. Are we not playing the game of the Japanese High Command if we pursue policies that will encourage last ditch resistance rather than weaken it?

If we were able to obtain a batch of prisoners, fatten them up, put them on a comfortable tropical island where by day they could swim, fish, and lie in the sun and by night drink saki and chase the native girls, and then drop a few of these surfeited individuals back of the lines to tell about it—why, then we would be displaying some of our alleged Yankee ingenuity. Our feeding the Axis prisoners a good turkey dinner at Christmas was good strategy. How did word of this make uncaptured and still resisting Fritz feel as he toyed with his ersatz sausage?

Diary of War Events

(As Reported in the American Press: Edited by M. K. W.)

JUNE, 1944

- 1st American troops capture Mt. Peschio in Italy, and 8th Army captures Frosinone and Sora.
Gen. MacArthur's forces capture Malakawng.
- 2nd For first time American planes land on Russian air bases.
4,500 planes drop 6,500 tons of bombs on 5 rail centers in Hungary and Romania and communication lines near Paris and the Low Countries.
Valmontone and Veletri in Italy captured.
- 3rd About 1,000 U.S. heavy bombers and fighters hammer the Pas-de-Calais and Boulogne areas.
German troops in Romania continue to attack near Stanca for fifth straight day.
- 4th Rome under Allied control.
30 Jap planes shot down.
- 5th RAF rocket planes damage 8 radio stations in the Channel Islands.
Allied planes sink 1 and damage 2 Jap destroyers, shoot down at least 18 aircraft.
- 6th **French channel coast invaded.**
More than 1,000 RAF heavy bombers blast pathway for soldiers from midnight to dawn, then 13,000 Fortresses and Liberators take over. In 8 hours, combined forces fly 7,500 sorties, drop over 10,000 tons of bombs.
Some 640 heavy naval guns pour shells into the German "Atlantic Wall."
2 Destroyers, 1 LST, and 1 heavy invasion barge lost. Plane losses 1%.
Flying Fortresses make their first attack from Soviet bases; smash German installations in Romania.
- 7th Allies capture Bayeux.
RAF cripples 3 German destroyers in Bay of Biscay.
American troops on Biak Island capture Mokmer airfield.
Chinese troops cut Burma Road, and capture Lameng.
- 8th 5th Army captures Civita Castellana and Civitavecchia.
8th Army takes Monterotondo.
- 9th Allies capture Ste.-Mere-Eglise, 18 miles south of Cherbourg.
At invasion sea-line 1 German destroyer sunk, another driven ashore by 8 Allied destroyers.
Gens. Marshall and Arnold and Admiral King arrive in London.
Allies capture Viterbo, Vetralla, Tarquinia.
Allied fliers sink 4 Jap destroyers off Manokwari, Netherland New Guinea.
- 10th Allied navies get 4 out of 7 German vessels at invasion sealine.
- 11th British capture Tilly-sur-Seulles.
Americans liberate Lison, reach outskirts of Montebourg.
RAF strikes Berlin, 1,000 American planes from Russia and Italy bomb targets throughout Balkans.
U.S. carriers strike Guam, Tinian, Saipan, and Rota for second day in row.
- 12th Allies capture Carentan.
Chinese capture Lonkin in Burma.
- 13th Munich, Innsbruck, and oil refineries in Italy battered by planes from Italy.
RAF blasts Gelsenkirchen (in Ruhr) and Cologne.
Poland, Belgium, Czechoslovakia, and Luxembourg recognize the de Gaulle Committee as the French Provisional Government.
- 14th During first week of invasion. Allied aircraft from Britain flew 56,000 sorties, dropped 42,000 tons of bombs.
Allies in Italy capture Orbetello and Bagnoregio.
Chinese troops capture Hsiangta.
- 15th B-29 Superfortresses of 20th Bomber Command make initial bow with sudden heavy assaults on the island of Kyushu.
180 tons of bombs dropped on Truk.
Allies in Italy take Orvieto, Aquila, and Narni, in France capture Baupte and Quineville.
- 16th U.S. assault troops storm into St. Sauveur-le-Vicomte and Montebourg.
Finnish Minister Procope and 3 counselors of his legation ordered to leave the U.S. as being unwelcome personally.
U.S. carriers blast 3 Jap bases in Bonin and Volcano island group, destroy 47 planes and 2 vessels.
- 17th Guam hit by U.S. warships.
Chinese troops occupy Kamaing after 7-day siege.
- 18th U.S. 9th Div reaches Barneville-sur-Mer, cuts off part of Cherbourg.
1,300 bombers plus fighters hit oil refineries and airfields in Hamburg area.
19th More than 300 Jap planes shot down off Marianas.
U.S. soldiers and Marines on Saipan capture Aslito airstrip.
- 20th American troops capture Montebourg and Valognes.
Allied planes bomb Pas-de-Calais, 12 German oil plants, and tank and plane depots in northwest Germany. 53 enemy planes shot down; 47 U.S. bombers and 7 fighters missing. 21 bombers make emergency landings in Sweden.
Our forces capture Boroku and Sorido airfields on Biak Island.
Chinese in Burma capture Tiangzup.
- 21st 2 robot launching platforms captured intact.
Chinese troops capture Chiangtso, clear the Kaoliking Mts.
- 22nd U.S. carrier planes sink 1 Jap cruiser and 3 fleet tankers; hit battleship, cruiser, 3 destroyers; shoot down 15 to 20 enemy planes. We lose 49 planes.
- 24th British in Burma seize strategic tail junction of Sawmching.
- 25th Cherbourg falls.
5th Army takes Follonica.
- 26th Since initial landings 3 weeks ago the Allies have liberated more than 1,000 square miles of France, taken more than 20,000 prisoners, and destroyed 4 German divisions.
- 27th British-based bombers hit the Pas-de-Calais emplacements; American planes strike at Budapest, Yugoslavia, and oil refineries at Trieste. Planes from Russia pound synthetic oil plant at Drogobych, Poland.
8th Army regains Chiusi, Italy.
- 28th 15th Air Force strikes oil refineries and rail centers near Bucharest.
8th Air Force hits airfields in Laon area of France.
- 29th RAF bombs Saarbruecken. 78 German planes shot down.
- 30th Allied armor gains near Caen despite counterattacks.
U.S. troops approach St. Lo, clean up more of Cherbourg area.
Robot planes still harass England.
Italian line nears Leghorn and Siena.
Main Russian drive above Pripet Marshes outflanks Minsk.
In 2 weeks on Saipan we had 9,752 casualties.
U.S. breaks relations with Finland.



For Heroism and Service



DISTINGUISHED SERVICE CROSS

LT. GEORGE F. SINGLETARY, JR., for action near Tambu Bay, New Guinea, 12-13 Aug 43. In order to place artillery fire advantageously in support of a scheduled infantry attack, he accompanied an advance infantry patrol through enemy-controlled terrain to an area in which the forward perimeter was to be established. The patrol took the natural cover afforded by the area, as the surprise element was essential to the planned attack. Although he could have returned to join the main troops he elected to remain with the advance patrol. During the night the patrol was sighted by the enemy and subjected to intense machinegun fire. Lt. Singletary was seriously wounded, but despite lapses of consciousness, at daylight he registered artillery preparations for the barrage and directed effective and accurate artillery fire which contributed materially to the success of our attack. Oblivious to personal comfort, he insisted on all wounded being evacuated before he consented to his own removal. In this action he displayed conspicuous courage and contributed greatly to the defeat of the enemy in this position. Address, 405 S. Washington, Bryan, Texas.

2ND OAK LEAF CLUSTER TO DISTINGUISHED SERVICE MEDAL

GEN. MALIN CRAIG: Gen. Craig was recalled to active duty 26 Sep 41, to act as Chairman of a board of officers appointed under Section 11, Act of Congress approved 29 Jul 41, for the purpose of vitalizing the active officer list of the Army. Upon completion of this duty he became Chairman of the War Department Personnel Board, which later became the Secretary of War's Personnel Board, and served in that capacity until the present date. Gen. Craig was responsible for the appointment of civilians in the Army of the United States and for the promotion of officers in the Army of the United States in the field grades. His devotion to duty, judgment, and high moral courage have been prime factors in the establishment of personnel policies and their successful application. His rigid adherence to sound principles and high standards have added much to the efficiency of the present officer corps. Address, 2126 Conn. Ave., N. W. Washington, D. C.

DISTINGUISHED SERVICE MEDAL

BRIG. GEN. JOHN M. LENTZ, for service in planning, organizing, establishing, and operating initially the Tank Destroyer Center, Camp Hood, Texas. His superior technical knowledge, untiring zeal and splendid judgment resulted in the organization and training of tank destroyer units whose tactical mission was not contemplated previously in the organization of our Army. He contributed materially to the development of tank destroyer tactics employed by our armed forces in all theaters of operation.

LEGION OF MERIT

COL WALTER R. HENSEY, for service as Field Artillery Officer on the staff of the Airborne Command from 3 Sep 42 to 13 Aug 43. As the first officer to fill that assignment he displayed exceptional ability, ingenuity, judgment, and sound professional knowledge in the successful development of parachute and glider Field Artillery as supporting weapons for airborne forces. His efficient methods and conscientious application of time and effort were largely responsible for the early entry into combat of the first airborne artillery units of our Army. Address, 10 Ironwood Rd., San Antonio, Tex.

SILVER STAR

(Posthumously)

T/5 LESTER A. GAYOSO: At Papitali Mission, Los Negros Island, Admiralty Group, as a member of an artillery forward observer's party, supporting a sustained assault in the face of bitter defenses by an entrenched enemy he followed the officer observer across an exposed area under heavy enemy fire in order to transmit data to artillery positions. Occupying a position forward of the troops conducting the attack he was subjected to enemy sniper fire, yet continued to transmit reports on the effect of artillery bombardment, insuring the accuracy of the fire support. While engaged in this duty the officer observer was detected and fired upon by enemy snipers. T/5 Gayoso immediately and with no thought of his own safety moved forward in a gallant attempt to locate and kill the snipers and protect the observation post, when he was killed himself by enemy fire. His disregard of his extreme peril in the effort to safeguard the observation post characterized his personal bravery and devotion to duty in the campaign. Address, 3521 Metropolitan Ave., Dallas, Tex.

SILVER STAR

For gallantry in action at Humboldt Bay, Dutch New Guinea:

22-23 Apr 44:

LT. COL. VIRGIL L. ANDERSON, 1025 W. 30th St., Los Angeles, Calif.

23 Apr 44:

CPL. BENITO R. DOMINGUEZ, 2470 Folsom St., San Francisco, Calif.

LT. EDMOND G. DUCOMMUN, 556 N. San Marino Ave., San Gabriel, Calif.

PVT. LLOYD M. FLATEN, 705 3d St., S. W., Mandan, N. D.

CAPT. MAURICE M. FLETCHER, 1026 W. Garfield, Spokane, Wash.

SGT. HOWARD H. HAFER, R.F.D. 4, Snohomish, Wash.

PVT. HAROLD C. HALVERSON, 612 8th St., N., Great Falls, Mont.

PVT. FRANK W. KEUMPEL, 4213 Midvale Ave., Seattle, Wash.

PFC. HOWARD H. LASSEGARD, 2740 Emerald St., Eugene, Oregon.

S/SGT. JAKE C. McLOUGHLIN, Box 2, Tecumseh, Okla.

T/5 GERALD W. MORRISON, Box 504, Weed, Calif.

T/4 ROBERT A. NELSON, Monticello, Minn.

1ST/SGT. JOHN D. ORR, 2517 7th Ave., W., Seattle, Wash.

SGT. RAYMOND Q. ROSETH, 408 Coteau St., Pierre, S. D.

PFC. HAROLD E. SCHIEFELBEIN, 1835 N. Chatauqua, Wichita, Kans.

PVT. ROBERT TEMPLETON, 5007 Colonial Ave., Dallas, Tex.

LT. CLIFTON B. THOMAS, 34 W. 4th, N. Salt Lake City, Utah.

CPL. WILLIAM VAVRA, Colome, S. D.

MAJ. WILLIAM B. BROWN: Near Salamaua, New Guinea, on 1 Sep 43, in his capacity as air observer with a field artillery battalion engaged in combat, he volunteered to observe enemy gun positions which were delivering heavy fire on the battalion position. Taking off in an airplane under artillery fire, he flew low over enemy positions and was subjected to intensive rifle and machinegun fire. Disregarding his safety, he directed the pilot to continue the flight over Japanese positions and adjusted his artillery fire until the enemy guns were neutralized. His voluntary actions resulted in the saving of many lives to his battalion. Address, 6405 S. E. 87th Ave., Portland, Oregon.

S/SGT. TROY CRABB (now 2d Lt.), for meritorious achievement while participating in an aerial flight on 10 Jan 44, near Cassino,

Italy. As a field artillery liaison pilot, S/Sgt. Crabb was piloting a cub plane on a moonlight mission when he spotted three enemy batteries firing effectively on our troops. With complete disregard for his own safety, S/Sgt. Crabb flew his plane close to the enemy position so that quick and accurate adjustment of our artillery fire on the target could be made by his observer, with a minimum expenditure of ammunition. Despite the meager light and rugged terrain, S/Sgt. Crabb's courage and skill enabled the mission to be successfully accomplished. Address, 827 E. Baltimore St., Ft. Worth, Tex.

MAJ. GEN. HORACE H. FULLER, for gallantry in action at Humboldt Bay-Cyclops Airdrome Area, Dutch New Guinea, on 24-25 Apr 44. Address, Fort Lewis, Wash.

T/5 ROBERT B. GIBSON, for gallantry in action, on 1 Dec 43, near Capriati, Italy. When the sound section of Btry. A was bombed heavily by nine enemy medium bombers, T/5 Gibson and six other men were seriously wounded. After receiving first aid to stop his bleeding, he insisted on giving first aid to the other wounded men. Although weak and in pain, and endangered by direct enemy artillery fire and explosions from a truck loaded with burning ammunition, he continued to care for the wounded and directed their removal to a clearing station before he himself submitted to further treatment. T/5 Gibson's courage and selfless concern for his fellow soldiers exemplify the high standards of the American soldier.

BRIG. GEN. THOMAS E. LEWIS, for gallantry in action in the performance of an aerial flight, 22 Jan 44, from the mouth of the Volturno River to the landing beach of the invasion forces near Anzio, Italy. Flying as a passenger in a slow, unarmed and unarmored field artillery observation aircraft, Brig. Gen. Lewis, with complete disregard for his personal safety and at great risk of attack by enemy fighter aircraft, made a flight approximately ninety miles over the ocean to the landing beach for the purpose of making a reconnaissance for suitable landing fields in the beachhead area. During the approach to the beach the plane was subjected to a bombing and strafing attack by six enemy planes. The information gained from this reconnaissance was of vital importance to subsequent landings of light artillery planes used for adjustment of artillery fire and courier service. Brig. Gen. Lewis' performance in taking part in this flight reflects great credit upon himself and upon the military service.

LT. COL. NORMAN E. POINIER: At Tambu Bay, New Guinea, on 30 Aug 43, in order to locate Japanese gun positions which were placing intermittent fire on his battalion, he made a dawn reconnaissance by small boat well into Japanese-controlled waters. He continued his reconnaissance after being fired on by Japanese shore positions until he located the position and several points of activity suspected to be a major supply point. Returning to his command post he flew as an observer in an airplane beyond local anti-aircraft protection and adjusted the fire of his battalion upon the targets. As a result of his actions the artillery was able to neutralize enemy gun positions and entirely disorganize the supply lines at one point. Address, 1710 Ash St., Lawton, Okla.

LT. NATHAN S. PENDLETON STITT, for meritorious achievement while participating in an aerial flight on 10 Jan 44, near Cassino, Italy. While observing fire by moonlight from a cub plane, Lt. Stitt spotted three enemy batteries firing effectively upon friendly troops. Flying his plane close to the target, he adjusted fire to neutralize the enemy positions. The courage and skill displayed by Lt. Stitt resulted in the successful accomplishment of a hazardous mission. Address, Pikesville, Md.

MAJ. JOHN T. WALKER, for gallantry in action on 22 Jan 44. Maj. Walker flew a slow, unarmed field artillery observation plane from the mouth of the Volturno River to the landing beaches of the invasion forces near Anzio, Italy, for the purpose of reconnoitering a suitable landing field for artillery observation planes in the new beachhead, the early use of them being highly important in providing the assault forces with maximum artillery support. This flight of ninety miles over the sea was made under the constant danger of enemy attack, and upon landing at the beach Maj. Walker's plane was subjected to bombing and strafing by six German aircraft. His exceptional performance of a hazardous duty sets an example of daring, skill, and trustworthiness for other pilots.

SOLDIER'S MEDAL

For gallantry in action at Yamai, New Guinea:
20 Mar 44: CAPT. WILLIAM HOLLOWAY, 1421 E. Johnson St., Philadelphia, Penna.

8 Apr 44: T/5 STANLEY ANTONOVICH, 764 E. 3d St., South Boston, Mass.

25 Apr 44: PVT. J. Y. HUFFSTICKLER, 112 Railroad St. Shelby, N. C.
PVT. WILLIAM R. LA BADIE. Address, 356 E. Oklahoma Ave., Milwaukee, Wis.

T/5 JOHN B. MARAGHY, for heroism near Lumberton, N. C., on 16 Dec 43. T/5 Maraghy a passenger on the Northbound Tamiami Champion when it collided with the derailed Southbound Tamiami Champion, rendered heroic and positive service far above anything logically expected and under the most adverse circumstances at the scene of the horrible wreck of these two Atlantic Coastline passenger trains in the early morning of 16 Dec 43. T/5 Maraghy, badly shaken up by the accident, with utter disregard for his own safety and welfare, worked unceasingly and to the point of shock and exhaustion for eight and one-half hours in the bitter cold, extricating the dead and injured from the wreckage, applying life-saving and timely first aid treatments without benefit of adequate medical facilities, and keeping up the morale of the maimed as well as of the uninjured. These accomplishments of T/5 Maraghy are in keeping with the highest traditions of the armed service, and reflect great credit upon himself and the military service. Awarded by the Commanding General, 10th Armored Div. Address, Dorchester, Mass.

COL. DOUGLAS J. PAGE, for heroism in July 1943 in Tunisia, Col. Page, hearing a call for help from three officers including an officer of the Army Nurse Corps, who were bathing in the sea and who had been carried out by a heavy undertow, without hesitation and with full knowledge of the hazardous conditions of that portion of the beach, swam to the rescue of the party. He seized the nurse, who could not swim, and with greatest difficulty succeeded in bringing her in an exhausted condition to shore, thus allowing the two officers who had been keeping the nurse afloat, but had been unable to make headway toward the beach and had become very tired, to make their way to shore. Col. Page's prompt and courageous action was an example of heroism that reflects great credit upon himself and the military service. Address, 154 Claremont Ave., San Antonio, Texas.

BRONZE STAR

M/SGT. BLYTH CAMPBELL: Since the activation of an armored Field Artillery battalion, in which he served as battalion motor sergeant, the outstanding efficiency attained by its maintenance section was directly attributable to his unusual initiative, intelligence and leadership. His success in training motor maintenance and tank mechanics and his ability to maintain an unusually large percentage of motor vehicles in commission assured the fitness of the battalion for combat when it arrived in Tunisia. During the Tunisian and Sicilian campaigns he was in charge of the forward maintenance echelon. His initiative and energy in recovering and repairing motor equipment damaged by enemy fire and accident, and his ability to anticipate maintenance troubles by continual inspections were greatly responsible for the combat efficiency of the battalion and contributed to the success of the campaigns. Address, Princeton, Ind.

T/4 CALVIN R. ERTIS: Prior to the Tunisian Campaign, in spite of language difficulties, he displayed outstanding intelligence and leadership in successfully instructing French Colonial personnel in the proper maintenance of American equipment. With the same vigor and success he schooled the mechanics of his sections in the proper maintenance of tanks. During the Tunisian and Sicilian campaigns, although higher echelon maintenance units and spare parts were lacking, his initiative and energy in making substitutes for materials not available and his use of tools not adapted to the repair work were instrumental in maintaining a maximum number of tanks and guns in commission, thereby contributing materially to the success of the campaigns. Address, Sherwood, Tex.

LT. LYLE B. MARTIN: As a field artillery observer on the first day and night of the attack on Kwajalein Island, his calls for artillery fire from the front lines contributed greatly to the success of our attack and to the failure of enemy counterattacks. In the early evening of the following day he observed an enemy artillery battery firing into our lines. Unable to adjust upon the enemy from his position, which had been moved to the rear, he, on his own initiative, obtained a small boat after dark and moved into the lagoon close enough to the enemy installation to adjust artillery fire. Through his efforts the enemy battery was silenced. Address, 541 E. Park, Olathe, Kans.

BOOK REVIEWS



JOURNEY FROM THE EAST. By Mark J. Gayn. 426 pp.; index. Alfred A. Knopf. \$3.75.

In 1909 Barim was a frontier town in a double sense: it was a pioneer settlement, and located near the Mongolian border of China. Mark Gayn was born there then, of Russian parents. His father was a lumberman, so much of his boyhood was spent far from well developed towns. Later he lived in Vladivostok and Shanghai, studied at Pomona and Columbia, and returned to Shanghai as a newspaperman. Currently he is on the staff of *Time*.

In the course of this career Mr. Gayn had uncommon opportunities to live with and as a member of quite different cultures. His schooling was under Chinese, Soviet, White Russian, and American systems. The background, discipline, and outlook of his fellows differed tremendously. Of them all, he seems on the whole to prefer the American.

On the jacket of the book he is described as being an American, although the text itself doesn't disclose any naturalization. Without doubt, however, he is spiritually of our kind. This appears both from his boyhood (which, despite its distant scene, was very like yours and mine) and from his reactions to Japanese aggression. In Shanghai he had a front-row seat, but being so close to the scene did have some disadvantages—Gayn himself admits that at times he was unable to see the forest for the trees.

Nonetheless he did a fine job in trying to inform us on what was coming in the Far East, even though little concrete action followed. One thing is strikingly plain: pious protests and platitudes had only the effect of rain on a roof; the Japs backed down only when some force was shown, as when the British sent a little gunboat into Tientsin harbor.

Much has been said, and pondered, as to what sort of man Chiang Kai-Shek really is. To obtain more background, Gayn visited Chiang's birthplace and found there many similarities with our own New England communities.

Mr. Gayn has the most rounded and thorough understanding of the Orient that this reviewer has yet encountered. He conveys the feel of it, too, so that this autobiography includes much material that is essential to an appreciation of the interplay of forces now working and of others yet to come.

TEN YEARS IN JAPAN. By Joseph C. Grew. 548 pp.; index; photographs. Simon & Schuster. \$3.75.

A year and a half ago Ambassador Grew published his *Report from Tokyo*. It rightly commanded the public's attention. Now he has written a major work which clearly and in detail shows just how matters developed and—at least as important—how he reacted to them at the time and how impressions changed and themselves developed with time.

It has been Mr. Grew's habit to keep a careful diary, noting not only events themselves but also thoughts and feelings. Later, with more information and the perspective of time, these latter might be revised or

might be confirmed and strengthened. That diary, with these nuances, furnishes the basic material of this book. Into it have been woven both his dispatches to the State Department and his personal and official correspondence, to make a coherent, smooth-reading whole—the inside story of a decade of conflict, intrigue, and surprise that culminated inevitably in the tragedy of war.

Events of the past two and a half years have vindicated Mr. Grew's judgment and diplomacy. They have also compelled general recognition of the great stake we have in an orderly Pacific and Asia. That result depends greatly upon what happens to Japan. Mr. Grew, who thoroughly knows the Japs, concludes that only a Japan purged by total defeat can ever return to the family of nations.

ISLANDS OF THE EAST INDIES. By Hawthorne Daniel, 249 pp.; index; endpaper map. G. P. Putnam's Sons. \$2.50.

Timeliness is the quality that gives this book its particular interest. The course of global war has turned the spotlight sharply on the islands of the East Indies, giving them a heightened reality and significance. Names of remote, far-away places have found their way into our headlines and become curiously identified with our objectives. In the words of the author relative to one of the islands he describes, "the most remarkable fact in New Guinea's history to date is that this unusually backward land should have come to be so important in the battle for the future of civilization."

Methodically the different islands are introduced to the reader with informative remarks on such details as physical aspects, native population, customs, government, flora and fauna, and natural resources. The wide variation of characteristics makes each island a distinct unit in itself; generalities are of little use over the range of the whole subject.

The author has a natural advantage in covering ground already opened to popular interest by developments in the war. It has been his task to follow in the wake of wartime headlines and to underscore their effect of bringing to us a closer familiarity with strange far-away lands. F. E. J.

MATHEMATICS FOR EXTERIOR BALLISTICS. By Gilbert Ames Bliss. 123 pp.; bibliography; index; ill. John Wiley and Sons. \$2.00.

Those interested in the whys and wherefores of range tables, which of course unlike Topsy didn't "jest growed," will find this work valuable. It presupposes considerable grounding in mathematics, as it covers the elementary calculus and differential equations used in the theory and computation of the trajectories, and their differential corrections listed in range tables for artillery fire control. The author, professor emeritus of mathematics of the University of Chicago, was an advisor at Aberdeen Proving Grounds during part of the last war, and has made his own contributions to the science covered in this book.

DISCOUNT OFFER AND MAILING DATA

CASH (money order or check) must accompany all orders from individuals. As a result of this arrangement your Association can obtain for its members 'most any books (texts, biographies, histories, fiction, etc.) at the following discounts:

On orders amounting to at least \$2.50..... 10%

On orders amounting to \$10.00 or more 15%

Remittance must be in U. S. funds; checks or money orders are the safest. Please do not send foreign currency, as it "shrinks" amazingly.

No discount is possible on Government publications, however, nor on *Journal* subscriptions or Association memberships.

We pay book-rate postage.

Nothing can be sent C.O.D. anywhere, or by insured or air mail to A.P.O.s overseas. Such items as globes are too bulky for shipment to individuals overseas, as we are of course subject to Post Office Department Order No. 19687; for its detailed provisions, consult your local postmaster.

A *TREASURY OF AMERICAN FOLKLORE*. Edited by B. A. Botkin; foreword by Carl Sandburg. 918 pp.; index of authors, titles, and first lines of songs. Crown Publishers. \$3.00.

Well subtitled *The Stories, Legends, Tall Tales, Traditions, Ballads and Songs of the American People*, this encyclopedic book will yield many, many hours of huge enjoyment. It is no book for a single reading—it's one to dip into again and again, reading and rereading the classics of our folklore. They're just about all here, and not just the ones you know, either. True enough, stories do have a way of getting about the country in a hurry, but every section has developed its own legends and "whoppers" that keep their roots right there. Tall tales are here by the dozen, but so are other native stories—*Uncle Remus*, for example, and songs and rhymes from New England schools to lumberjack camps. It's just a swell book to have around.

HANDBOOK TO ARMY REGULATIONS AND OTHER DIRECTIVES ON ADMINISTRATION. By Lt. Col. Walter Sczudlo, AGD. 305 pages. Military Service Publishing Co. \$2.50.

Stacked up on a bookshelf, the Army's administrative directives stretch "from here to there." They include regulations, bulletins, circulars, manuals, memoranda, etc., etc., of many kinds. Those who work with them constantly learn to find their way around, but to the uninitiated this mass of material often seems a maze. Col. Sczudlo's *Handbook* is a thoroughly welcome guide which will be as useful to the professional army clerk or administrative officer as to the man doing such work on a temporary wartime basis.

It contains a selection of ARs and other orders of a general administrative nature, grouped alphabetically by principal subjects (so that an index is unnecessary), condensed, digested, supported by detailed references to the precise source material, and excellently cross-referenced. Duplications and ambiguities are claimed to be eliminated; certainly, they are thoroughly minimized, at the very least.

Alphabetically, this material runs from *Abbreviation* to *War Department Manpower Board*. Exceptionally valuable are the lists of *Forms* and of *Records*. The former are named and numbered, their sources are cited, and they are cross-keyed to their references in the *Records* section. 688 different records are listed, covering practically all that are normally maintained by administrative personnel or offices as required for performance of their duties or as prescribed by higher authority. They are grouped under the individuals or offices responsible for initiating, maintaining, or preserving them. Their Form Numbers are given, of course their sources are cited, a summary of contents, etc., is included, and cross-references are given to the titles in the *Handbook* concerned with either the record in question or any phase of the general subject matter covered by it.

A tremendous amount of research is represented in this *Handbook*. This effort was intelligently directed, resulting in a thoroughly useful and practical manual. Every orderly room will find a copy as indispensable as its *Company Administration*.

INTRODUCTION TO INDIA. By F. R. Moraes and Robert Stimson. 176 pp.; endpaper map; illustrations. Oxford University Press. \$2.00.

This is strictly a "quickie" on the subject of India. It would be more appropriate to call it a handbook to a sketchy introduction to India. The authors are quite frank in their admission that the book endeavors "to give British and American troops now in India a quick and balanced survey of the country. . . ." A. E. G.

BORDER COMMAND. By Carl Coke Rister. 225 pp.; bibliography; index; illustrations. University of Oklahoma Press. \$2.75.

There was a great deal more to Gen. Phil Sheridan than his somewhat apocryphal ride from 20 miles away. Not only was there more than that to him during the Civil War, but from 1868 to 1876 he played a tremendous part in curbing the turbulence of the plains. As commander of the West he was handed the "Indian problem" for solution, while at the same time he was hampered by the blow-hot-blow-cold policies and agitations of the East. Blunt, straight-forward, and brilliant, "Little Phil" planned and executed a series of campaigns which forced the recalcitrants to yield or starve.

These campaigns and their participants have been largely ignored in our history study, yet they were of utmost importance in the settling

Do you know enough about EXPLOSIONS?

Which types of explosives are most destructive? How much heat will set off a charge of tetryl? Sympathetic detonation distances? The danger distance from flying missiles? What size crater will be formed by a specific explosion?

Here is a practical book for all who deal with explosions.

It is simple. It is up-to-date. Entirely practical, it will show you what causes an explosion, what happens when the charge goes off, and the actual effects of the explosion on the surroundings.

Just Published!

EXPLOSIONS, THEIR ANATOMY AND DESTRUCTIVENESS

By Clark Shove Robinson. Department of Chemical Engineering, Massachusetts Institute of Technology; Lieutenant Colonel, Ordnance Reserve. U. S. Army

88 pages, 5½ × 8½, 27 illustrations, 18 tables, \$1.50

Here is a book that tells in as simple a way as possible the sequence of events leading up to an explosion, the phenomena produced, and the effects of these phenomena on the surroundings. Clear, concise, up-to-date, the book gives data on 125 notable explosions and charts practical graphs of damage done by these actual charges.

ORDER YOUR COPY FROM

U. S. FIELD ARTILLERY ASSOCIATION
1218 Connecticut Ave. Washington 6, D. C.

Rand McNally's New Reference Map of E U R O P E

- Includes Western Asia and Mediterranean Lands
- Size: 49" × 40".
- Folds to 12 5/16" × 13 5/16".
- Highly detailed; scale: 1" = 72.5 miles.
- Additional Features:
35" × 29" World Map in Full Color
Four Historical Maps of Europe
Chronicle of 200 Years of War and Peace

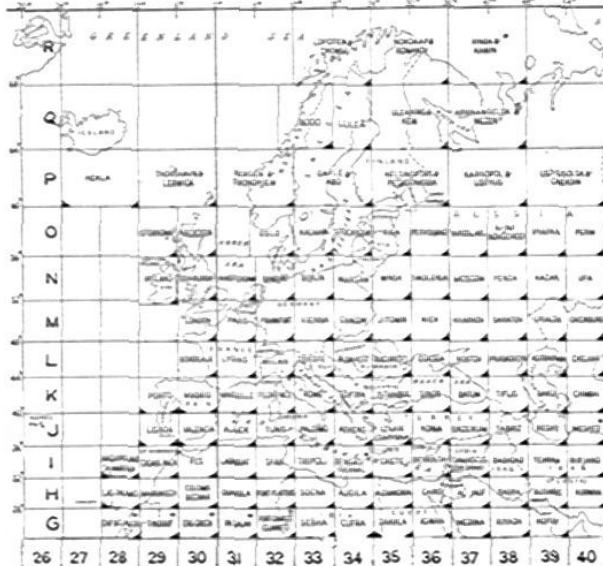
\$1.00

(See discount offer on page 584)

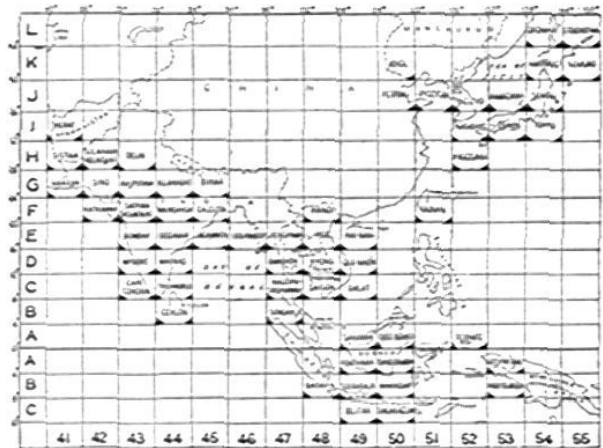
U. S. FIELD ARTILLERY ASSOCIATION
1218 Connecticut Ave. Washington 6, D. C.

"INTERNATIONAL" MAP SHEETS

were prepared by the various governments on a uniform scale of 1:1,000,000 (about 16 miles to the inch). Except for a few in northern latitudes, each covers an area 6° × 4°. Drawn on a modified polyconic projection, sheets naturally vary somewhat in size; the average is about 30" × 24".



Non-topographic sheets are marked *.



Sheets marked ▲ in lower right corner are black and white lithographs. Those marked ▽ and ▲ (in both lower corners) are photostats.

All sheets are black and white, only.

In ordering, designate sheets both by coordinates and by name of sheet.

PRICES:	
Lithograph sheets	\$2.00 each
Photostat sheets	\$3.00 each

(See discount offer on page 584)

U. S. FIELD ARTILLERY ASSOCIATION
1218 Connecticut Avenue Washington 6, D. C.

and development of the West. Sheridan, Sherman, Custer, Miles, Cody, Satank, Sitting Bull—their names are familiar, but their deeds are hazy. Mr. Rister has brought them all to life again, in a fascinating narrative of special interest to all those who have served in Oklahoma, Texas, or other parts of the plains.

WAR PICTURES BY BRITISH ARTISTS (Second Series): WOMEN — PRODUCTION — SOLDIERS — AIR RAIDS. About 62 pp. Oxford University Press. 50c each, \$1.75 per set of the four.

The drawings and paintings reproduced in these little books were made by artists working under the official direction of the Ministry of Home Security on the recommendation of the Ministry of Information Artists' Advisory Committee. These artists have done a beautiful and graphic job of portraying many facets of a war-torn country, from its superb efforts and achievements to the parts played by its varied people.

WAR-TIME CHINA. By Maxwell S. Stewart. 63 pp.; illustrations. American Council, Institute of Pacific Relations. 25c.

BEHIND THE OPEN DOOR. By Foster Rhea Dulles. 92 pp.; illustrations. American Council, Institute of Pacific Relations. 40c.

Here we have two splendid additions to the illuminating series of pamphlets produced by this publisher. The first describes the stresses and strains *behind* the fighting lines in China. The second is a popularly written history of Jap aggression from Perry's time to Pearl Harbor. Like the rest of the series, these booklets are written by specialists in their fields and have been carefully checked by experts; their scholarship is sound.

GEOLOGY FOR EVERYMAN. By Sir Albert Seward. 302 pp.; index; ill. The Macmillan Co. \$3.25.

The late Sir Albert Seward was primarily a botanist, but he developed a love for geology as a hobby. *Geology for Everyman* is a result, a book written to help instill in others a love for the physical development of the world about us. It makes no assumptions of geological training—step by step it leads one through the evolution of formations, all in a delightfully easy fashion. Although its photos and examples are principally from the British Isles, the principles of course hold true for anywhere in the world. It is thus as useful to the amateur geologist here as in England, where it was written.

TROPICAL NURSING. By A. L. Gregg. 173 pp.; glossary; index; illustrations. Philosophical Library. \$3.00.

Dr. Gregg's splendid handbook on tropical hygiene and the care of tropical diseases is now in its second edition. For those in or headed for those areas, it should be highly useful.

YANKEE THUNDER: The Legendary Life of Davy Crockett. By Irwin Shapiro. 205 pp.; ill. Julian Messner, Inc. \$2.50.

There were a number of Davy Crocketts: the flesh-and-blood frontiersman and hunter, the hero of the Alamo, the political figure—and the mythical Crockett, the man of legend, folklore, and tall tales. For many years this last lived and grew and grew, largely through almanacs, to become a figure very like Paul Bunyan, Pecos Bill, and other legendary characters. Shapiro has jotted down the biography of this rarified, rip-snortin' figure, and made of it a whale of a collection of tall tales.

THE VOICE OF NORWAY. By Halvdan Koht and Sigmund Skard. 299 pp.; index. Columbia University Press. \$3.50.

Many Norwegian characteristics are much like our own, especially the support of law and liberty. In those, Norway far antedates us. With so much in common it is unfortunate that Americans are so completely ignorant of Norway's history—how she developed the type of people and government she had until April, 1940.

The Voice of Norway is a fascinating chronicle in two parts. In the first Dr. Koht, Professor of History at the University of Oslo for many years and Minister for Foreign Affairs during 1935-41, sketches Norwegian history. It is an absorbing, well-written, flowing account. The second part is a colorful history of Norwegian literature by the former Chief Librarian of the Royal Norwegian Academy of Arts and Sciences.

Unifying the whole is the approach of the two men—they view

both history and literature from the standpoint of liberty under the law, the essence of the Norwegian spirit. This is a thesis we can well understand and appreciate. It points up the likeness between our country and the authors'. Liberty and law will return to the land of the Vikings—and may we here not abuse, misuse, or throw away either of these heritages of ours.

SOLDIERS IN THE PHILIPPINES: A History of the Insurrection. By William Thaddeus Sexton. 246 pp.; maps. *Infantry Journal*. 25c (to members of the armed forces only).

It is good to find so authentic and fascinating book made available so generally. It is made available through the Military Service Publishing Co., which originally published it under the title *Soldiers in the Sun*. Neither geography nor fighting conditions change much with the passing of time, so this portrait of the insurrection will give a splendid idea of the situation confronting our troops in the Southwest Pacific today. It was written from an interest aroused by service in the islands; the author was more recently Secretary of the War Department General Staff.

GUN CARE AND REPAIR. By Charles Edward Chapel. 447 pp.; index; illustrated. Coward-McCann, Inc. \$3.75.

In the field of gunsmithing, *Gun Care and Repair* is a classic. It runs the complete gamut, from shop, bench, and tools, through drawings, finishing, detailed operations (such as inletting, bluing, etc., etc.), and metallurgy, to adjustments, remodeling military rifles, and restoring antique firearms. Throughout it is just as useful to the tyro as to the man with some experience. Plates illustrate the careful text, making all operations and processes crystal-clear.

The author, a retired Marine officer, is internationally recognized as an ordnance authority, but he has never lost touch with or sight of the average American who cares for and repairs his guns in war and peace.

THE GERMAN SOLDIER. 97 pp.; illustrated. *Infantry Journal*. 25c.

As in the case of the Japanese book by the same publisher, this one covers the general background and characteristics of the soldier himself—what makes him tick, as it were, and how well he keeps time. Again it is unfortunate that many photos had to be so heavily retouched, and even so result too often in hard-to-distinguish blurs.

THE SPOKEN ARABIC OF IRAQ. By John Van Ess. 280 pp. Oxford University Press. \$1.50.

For the many stationed or traveling in Iraq, this handbook should prove highly useful. Its approach is the colloquial; a bibliography should aid those preferring the literary language. It has stood the test of use: originally published in 1917, it has gone through many reprintings and a revision. Despite its length and scope, it is a compact, light weight, pocket size book.

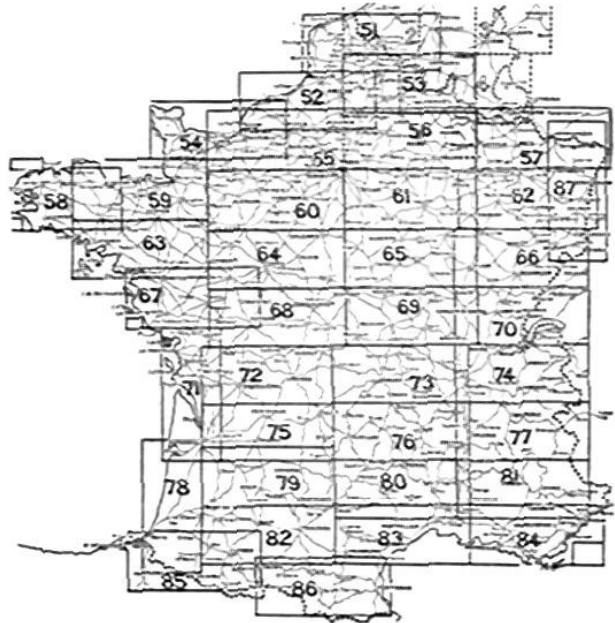
MY LIVES IN RUSSIA. By Markoosha Fischer. 269 pp. Harper & Bros. \$2.75.

Markoosha Fischer, wife of Louis Fischer, the foreign correspondent, was born under the czars. After 10 years of schooling abroad, she returned in 1914 to help care for war refugees. A year of the ugly atmosphere was enough, however; she left vowing not to return while czarism remained. Copenhagen, New York, Stockholm, and Berlin were her principal homes until 1922, but from then until 1939 she lived in Russia almost continuously.

Throughout her life her sympathies have been with the underprivileged, but her desires have also been for individual freedom. Thus it was that while she found in the Soviets' aims much that was admirable, she realized that some of the methods were not exactly laudable. Being neither a dyed-in-the-wool communist nor an irreconcilable enemy of the new regime, she could see events in shades of gray rather than in sheer white or black. It is this quality of relative detachment that gives so much importance to Mrs. Fischer's comments.

My Lives in Russia is essentially a story of the day-to-day life of a Russian household. It therefore conveys an understanding of Russian life more rounded, comprehensive, and understandable than has (or could) any "survey."

Black and White Copies of
MICHELIN ROAD MAPS
 are on a 1:200,000 scale (3.2 miles per inch). *Sheet size: 44" × 20".*



Sheets for Belgium, Luxembourg, and Southern Holland are numbered 1 to 4. Sheet 1 is above 2 and 3 (see outline numerals on cut above).

France is covered by sheets 51 to 86, inclusive.

Order by sheet number.



Price: \$5.00 per sheet, subject to discount notice on page 584.



U. S. FIELD ARTILLERY ASSOCIATION
 1218 Connecticut Ave. Washington 6, D. C.

OUR NATION'S CAPITAL: A Portrait in Pictures. By Mary Eleanor Browning. 102 pp. of photographs. Hastings House. \$2.00.

In 130 lovely photographs Miss Browning gives a well-rounded view of Washington. Imposing buildings and monuments, quiet streets and little known corners—these were her subjects. The result is a charming book, although an inevitably incomplete one since the Washington scene is ever changing. The points shown here, however, have an unchanging timelessness.

THE MAKING OF MODERN CHINA: A Short History. By Owen and Eleanor Lattimore. 178 pp.; maps. Infantry Journal. 25c (for members of the armed forces only).

This little book is in four parts. The first describes the land and its people, including the borderlands. The second summarizes Chinese history through the Boxer Rebellion. From there the account carries down to the approximate present, with some hopeful forecasts for the future.

D-DAY. By John Gunther. 276 pp. Harper & Bros. \$3.00.

This tells what John Gunther saw and did during the invasion of Sicily and Italy and a side tour to the Middle East. The account makes pleasant reading and it throws some interesting lights on the personalities of the higher Allied commanders. If you have an idle moment and like these "I came, I saw, I wrote" books, this is one of the best. R. G. M.

THE WAY OUR PEOPLE LIVED. By W. E. Woodward. 397 pp.; bibliography; illustrated. E. P. Dutton & Co. \$3.95.

When writing his *New American History* a few years ago, Mr. Woodward suddenly realized he was writing only of dates, wars, political campaigns, and other such items that comprise most "formal" histories. Everyday life was quite ignored.

That omission is now corrected, by this collection of eleven vignettes. In each chapter a different set of characters wander through action typical of their time and place. They range from Boston in 1652 to New York in 1908. All details—both conversation, and descriptions of such things as buildings, clothing, food, customs, etc., etc.—are faithful to their settings, so that you readily see how people lived, worked, played, and traveled. Although not a true source book, it is as faithful as one; and the bibliography will fascinate anyone wanting to pursue the subject-matter further.

MODERN RECONNAISSANCE. 230 pp.; illustrated. Military Service Publishing Co. \$1.50.

Proper reconnaissance is as important in today's warfare as ever before. Ground reconnaissance, that is—careful and thorough-going. From the *Cavalry Journal's* issues of the last couple of years have been collected a number of articles on this subject; they comprise this little book. They range from training to practice and use. Most were written by cavalrymen, but others are by infantrymen, war correspondents, and Russians. A brief biographical sketch is given of each author.

MUZZLE FLASHES. By Ellis Christian Lenz. 813 pp.; illustrated. Standard Publications, Inc. \$15.00.

In recent years there have been lots of books published on the subject of small arms, but not a one seen by this reviewer carries so much of the love of the job as does *Muzzle Flashes*. The "care and feeding" of small arms, their history and the practical use and enjoyment of them—these have been Mr. Lenz's hobby for thirty years. To live—and to have funds to ride his hobby—he was a commercial artist during that time. *Muzzle Flashes* is a labor of love that contains the very best of both his profession and his avocation.

History contains much fascinating lore that seldom gets printed. The closer the focus on one facet, the more delightful the anecdotes. In pursuing the history of firearms Mr. Lenz captured the spirit of the ages and of the men involved. More to the point, he frequently digresses to retell them in delightful fashion; they fall naturally and logically into the narrative, be they concerned with the whys of flintlock development or with the virtues of the modern "Bee" cartridge.

Illustrations are one of the book's strong points. Mr. Lenz was (rightly) convinced that too much detail is lost between camera lens and printed page, when wood and metal are the subject. He therefore worked out a watercolor technique that shows "clear as crystal" just what he's driving at, be it a culverin or the operation of a bullet mold. Many are as detailed as a photo print; others designedly have a woodcut character.

Thus it is that, by combining hobby and work, Mr. Lenz covers the field of small arms, primarily from the point of view of the gun lover. Of course, as with any book on a technical subject, this one contains material that is old to the experienced and some things that have also been covered elsewhere. That is no drawback, however—no more here than with those other books. The important things are that *Muzzle Flashes* is rounded and complete, its approach is fresh, its phrasing unhackneyed, and its illustrations unequalled. This all adds up to saying that here is a wealth of material that can't be had in many combinations of several books that together would cost considerably more than this single one. *Muzzle Flashes* is a true gun-lover's book.

SUMMARY OF OPERATIONS IN THE WORLD WAR:

3d DIVISION (113 pp., index, maps; \$1.50)

4th DIVISION (84 pp., index, maps; \$1.50)

7th DIVISION (22 pp., index, map; 75c)

27th DIVISION (42 pp., index, maps; \$1.00)

28th DIVISION (98 pp., index, maps; \$1.50)

30th DIVISION (43 pp., index, maps; \$1.00)

32nd DIVISION (86 pp., index, maps; \$1.25)

36th DIVISION (24 pp., index, map; 75c)

77th DIVISION (125 pp., index, maps; \$1.50)

79th DIVISION (40 pp., index, maps; 75c)

81st DIVISION (26 pp., index, map; 75c)

93d DIVISION (40 pp., index, maps; \$1.00)

Prepared by American Battle Monuments Commission; published by Government Printing Office.

Continuing its splendid work, the American Battle Monuments Commission has recently released another group of divisional histories. These accurate accounts naturally vary in length, in accordance with the differing participation of the several divisions. Their maps are not tiny ones printed in the body of the books, but are usually fine 1:20,000 operations maps and in all instances are large size and folded to fit into a pocket in the cover.

These volumes are of distinct interest to anyone who served with these divisions in the last war, and also give interesting background to those now connected with them. In addition, these maps may well be useful when our invasion of Europe penetrates to these older battlefields.

THE SOLDIER AND THE LAW. By Col. John A. McComsey and Lt. Col. Morris O. Edwards; revised and enlarged by Col. Charles E. Cheever. 573 pp.; index. Military Service Publishing Co. \$2.00.

In line with its policy of keeping its military books strictly up to date, this publisher has again had this most useful book revised. Not in any sense a substitute for the *Manual of Courts Martial*, it supplements it, with the dual mission of preventing military delinquency and of providing practical assistance to those concerned with the efficient administration of military justice. By using practical illustrations, charts, forms, and check lists, the authors have aimed to make as mechanical as possible the purely procedural aspects of military justice.

This new edition is considerably enlarged. One new chapter explains the principal benefits allowed the dependents of soldiers. Another discusses the law of land warfare. A third constitutes an examination on that subject. And to the appendix has been added, for reference, the new basic field manual on the rules of land warfare.

THE SIX WEEKS' WAR. By Theodore Draper. 336 pp.; index; maps. Viking Press. \$3.00.

This book on the Battle of France is a sober, competent account. It doesn't reveal anything particularly new but does round up a lot of loose ends and bring many scattered bits of information together into a connected narrative.

It seems almost inevitable that each year or two will bring another book on the Battle of France. In two years at least three have already appeared on the whole campaign (Vilfroy's *War in the West*, Cot's *Triumph of Treason*, and this); and such books as Gerard's

Official Restricted and Unrestricted Manuals

FIELD MANUALS ON SERVICE OF THE PIECE

6-50	75-mm Gun, M1897 and M1897A4, Horse-drawn and Truck-drawn	15c
6-55	75-mm Gun, M2, Horse-drawn and Truck-drawn	10c
6-56	75-mm Gun, M2A3, Horse-drawn and Truck-drawn	15c
6-60	75-mm Gun, M1914 and M1916A1, Horse-drawn and Truck-drawn	15c
6-65	75mm Gun, M1917A1, Truck-drawn	10c
6-70	75-mm Howitzer, Horse-drawn and Truck-drawn	10c
6-75	105-mm Howitzer, M2, Truck-drawn	15c
6-80	155-mm Howitzer, M1918A1, Truck-drawn	10c
6-85	155-mm Gun, M1918	15c
6-90	155-mm Gun, M1	15c
6-91	8-inch Howitzer, M1	15c
6-95	240-mm Howitzer, M1918	15c

OTHER FIELD MANUALS

6-5	FA Organization and Drill	15c
6-110	Pack Artillery	30c
6-120*	The Observation Battalion	20c
6-125	Examination of Gunners	20c
6-130	Reference Data	20c
17-60*	Armored Division Artillery	15c
16-64*	75-mm Howitzer T-30, Self-Propelled	10c
24-6*	Radio Operators' Manual, AGF	15c
24-9*	Combined US-British Radio telephone (R/T) Procedure	10c
24-10*	Combined Radiotelegraph (W/T) Procedure	20c
30-22*	Military Intelligence, Foreign Conventional Signs and Symbols	40c
5-20	Camouflage	15c
21-5	Military Training	15c

21-30	Conventional Signs, Military Symbols, and Abbreviations	20c
21-50	Military Courtesy and Discipline	10c

TECHNICAL MANUALS

6-215	Abbreviated Firing Tables (Extracts from FT 75-B-4 and FT 155-D-2)	20c
6-225	Field Artillery Trainer	10c
6-230*	Fire Control Code	10c
6-650*	Field Artillery Notes, Meteorological Data Using British 25-PR Range Tables	10c
9-303*	57-mm Gun M1 and Gun Carriages, M1, M1A1, and M1A2	30c
9-308*	76-mm Gun Materiel M1 (Combat Vehicles)	30c
9-320*	75-mm Howitzer Materiel	30c
9-321*	75-mm Howitzer M1A1, Mounted in Combat Vehicles	20c
9-325*	105-mm Howitzer M2 and M2A1; Carriage M1A1 and M2	20c
9-330*	155-mm Howitzer Materiel, M1917, M1918, and Modifications	30c
9-331*	155-mm Howitzer M1 and Carriage M1	30c
9-335	8-inch Howitzer Materiel, M1	25c
9-345*	155-mm Gun Materiel, M1917, M1918, and Modifications	35c
9-350	155-mm Gun Materiel, M1	20c
9-1225*	Browning Machine Gun, Cal. .50, All Types	20c
9-1325*	105-mm Howitzer M2 and M2A1; Carriage M1A1 and M2	45c
9-2210*	Small Arms Accidents, Malfunctions, and Their Causes	10c
1-205	Air Navigation	40c
5-235	Surveying	70c
5-236	Surveying Tables	40c

As all of the foregoing are Government publications, no discount is possible.

(Date)

U. S. FIELD ARTILLERY ASSOCIATION,
1218 CONNECTICUT AVENUE,
WASHINGTON 6, D. C.

I enclose \$..... for the manuals checked above.

(Signature)

(Grade, Name, Serial Number)

(Complete Address)

A.P.O.

(City, including zone number, and State)

Manuals marked (*) are RESTRICTED, and require completion of the following. An order from an (1) officer—must be countersigned by his commanding officer or by the adjutant, or (2) enlisted man—must be countersigned by his immediate commanding officer.

(Signature)

(Name and Grade)

(Position and Organization)

PRINT OR
TYPEWRITE

PRINT OR
TYPEWRITE

GUNS from the inside out



The BASIC MANUAL OF MILITARY SMALL ARMS

A COMPLETE GUIDE TO THE WEAPONS OF THE U. S., ITS ALLIES AND ITS AXIS FOES \$2.00

• Hundreds of sparkling photos pointed up by graphic text showing how to use, maintain, disassemble and assemble all rifles, pistols, and machine guns.

AN INVALUABLE TOOL FOR AMERICAN SOLDIERS OF THE PRESENT AND FUTURE

• This is the only book of its kind on the market. It gives complete specifications and illustrated details of operation on all the important small arms in use in the world today. Weapons of fourteen nations are pictured and described. Working drawings and photographs—More than 400 of them—give you the full story of each gun without reading pages of technical jargon. Full instructions on the use of small arms, and vital information on disassembling and assembling these weapons in the field. If you capture a Japanese or German machine gun can you make it work? This book says how—and how.

United States Infantry Weapons—Garand Semi-Automatic Rifle, Springfield Rifle, American Enfield Rifle, the new Winchester Semi-Automatic Carbine, .45 Colt Automatic, New Service .45 Auto, Smith & Wesson .45 Army, Winchester (or Remington) Riot Gun, Reising Gun, Tommy Gun, Browning Machine Rifle, Johnson Machine Rifle, Lewis Gun, Browning Machine Gun and Browning .50.

Great Britain Infantry Weapons—303 S. M. L. E. Short Rifle Magazine Lee-Enfield, .303 Pattern '14 Enfield, .303 Rifle No. 4, Boys' .55 Anti-Tank Rifle, .455 Webley Revolver, .38 Caliber Revolver No. 2, .455 Webley Automatic Pistol, Tommy Gun, 9 mm Sten Gun, Bren Light Machine Gun, British Lewis Gun, .303 Hotchkiss and Vickers Gun.

Russian and French Infantry Weapons — All operational and instruction data on seven Russian and eight French weapons of battle proved maximum effectiveness and common usage.

Axis Infantry Weapons — Up-to-the-minute technical details on fourteen German, nine Japanese and eight Italian small arms which American troops might need to use in emergencies. German Luger (Parabellum) Automatic, Mauser 7.63 mm Pistol, Walther Automatic, Steyr-Solothurn Machine Pistol, Mauser Machine Pistol, Erma Machine Pistol, Neuhausen Machine Pistol, Bergmann Machine Pistol, 7.92 mm 41 and 41-W Rifle, Gewehr 42 Automatic Rifle, Mauser Rifle, 7.92 mm Light Machine Gun, Japanese Nambu 8-mm Automatic, Arisaka 6.5 mm Rifle, Nambu Machine Rifle, 6.5 mm and 7.7 mm Light Machine Gun, Hotchkiss Heavy Machine Gun.

(See discount offer on page 584)

U. S. FIELD ARTILLERY ASSOCIATION

1218 Connecticut Avenue

Washington 6, D. C.

Tank Fighter Team and *Falaise's Thorough Hell to Dunkirk* have told of small unit actions. Until the next book comes out I'd say that this has a slight edge on the field because it contains later information.

The broad background for the French debacle is pretty clear by this time: no planning on the part of the French General Staff, no political unity, no industrial preparedness. Any one of these shortcomings is enough almost to guarantee defeat, and France suffered greatly from all of them.

Militarily, France was beaten because it couldn't make up its mind whether to trust a barrier like the Maginot line or whether to trust maneuver. As Capt. Bauer (the military critic of the *Revue Militaire Suisse*) said: "If France was quickly and completely beaten in 1940 it wasn't because the frontiers of Alsace and Lorraine were made of concrete or because the Franco-Belgium border was undefended, but because the French acted as though the Maginot line didn't exist and at the same time acted as if it ran all the way to Dunkirk."

Draper explains the frenzied attempts of the French to reconcile these opposing theories, and gives an excellent picture of the overall campaign. His remarks on the French military (particularly de Gaulle) and political leaders are discerning and to the point. The story of the political intrigue that forced an armistice on the French and prevented the establishment of an official government in North Africa is clear and detailed, though a little more background on French politics would have made it easier to understand.

A major fault is the very poor maps. It is almost impossible to follow the details of the campaign. If you can overlook these and the silly claims made on the jacket blurb you will find *The Six Weeks' War* interesting reading and a handy book to have around—until the next one on the subject comes out.

R. G. M.

OUR HIDDEN FRONT. By William Gilman. 250 pages; photographs; endpaper map. Reynal & Hitchcock. \$3.00.

Alaska has been our truly hidden front, not only because we know little about it in general but also because a strange pall of unusual secrecy has enveloped it since the start of the war. Mr. Gilman is the only correspondent yet to give us a rounded account of events there; he is also the one who went there earliest and stayed longest, having sailed from Seattle less than two weeks after Pearl Harbor and remained until after Attu's recapture.

His story is one of impressive accomplishments. It is also one of circle-running, of inflation in the labor market, of a censorship that denied to Alaskans news of their area that was published in the states. It gives background news and straightens out misconceptions of Alaska's possibilities or lack of them. It is a chronicle of the loneliness, drudgery, and boredom of the building of outposts, and of the sheer courage of soldiers of all arms. The Alcan Highway received an honest appraisal. And the Battle of Attu is detailed.

In short, Mr. Gilman covers the entire Alaskan picture in an honest and forthright way. In following his account, however, you will want something considerably better than the endpaper map, which is not a bit better than most such. It is a pity that it omits so many points that are frequently mentioned in the text (for example, where is Bristol Bay?), and that many of its place-names become meaningless blurs among a mass of dots. Publishers as a whole would do their readers a great service by paying more attention to so potentially useful a part of their books—they realize that maps are desirable, so why not see that a good job is done on them? . . . But this doesn't detract one bit from the value of what the author himself has to say.

CAPTAIN RETREAD. By Donald Hough. 218 pp. W. W. Norton and Co. \$2.50.

This book will amuse you; I'll guarantee that. At the same time despite its grand humor, it is in many ways one of the most serious books I've yet seen about the Army—particularly in explaining the vexed problems of morale, leadership and civilian-soldier relations.

Capt. Hough's story is a delightful yarn about a "retread" and how he adjusts himself to the modern army. It's an experience that is stranger than going into the Army from scratch—half welcomed, half feared, and totally incapable of keeping the two wars separated. At once nostalgic and contemporary, the book recalls snatches of 1918—including the Battle of the Saucers and a wonderful series of Army ball games—and then switches into the present with tales of the

amazing Captain Zerega; of Kelly, the RCAF pilot who "buzzed" everything he saw and carried on a full-scale offensive against PT; about the Battle of Yuma, in which the AAF fought the desert and lost; and an uproarious account of how Hough became the "Greatest Supply Officer Since Alexander Hamilton"—and a dozen other yarns that peel the red tape and brass trimmings right off the Army and disclose its humanity.

This is what I call a "Hey, you!" book—that is, one that you look up from with a "Hey, you!" and then start reading great chunks to whomever happens to be around. Yet, as I said before, under all the disarming gayety runs a strong current of seriousness that will make you stop and think about this Army of ours, how and what it is doing, and why, despite all the snafu, it's the army that's going to help win the war and have a good time doing it.

For the first time as a book reviewer I'm going right out on the limb: This is a damn fine book. R. G. M.

CONVERSATIONAL FRENCH. By H. V. Besso & L. Clark Keating. 184 pages; index. Hastings House. \$1.50.

Like *Conversational Spanish*, this text was prepared for the AAF. That earlier book was extraordinarily effective as a teacher, due largely to its oral, conversational approach, to the careful selection and presentation of its material—in short, to its direct usefulness.

That same pattern and technique are followed again, but this work is by no means just a French translation of the Spanish words. On the contrary, full advantage has been taken of the opportunity to enlarge and improve. Everyday experiences are the nub of this approach to the language; as a result, a practical vocabulary and working knowledge are quickly built up.

ARGENTINE DIARY. By Ray Josephs. Random House. \$2.75.

The author is a newspaper correspondent who was stationed at Buenos Aires through the critical year of 1943 down to 15 Jan 44, when Argentina severed diplomatic relations with the Axis Powers. His book is well written and entertaining. Its gist is that the government of Argentina was taken over on 4 Jun 43 by a Fascist clique of army colonels. The same colonels have been running the government ever since, under a president who acts as a respectable front for behind-the-scenes activities.

Three changes in the Presidency have occurred within a year. None of them were important, for the real leaders (who are the colonels) continue to direct affairs. The Argentine army is strongly in sympathy with the Axis, and is anti-United States. Nevertheless, American diplomatic and economic pressure was so severe that the government did finally break with the Axis. So the record shows. Josephs represents that this is largely a paper change, which has not materially altered the situation. He claims that the people are not in accord with their military government, but that they have no effective way to oppose their officials.

Not all of the people of Latin America favor the United Nations. Regardless of what proportion of the citizens a Latin-American government really represents, some are at heart against the United States. Not openly so, for they well realize the futility of hostilities. Some are kept in line by favors, in the hope of getting something for nothing or for little. A few, including Argentina, are unfriendly to the United States.

It would be useless to conceal the change in the strategical situation that might arise in the future if Spanish-America, once united under the banner of Spain, should reunite in some confederation yet to be formed. This can happen. Argentina would like to be the nucleus of such a movement. She has succeeded in securing similar and sympathetic governments in the states adjacent to her—Bolivia, Paraguay, and Chile. Denied lend-lease military supplies in consequence of their attitude, they have begun to manufacture their own guns, tanks, and munitions. They are making fair progress. Left alone, in time for the next World War, they might conceivably rally other states to themselves and organize a strong Latin-American military power.

Ray Josephs's book explains this growing movement as observed by him at its fountain source. C. H. L.

CALL IT NORTH COUNTRY: The Story of Upper Michigan. By John Bartlow Martin. 272 pp.; bibliography; index; maps; photographs. Alfred A. Knopf. \$3.50.

Upper Michigan, with its roaring lumber camps and lusty mines, has had a wild and woolly history. Although rich in natural resources,

POLAR VIEW GLOBE



THE AIR CHIEF, No. 1225

A full-colored 12" globe ball rests in a solid American walnut base. The ball can be turned in any direction, or removed from the base for closer examination. A printed dial, mounted on the top of the base, makes it easy to trace and measure the great-circle distance between any two points on the earth's surface and also to read differences in time. Price each: \$10.00.

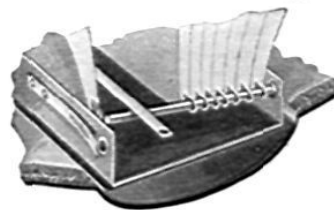
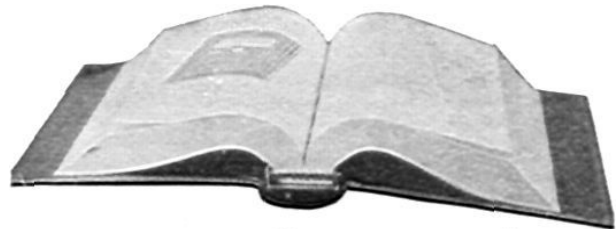
THE SUPER CHIEF, No. 2625

This 16" globe and mount are similar to the Air Chief, above. Base has 4 legs instead of 3, with stretchers between them. The larger globe facilitates comparison of locations, but its political map does not name and locate quite so many points as does the Air Chief. Price each: \$42.00.

(See discount offer on page 584)

U. S. FIELD ARTILLERY ASSN., 1218 Connecticut Ave., Washington 6, D. C.

Keep Your Journals for Constant Reference Both Now and Later



Here at last is a sturdy binder that will hold all 12 issues of your JOURNAL. Copies are held in place by a thin flat wire strip, spaced according to thickness which allows each copy to the read clear back to the binding margin.

This binder is made of strong washable imitation leather, in traditional artillery color. *The Field Artillery Journal* is lettered in gold across the upper part of the front cover and on the back edge. The Field Artillery cross-cannons are in gold on the lower front cover.

\$5, subject to discount, as noted on page 584

U. S. FIELD ARTILLERY ASSOCIATION

1218 Connecticut Avenue, N. W.

Washington 6, D. C.

ORDER FORM
for books reviewed in the
AUGUST, 1944, FIELD ARTILLERY JOURNAL.

(Date)

U. S. Field Artillery Assn.,
1218 Connecticut Ave.,
Washington 6, D. C.

Enclosed is \$_____ for the following checked books reviewed in this issue of THE FIELD ARTILLERY JOURNAL:

Journey from the East, by Mark J. Gayn	\$3.75
Ten Years in Japan, by Joseph C. Grew	3.75
Islands of the East Indies, by Hawthorne Daniel.....	2.50
Mathematics for Exterior Ballistics, by Gilbert Ames Bliss	2.00
A Treasury of American Folklore, edited by B. A. Botkin, foreword by Carl Sandburg.....	3.00
Handbook to Army Regulations and Other Directives on Administration, by Lt. Col. Walter Szudlo, AGD.....	2.50
Introduction to India, by F. R. Moraes and Robert Stimson	2.00
Border Command, by Carl Coke Rister	2.75
War Pictures by British Artists (Second Series): Women Production—Soldiers—Air Raids, 50c each: set of the four.....	1.75
War-Time China, by Maxwell S. Stewart.....	.25
Behind the Open Door, by Foster Rhea Dulles40
Geology for Everyman, by Sir Albert Seward.....	3.25
Tropical Nursing, by A. L., Gregg.....	3.00
Yankee Thunder, by Irwin Shapiro.....	2.50
The Voice of Norway, by Halvdan Koht and Sigmund Skard.....	3.50
Soldiers in the Philippines, by William Thaddeus Sexton (to members of the armed forces only)25
Gun Care and Repair, by Charles Edward Chapel.....	3.75
The German Soldier.....	.25
The Spoken Arabic of Iraq.....	1.50
My Lives in Russia, by Markoosha Fischer	2.75
Our Nation's Capital, by Mary Eleanor Browning	2.00
The Making of Modern China, by Owen and Eleanor Lattimore (for members of the armed forces only).....	.25
D-Day, by John Gunther	3.00
The Way Our People Lived, by W. E. Woodward.....	3.95
Modern Reconnaissance	1.50
Muzzle Flashes, by Ellis Christian Lenz	15.00
Summary of Operations in the World War, prepared by American Battle Monuments Commission	
3d Division.....	1.50
4th Division	1.50
7th Division75
27th Division	1.00
28th Division	1.50
30th Division	1.00
32nd Division.....	1.25
36th Division75
77th Division	1.50
79th Division75
81st Division.....	.75
93d Division.....	1.00
The Soldier and the Law, by Col. John A. McComsey and Lt. Col. Morris O. Edwards	2.00
The Six Weeks' War, by Theodore Draper	3.00
Our Hidden Front, by William Gilman.....	3.00
Captain Retread, by Donald Hough.....	2.50
Conversational French, by H. V. Besso and L. Clark Keating.....	1.50
Argentine Diary, by Ray Josephs.....	2.75
Call It North Country, by John Bartlow Martin	3.50
The Forgotten Ally, by Pierre van Paassen.....	2.75
Prairie City, by Angie Debo.....	3.00
Dictionary of Service Slang, compiled by Park Kendall	1.00
All Embarrassed, by William Steig	2.00

PRINT OR TYPEWRITE

.....
(Signature)

.....
(Grade, Name, and Serial Number)

.....
A.P.O.

.....
(Complete Address)

.....
(City, including zone number, and State)

its isolation and rough climate made hard going for pioneer families. Now it is rich in memories of a colorful past—from the days of the Huron and Chippewa, through the expeditions of French voyageurs and the explorations of Houghton and others, down to its modern development.

Out of these changes have come many yarns—some true and others fabulous. All make grand reading. Mr. Martin has steeped himself in the lore of this land, out of a keen interest arising from his love for its lakes and forests. Tales of the old-timers are woven into a running account of changes and development, so that one wants to get personally acquainted with this section.

THE FORGOTTEN ALLY. By Pierre van Paassen. 343 pp.; endpaper map. Dial Press. \$2.75.

Mr. van Paassen makes a very strong plea for Zionism, one-sided from the strong passion which characterizes much of his writing. He is at his best when—on a broader scale—he discusses the hidden intrigues, secret treaties, espionage, and schemings of the past, things which will bear much watching lest they rear their ugly heads again.

PRAIRIE CITY. By Angie Debo. 245 pp.; index; photographs. Alfred A. Knopf. \$3.00.

The toil, joys, disappointments, and hopes of Oklahoma's development from raw prairie are still very recent. Many of the first settlers are still living on the land they broke to the plow. From their tales and from records, Dr. Debo has woven the story of the mythical and cross-sectional town of Prairie City. Not the least of the source material is the author's intimate personal knowledge of Oklahoma, its communities, and its people.

Founded during the Cherokee Run of '89, Prairie City was just taking form when the Strip was opened 4 years later. To the newcomers, its recent settlers were already old-timers. Shortly the two groups began to work together, forming a single community in many ways. In its growth we see the workings of democracy in its purest form—the formation of an initial government. Incidentally, in these days of extraordinary complexities it is a mighty good idea to refresh ourselves on the whys, wherefores, and (especially) the hows of the fundamentals.

From those early days down through Pearl Harbor, Dr. Debo's work is not just a study of a community—it is a tribute to those who shaped a commonwealth. Fascinating as a novel, it is a careful, accurate saga of an important part of our nation.

DICTIONARY OF SERVICE SLANG. Compiled by Park Kendall. 58 pp.; illustrated. M. S. Mill Co., Inc. \$1.00.

Slang is 'most too effervescent to be pinned right down into a dictionary, but Mr. Kendall has made a pretty good stab at it. He covers a lot of territory: the Army, Navy, Marines, Australia and New Zealand, Spars, Waves, nurses, female Marines, Wrens and Waafs, and the Wacs. That's a big order for anyone, but you'll find most of those weird phrases tucked away in one or another of these lists. This little book is especially handy for one not in the service but who wants to learn the lingo of someone who is.

ALL EMBARRASSED. By William Steig. 101 pp. Duell, Sloan & Pearce. \$2.00.

Mr. Steig continues his weird investigations into the subconscious with more grotesque sketches, this time with the common theme of embarrassment. In fact, so consistent is this approach that *Embarrassment* is to be considered the main title of each sketch, with the printed captions serving merely as subtitles. The complexities of modern life leave all of us bewildered and impotent in many situations of ordinary life; this frustration embarrasses us, setting up an inner chaos—which Steig satirizes in his unique fashion.

ILLUSTRATION CREDITS

(If not listed, unsigned illustrations are from authors, by the *Journal* staff, or from special sources. References are to pages.)

Signal Corps: Cover, 498, 504, 505 (lower left), 544 (bottom), 545, 547 (except second right), 549 (except lower left), 555, 574 (left).

British Information Services: 501, 505 (top left and right), 544 (top), 547 (second right), 549 (lower left).

George Philip & Son, Ltd., and Rand McNally & Co.: 522, 528.

U. S. Marine Corps: 531, 537.

Lt. Col. Robert C. Gildart, FA: 532.

Capt. George T. Fielding, III, FA: 533.

New York Times: 546, 552, 553, 556, 557, 558, 559.

AN ENTIRELY NEW KIND OF ATLAS

In War

... a guide to Global Strategy

In Peace

... an Atlas for the coming age



Atlas of Global Geography

ERWIN RAISZ

Lecturer in Cartography, Institute of Geographical
Exploration: Harvard University

This beautiful and informative book of "global maps" gives a plane's-eye view of our world, revealing the fundamental facts of geography and terrain on which global thinking must be based. "It ought to make you as interested as you were when you first read Jules Verne. Practically everybody will enjoy and read it with profit."—*N. Y. World-Telegram*. "A most resourceful cartography . . . interest and attractiveness . . . Races, religions, economics, agriculture, manufacturing and mining, disease, hunger, illiteracy, inaccessibility and the Nazi doctrine of 'Geopolitik' are likewise studied in a remarkable book."—*St. Louis*

Globe-Democrat.

\$3.50

*Every American—soldier or civilian—needs this
remarkably complete reference work.*

**THE U. S. FIELD ARTILLERY ASSN.
1218 Connecticut Ave. Washington 6, D. C.**

Field Artillery Guide



"I have found the *Field Artillery Guide* an excellent text on all the necessary Field Artillery subjects, and a daily necessity in my work. Nearly every officer and many enlisted men in this battalion have copies of the *Guide*, and all find it very valuable as a reference source. My copy of the *Guide*, unfortunately, was destroyed by the rain and mud of this region, so please send me another. I am Assistant S-3 in the battalion, and the *Guide* is extremely valuable to me because it is the most complete, most concise, and handiest reference work I have as yet seen."

—Lt., FA, in combat in the
Southwest Pacific Area



2 to 4 copies, 10%

5 to 12 copies, 15%

Over 12 copies, 20%



☆ *Can be had, leatherbound and with your name in gold, for \$5.00—subject only to normal discount (see page 584). Be sure to print the name precisely as you want it to appear.*

U. S. FIELD ARTILLERY ASSN., 1218 Connecticut Ave., Washington 6, D. C.