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SEPTEMBER, 1944

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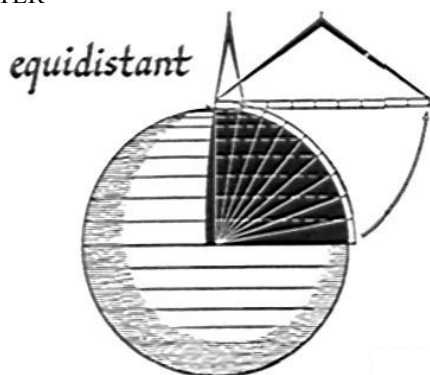
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SEPTEMBER, 1944—Vol. 34, No. 9

THIS MONTH'S COVER carries what is to our mind one of the war's outstanding photos: an 8" howitzer in action at Cassino during wet winter weather. Photographically it is well done, and rarely does the smoke remnant show so clearly — *Conqueror's* breach must have just been opened.

FIRST CLASS MAILING has just been arranged for the "pony" edition, to those with overseas APO or FPO addresses who are willing to invest an extra \$1 per year for the purpose. This should take weeks (months, in some cases) off delivery time. Since memberships expire at different times through the year, expiration dates will be appropriately adjusted so that they and the first-class-mailing-remittance expire simultaneously.

ALL REMITTANCES for any purpose should be in U. S. funds. Usually we can exchange without difficulty the small amount of British and A.M.G. currency that comes our way, but the *local* francs, lira, etc., that have been rolling in recently have no value here whatsoever.

HAVE YOU SPARE COPIES of this JOURNAL for January, April, or October, 1941? The Australian War Memorial, a department of the Commonwealth, is anxious to complete its files. You will do them a service if you will send such copies here. In turn, we will extend your membership in payment.

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No articles are official unless specifically so described.



Lesley J. McNair

May 25, 1883 - July 25, 1944

The entire Army mourns the untimely passing of Lieutenant General Lesley J. McNair, whose death in action, from the accidental dropping of an American bomb, occurred in France toward the end of July, 1944, only a fortnight after he relinquished command of Army Ground Forces.

General John J. Pershing, General of the Armies, stated: "General McNair was a great soldier, and his untimely death will be a great loss to the Army and the Nation."

General George C. Marshall, Chief of Staff, said: "The American Army has sustained a great loss in the death of General McNair. Had he had the choice he would probably have elected to die as he did, in the forefront of the attack. His presence on the firing line with the leading element in the great assault which has just been launched on the

American front in Normandy was indicative of his aggressive and fearless spirit and should be an inspiring example to the forces of our great ground Army which he organized and trained."

Lieutenant General Ben Lear, Commanding General, Army Ground Forces, stated: "The officers and men of the United States Army Ground Forces are deeply grieved over the death of our great former commander and leader. The country has lost a most capable and distinguished military commander, as well as a glorious citizen. We knew him as a commander, a leader, and a friend held in ever increasing affection. We deem ourselves privileged to have served under him. His splendid spirit, aggressiveness, and fearlessness will continue to be an inspiring example to all of us."

KWAJALEIN ATOLL—*An Interim Report*

By Maj. Gen. A. V. Arnold

Artillery with the force attacking the southern part of Kwajalein Atoll included four 105-mm and one 155-mm howitzer battalions. Their plan was to destroy by fire or neutralize the enemy so the infantry could mop up with minimum loss. Initially all five artillery battalions were to be in general support. Later two artillery battalions would be in direct support and three in general support.

Division artillery reconnaissance parties instituted a reconnaissance of position areas. Advance parties of the battalions followed shortly; they assisted in making the reconnaissance of position areas and routes thereto, and led the first DUKWs to the position area. The first of the latter landed at 1240, the first registration began at 1515, and all battalions were in position and ready to fire prior to darkness on D-day. Using an air observer, the registrations were accomplished on a division check point. This fire began so early in the general operations that initial rounds of adjustment had to be smoke shell in order to distinguish our bursts. Unloading of ammunition continued throughout the night following the landing, so that by the dawn of D+1 3½ units of fire were at the gun positions.

The attack of D + 1 was preceded by a 5-battalion preparation from H—90 onward. Kwajalein Island was secured on D+4 day.

On D+3 the attack of Ebeye commenced. Fire of the three general support battalions supported it, with a preparation similar to that used on Kwajalein Island. Later, a battalion of 105s was released to the direct support of the infantry, leaving in general support one battalion each of 105s and 155s. Ebeye was secured on D+4 day.

On the afternoon of D+4 two battalions of 105s were moved, with the mission of direct support of other infantry battalions. Both South Gugegwe and Center Gugegwe were secured on D+5, completing all artillery missions.

FIRE CONTROL

Fire of the direct support artillery was controlled by forward observers. That of the artillery in general support came from an observer afloat and by air observers; maximum dependence was on the latter.

Survey was in the position areas only. This, incidentally, was only 150 yards wide by 900 yards long for the 48 105s, the 155s being in position 200 yards in rear of that. In each battalion area DivArty furnished placemarks and a line of known direction.

Progress of the supply improvement of uncontrolled mosaics was very apparent. In this operation, one to a scale of 1/20,000 provided a fire chart of superior accuracy on map transfers. The greatest error was 5 mils and 25 yards. A somewhat larger scale map of individual islands, gridded and broken down to numbered target areas, was entirely adequate and satisfactory for orientation and target designation. Scheduled fires were fired by target area numbers. FDC rotated its personnel for a relief.

Normal rate of fire for prepared fires was 4 RGM. Most preparations were fired with half quick and half delay fuze.

Each night FOs adjusted normal barrages parallel to our infantry's front. General support battalions were adjusted 100

yards in front of the direct support battalions, to fire on call of FOs. Harassing fires continued throughout the hours of darkness, with irregular patterns, schedule, and rates of fires.

Each battalion maintained one LnO, with direct wire communication, at DivArty CP at all times. This is an excellent arrangement for keeping both the battalions and DivArty constantly informed of the situation, and for the coordination and control of fires.

FIRING

Fire of the 105s was especially effective for neutralization and demoralization. The field artillery fire destroyed buildings and light fortifications, kept the Japs under ground, broke up all attempted counterattacks, and held our infantry casualties to a minimum.

During sustained firing, each 105 battery fired 8 minutes and then rested 2, to deliver 100 rounds each 10 minutes. During that 2-minute period, guns were swabbed, cleaned, and oiled.

Each 10 minutes one gun was pulled out for a 10-minute rest. Maintenance was continuous during lulls.

155s fired 50 rounds each 10 minutes during sustained firing. Their maintenance was the same as that of the 105s.

Rate of fire was controlled by chiefs of sections and battery executives. All of these were equipped with telephones. Because of the condensed position area about half of them used head-and-chest sets.

Maintenance personnel supplemented the howitzer squads, and a rotation system relief was used.

OBSERVATION

Commencing at 1515 on D-day, 2 air observers registered one howitzer from each of 4 battalions on scattered check points. On D+1, before H—90, air observers registered one piece from the 5th battalion and checked the adjustment of all battalions on their proper initial targets.

One air observer reported the progress of the troops and ordered our fire to lift when the leading ones were within 300 yards of our bursts. After H+10, air observers maintained surveillance of the fire of the 3 (remaining) general support battalions, adjusted fire on targets of opportunity, registered



pieces on check points, and conducted general observation missions.

On succeeding days air observers continued fire on targets of opportunity and registered battalions on new areas of operation. Two observers were in the air at all times during daylight; the maximum number conducting fire at one time was 3. Air observers were a major factor in the success of the artillery support of the operation.

COMMUNICATION

Radio was the primary means of communication. A common channel was established between tanks and artillery for use

with FOs, but observation was such that it was not used except to determine the tanks' location.

Wire furnished communication between position areas, FDCs, and DivArty CP. Wire connected FOs, LnOs, and BnCs of direct support battalions. Communication was maintained between commanders of direct support battalions by direct wire and by wire through infantry regimental switchboards.

Many elevated lines in the position area were broken by trees being felled for fields of fire on the first day and night. Wiremen must constantly patrol their lines and vehicle drivers must be educated in wire preservation.

VERTICAL CONTROL IN THE JUNGLE

By Lt. Col. M. L. Curry, USMC

In terrain both mountainous and jungle-covered, the *bête noire* of fire direction is the difficulty of determining the altitude of a target seen only by an FO whose location is uncertain but who has made an adjustment on it. Rapidly massing the fires of two or more battalions is nearly impossible in this case, as each battalion must be adjusted in turn. However, the three-dimensional coordinates of the target can be determined fairly rapidly for plotting on a surveyed firing chart, for future reference, when time permits. Here is a solution we used on Guadalcanal; although "there's nothing new under the sun," the writer has never seen this published anywhere.

This stunt presupposes the establishment of accurately located OPs, permitting locations by intersection. After the adjustment has been completed the FO gets a zero height of burst on the target. The burst center is then raised vertically above the target

high enough to be seen by the surveyed-in OPs, by the introduction of an arbitrary angle of site which we will call the "added SI." A series of rounds is then fired with the same setting found for the zero height of burst on the target. This burst center (elevated vertically above the target) is located by the usual highburst methods, giving

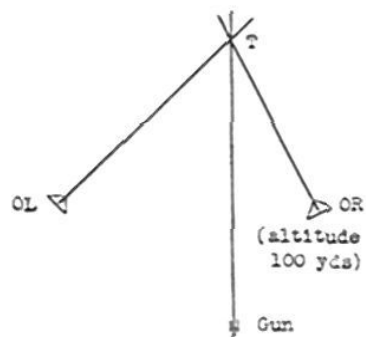


Figure 1

both horizontal coordinates and altitude. From the plotted range and the "added SI," the height of the burst above the target is obtained. Subtracting this from the altitude of the burst center gives the altitude of the target.

EXAMPLE

Adjusted QE on target	200 <i>ft</i>
Adjusted Time on target (Zero height of burst)	14.3 sec
Added SI	30 <i>ft</i>
QE for high burst (200 + 30)	230 <i>ft</i>
Time setting for high burst	14.3 sec
Burst center plotted at T (Fig. 1) from OR and OL reports	
Plotted map range (R)	3,000 yds.
Plotted distance OR-T (r)	2,000 yds.
SI from OR to burst center (Fig. 2)	+10 <i>ft</i>
Altitude of OR	100 yds.
Height of burst center above OR (2×10)	20 yds.
Altitude burst center (100+20)	120 yds.
Distance burst center raised above target (3×30)	90 yds.
Altitude of target (120—90)	30 yds.

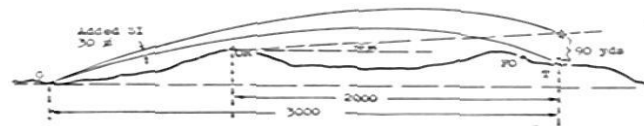


Figure 2

PATROL PARTY

By Capt. Robert F. Cocklin, FA

Combat in the jungle has presented a new and entirely unique problem to the liaison officers and forward observers in the field artillery. That problem deals with the necessity of functioning properly under conditions dissimilar from any previously encountered.

For the most part, the liaison officer or forward observer has to function with infantry patrols, particularly in this theater.

OPs are often of questionable value from the standpoint of adjusting fire on the enemy. Since this terrain will not permit the use of motor vehicles, the liaison officer becomes a foot soldier along with the doughboys. In order to fulfill his mission, he must have his radio and have it functioning properly. Therefore we come to the problem of how and what the liaison officer will take with him on these patrols.

Most of the patrols which require an artillery observer will

be of from 5 to 7 days' duration. Generally they will consist of not less than a reinforced company. Both the time element and the size of patrols are dictated by the difficulty of the terrain. It is impossible to move with any speed, so to patrol an area of consequence a minimum of five days is required.

In most instances the artillery officer will have to carry a 610 radio with spare batteries, and will undoubtedly want a couple of Coleman stoves for himself and his party. This is practically all of the equipment necessary, aside from the personal equipment of the party. When you stop to consider, however, that all of this is to be carried by hand and that rations and personal equipment will make a leaden pack that sorely taxes the strength of most men, there is a definite problem.

Those of us who have been doing this work, have all had our initiation. Our first trip out was noted for the amount of stuff we carried along that we didn't need and the necessities we left behind. Every individual will naturally arrive at his own conclusions as to exactly what he wishes to carry, but there are certain items that all of us are agreed upon as furnishing the greatest amount of comfort with the least weight and bulk:

1 Shelter-half	1 Grenade carrier (3 grenades)	New jungle medical kit
1 Poncho	1 Jungle sweater	Intrenching tool
4 pr. Socks	Rations	2 Water-proof bags for socks, matches, maps
2 Canteens	Oil	
1 Carbine	Patches	Jungle pack

These items should be carried by each man, but in order to carry the radio and its batteries it will be necessary to split up among other members of the party the belongings of the men who are carrying those items.

In lieu of a water-proof cover for the radio and batteries, we have found that the radio can be carried in two jungle packs and the batteries in another. It is absolutely essential that all radio equipment be kept dry: the artillery party is just excess baggage unless it can fulfill its mission.

For a patrol of the type we have been discussing, we have found that the desirable artillery party will consist of one

officer and six men. This will enable the group to carry the necessary equipment without undue hardship on anyone.

There are some odd items of interest that pertain to this subject which I would like to set down here. First of all, the officer will find it convenient to alter his jungle suit for greater comfort. We have found that taking out the suspenders lessens the strain on the shoulders (if you are not used to carrying a pack this becomes a major item). Since you are always wearing a web belt, the side pockets should be lowered about four inches to enable the wearer to get into them without taking off his belt. A small flap at the lower end of the zipper is also desirable.

Most of us prefer to wear leggings, as in crossing streams you inevitably pick up sand and muck inside your socks—which is very hard on the feet. We have not found the jungle boot satisfactory for patrol. The officer will have an option of carrying his automatic, but most of us leave ours behind because of the additional weight. A carbine with extra clips is far more valuable. Thompson sub-machine guns are available, and if you feel fairly certain of enemy contact you may wish to arm certain members of your party with this weapon instead of the carbine.

Along with the extra batteries, stick in several smoke grenades to assist in giving your location to friendly units. Also include one thermite grenade which can be laid on the radio to render it useless should the necessity arise.

The artilleryman must remember that he is going to suffer a good deal of hardship on these patrols. He is going to be constantly wet, tired, and under a nervous strain. Therefore we consider it essential to be as comfortable at night as possible. If you haven't a dry jungle sweater to slip on and some dry socks to get into, you won't sleep—and it takes a good man to keep going without it. Foot powder, halazone, insect repellent, and the like are absolutely essential, but will be found in all jungle medical kits.

Undoubtedly many liaison officers would change this list somewhat according to their personal desires, but we feel that for the most part it will give the party the greatest amount of comfort without losing any of its flexibility—and will enable the artilleryman to fulfill his mission.

LIAISON IN THE JUNGLE

By Capt. Ralph M. Fuller, FA

The real "secret weapon" of this war is cooperation between units. Much credit has been given to planes, tanks, and bazookas; rightfully so, but the factors that win battles are those men fighting face-to-face with the enemy.

In this respect, the liaison officer with the infantry can do a great deal in making a closely knit combat team, by convincing the infantry battalion commander that he can trust your work and that you can go out and do a job for him. After any operation you'll know that you did your part, and feel that your's is "the best damned artillery in the U. S. Army."

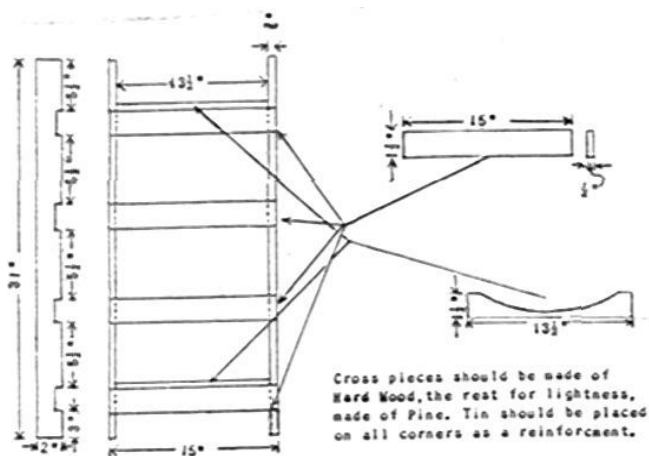
To do your work in the jungle, many changes must be made. T/E for liaison is adequate, but careful planning must be made to get the most out of your men and the equipment that you have. Before coming into the South Pacific, our organization

realized that vehicles for liaison would be a luxury instead of standard equipment. The problem of packing our equipment was a big one, but carefully thought-out plans soon gave us a solution.

EQUIPMENT

Packs must be made to hold the equipment, and after some work on the drawing board our sections made some modifications of the "Sourdough Pack." These seem to be the answer. They are strong and light enough when packed that our sections are able to keep up with the infantry on any operation. The drawing herewith shows the exact dimensions that we used, and we have not had to change this design in any way.

The men carry everything they will need for several days'
September, 1944—FIELD ARTILLERY JOURNAL 597



operations. We have broken our equipment down to:

<i>Ln Sergeant</i>	<i>Ln Corporal</i>	<i>Radio Operator</i>
Jungle Pack	609 Battery Pack	609 Receiver
BA-40	Map Case	Prearranged Codes,
Remote Control	Personal Equipment	Call Signs
Wire Kit (TL-18)	Bed Roll	Message Book
Field Glasses	Message Book	Personal Equipment
Compass		Bed Roll
Bed Roll (socks and shoes)		
Shaving Kit		
<i>Wireman No. 1</i>	<i>Wireman No. 2</i>	
Wire Pack	(Driver) Jungle Pack	
2 DR-8, 1 RL-39	1 DR-8	
1 EE-8, Pole Climbers	1 BA-40	
Friction and Rubber Tape	TL-18	
Personal Equipment	Bed Roll	
Bed Roll	Personal Equipment	
TL-18		

Each man must have two canteens, entrenching tools, and rations. Suggested rations are: 1 breakfast "K" ration, 1 dinner "D" ration, 1 supper "C" ration. We have taken the bolo and cut it down about 6"; this increases its efficiency as a brush knife.

OPERATIONS

Concentrate the training of your section to best prepare for the tasks ahead of you. Most operations will be amphibious, but training of that sort will come. Take every opportunity to modify your plans, when changes are necessary.

Exchange information when you get something. Remember, the infantry wants to know of any changes you make in your battalion. Many LnOs do not keep the Inf CO informed. Information for your S-2 and S-3 is vital—keep them posted at all times on your front lines, movements of patrols, and all information of enemy movements. Get from your S-3 adjusted data on base point, check points, and targets; plot these on a jeep board and you will find that this gives you fairly accurate data

when surprise fire is needed.

As a liaison officer, you must get photos. Yell for photos! You've got to have them, and don't be afraid to say so! If they don't come to you, go after them. When you get them, grid them with your coordinate system and identify all known targets on them. Show your front lines carefully and keep them up to date. That is a definite *must*.

FRONT LINE LOCATION

Locating the front lines will be one of your jobs, so keep it in mind when you do your work. You have several ways to do this—one is to get overlays from the Inf S-3 and make them fit your photo; then, with this adjusted overlay sent back to FDC, you will be able to keep the S-3's firing chart up to date.

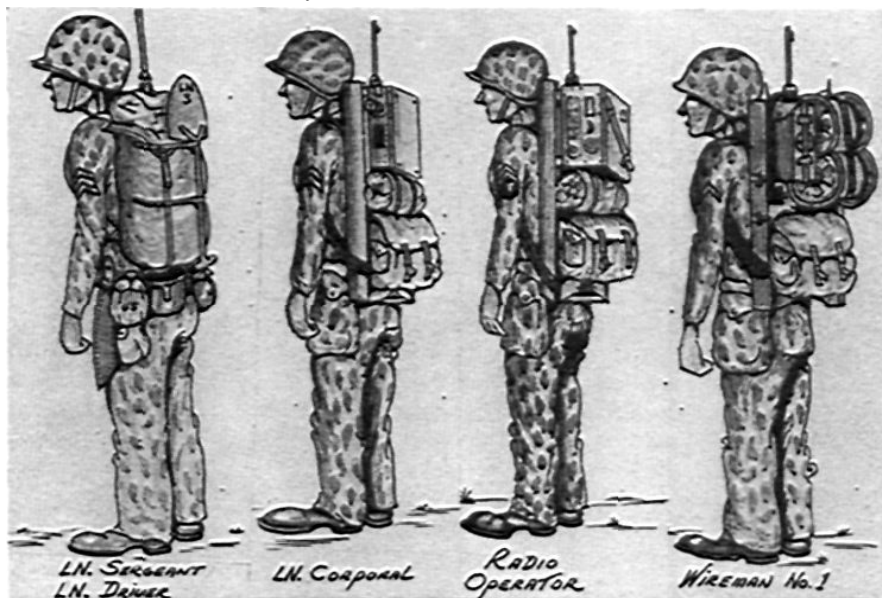
This method is not exact because you will find that many company commanders do not provide accurate drawings. One of the best methods is to have FOs adjust on a point at a specified distance ahead of them, after making a check point or base point registration. Plot the point fired on by using the adjusted range and deflections, less corrections. Using the ranges Observers-to-Bursts, plot new points. Connecting lines between these points are the front lines.

If the terrain at the front is open enough or high enough to permit any kind of observation, the FOs may locate themselves from known points on the map or photo. The results will be approximate if only a compass is used, but they should be satisfactory.

Another method would be to use smoke pots or pyrotechnics on a prearranged time schedule, locating these from several OPs much like taking readings for a CI adjustment.

Another method entails the use of the liaison plane. On a prearranged time schedule have the infantry mark their lines with panels (small pieces of cloth will do). The air observer sends back a number of points by use of the coordinate system. These points are plotted on the firing charts and the lines are extended from point to point.

Many ideas have been set down on traverse. If that is the only way to locate your front lines, then use it—but if there is an easier and faster way, use it if it gives you the same results. Should you use the traverse method, you will need your entire survey section to run the traverse of the front lines.



COMMUNICATIONS

Communications will be your biggest problem. Initially you will be confined to radio, and this radio net should be controlled by the artillery Bn CommO or CO. If this is not done the air will be so jammed that everyone will have a difficult time doing his job. When we transmit, the radio is left on the packs and we use the long cable extension to connect the radio and battery packs.

Wire is a "must." One of the best ways to handle it is to have a man from the battalion wire section land with your liaison party and run a line from the Inf Bn CP to your switchboard before your guns ever hit the shore. Send your two wiremen with him (one of your wiremen will be your driver) and be sure that they put the wire high in the trees. If this is not done the tanks, "alligators," and "buffaloes" will cut the wire beyond any repair. When your communications are complete start getting accurate and up to date information back to your CO and S-2.

METHODS

In jungle operations you will find that high angle fire is used most of the time. You must show the infantry commanders that when using high angle you cannot normally aid them in ranges closer than 2,800 yards from the guns.

Unlike any other warfare, jungle operations are made on small beachheads 500 to 1,500 yards from the beach. Careful planning must be made to get the most from your guns by placing your batteries as far from their supported units as possible.

To fire in protective lines at night, you should tie in all of the company commanders by the infantry 300-series radio. These commanders get their platoon leaders on sound-power phones, and as each round is fired they will be able to sense the round and you may complete your adjustment. This method should be used only if you or your FO cannot observe the firing.

Use observation when possible, even if you must climb a tree to get it. We have used a bos'n chair and it works very well. This is risky but "you can't live forever."

Before starting your operation, be sure that your FOs are told what plan of communications will be established and be doubly sure they understand the tactical mission. Be certain that they have a prearranged code and sufficient gridded photos of the area.

We have used two FOs, one with each attacking line company. This method gives the infantry better direct artillery support. Before going into jungle operations it was necessary to revamp the T/O for FO teams. We organized our sections with one officer, one NCO in charge, two radio operators, and

three wiremen. Their equipment is identical to that carried by our liaison sections.

Train your non-coms carefully, because your officers may be killed or called back to the battalion CP and your non-coms should be able to carry on no matter what may arise.

You must read your section into the complete plan. They are intelligent, and can help you more if they know what you are trying to do.

When you come out here remember that Japs hate artillery fire. Give it to them in big doses!

Don't lose sight of your main mission as a liaison officer. First, you must get information back to your battalion, and give information to the Inf Bn CO; secondly, you must be a good shot, remembering that shooting is your secondary mission.

SUMMARY

Before leaving his own organization a liaison officer should become familiar with the situation of his own unit and with the unit to which he is sent. In that respect, he must ascertain definitely what his mission will include. Be sure that arrangements for communications, signals, supply, and transportation are adequate. Get all photos and maps that are necessary for the operation. Then pass this information on to the FO and Ln sections. The liaison officer should obtain credentials, in writing, if this is his first duty with the infantry battalion.

On reaching the headquarters to which he is sent, the liaison officer should report promptly to the CO and show his credentials (if they are in writing), then arrange for transmission of messages to his own Bn CO giving the situation of the infantry, its plans and movements.

During his tour of duty the LnO should further harmonious cooperation between his own HQ and the one to which he was sent. Accomplish the mission without interfering with the operation of the HQ to which sent. Keep informed of the situation of his own unit and make that information available to the commander and staff of the unit to which sent. Most important is to keep his own battalion up to date on anything that the infantry may do or enemy that it may meet. If he fails to do this, he has failed in his mission.

Records should be kept of all messages and reports sent or received during the tour of duty—most important is to make a prompt report to his own headquarters if he is unable to accomplish his mission. Then, report his departure to the visited unit commander on the completion of his mission.

On return to his own headquarters the liaison officer should report on his mission and transmit promptly any requests of the commander from whose headquarters he has just returned.

Communications Problems in SWPA

By Capt. Richard Leffers, FA, and Lt. George W. Maddox, FA

Communications problems differ in this theater from those encountered in the States, almost wholly as a result of differences in terrain. Training received by units in the States (both in schools and on maneuvers) generally applies in this theater. Many descriptions have been written concerning South Pacific operational difficulties caused by weather and terrain, and it is not the intention of the writers of this article to go into a lengthy discussion on this subject, but a brief

description of terrain is necessary in discussing the problems encountered.

The coast line is generally irregular, having many coves and capes. Along the coast are many small islands. Beaches are usually very narrow and almost without exception are fringed by heavy jungle growth. There are many coral reefs and sharp rocks in the shallow water along the beaches, and in the **September, 1944—FIELD ARTILLERY JOURNAL** 599

passes and channels between the small islands and the mainland.

The jungle (or rain forests, as they are called here) can usually be described as impenetrable for anything except men on foot and some types of heavy track-laying equipment. Tree heights run to 100 feet, with dense tangles of vines intertwining from the tops to the roots of the trees and underbrush.

Streams and rivers, although very plentiful, do not present many problems as they are generally not difficult to cross.

In areas not completely covered by rain forests Kunai grass is the most common vegetation. Actually this grass is more difficult for a man to work in than is the jungle itself. It often grows to the height of 10 or 12 feet and paths must be literally hacked through it. Heavy track-laying equipment may be used to a great advantage in making passageways in this grass.

Within distances varying from a few hundred yards to a few miles from the beach, mountains rise sharply. Invariably, razor-back ridges and deep ravines reach finger-like from the mountains toward the sea. This type of terrain is difficult anywhere in the world but is more so here due to the heavy growth that extends from the beach high into the mountains.

WIRE

Wire laying and maintenance in this theater therefore requires a tremendous amount of hard work and initiative. Very seldom can normal wire laying by vehicle be used. Though lines as a rule are not long, the installation of an artillery wire net very often takes many times as long to complete as does a similar net under more favorable conditions.

Wire routes must be carefully selected and all wire put in overhead wherever it is at all possible. To service and elevate the wire when laid may require more time, but it pays dividends. Care must be taken to avoid traveled routes and areas or roads in which bulldozers or other track-laying equipment are apt to be used. Even though wire is installed properly, there is no guarantee that bulldozers will not either push down the tree to which it is secured or cause a tree to fall across the line, breaking communications. Oftentimes many hours of hard work can be saved by obtaining all of the information available concerning the proposed plans of the engineers on road and dump area construction prior to planning wire routes. Wherever possible heavy Kunai areas should be avoided, since there is no way either to elevate the wire or to get it flat on the ground.

Atmospheric conditions here greatly reduce the efficiency and stamina of even the best wire crews. In the extreme heat and humidity of the jungle, men must constantly guard against overheating and reaching such a state of fatigue that they are unable to continue working.

Where it becomes necessary to lay wire underwater, a few simple steps must be taken to insure good communications. Where a current exists (in a stream or by tidal action) it is

advisable to attach weights to the wire. Sand bags, scrap metal, or rocks may be used. They should be spaced closely enough together that there will be no movement of the wire against coral or sharp rocks. When wire is laid underwater off the beach, it is least endangered by landing craft if it is laid in water not less than 2½ feet deep. Stream beds should always be avoided wherever possible as rampaging flash floods are not uncommon. New wire should be used if available, and all splices should be thoroughly checked for water tightness. In most cases the ordinary field splice may be made watertight by using generous amounts of both rubber and friction tapes. For prolonged use it has proven advantageous to fuze the rubber tape layer with a blow torch, then apply three layers of friction tape, each fuze with a blow torch. Good wire, properly installed, will operate successfully over extended periods. It is advisable to use only trunk circuits for the artillery net: simplex and phantom circuits will work but crosstalk is hard to overcome.

RADIO

The problems encountered in wire laying increase tremendously the importance of good radio nets. Every effort should be made to have both wire and radio nets available at the earliest possible moment, but until the wire net is established radio is usually the sole means of communication. Since the installation of the wire net may take anywhere from several hours to several days, it is readily apparent why so much stress must be placed upon radios.

Set maintenance is a continuous battle against dampness. In addition to the usual causes of set failure, atmospheric conditions offer a very difficult problem. Unless sets are kept dry, rust and mold will quickly ruin them. This dampness is not necessarily the result of exposure to rain but more often comes from

absorption of dampness from the air itself.

The most effective means of combating this ever-present cause of set failure is an improvised drier. Any old packing crate or container that can be completely closed serves the purpose very well. An electric light bulb or gasoline lantern gives ample heat for complete drying when placed in the drying box along with the set. With daily drying and continuous maintenance of sets, excellent results may be obtained. Ranges, battery life, and the number of set failures do not differ measurably from those expected in more favorable theaters.

Radio nets as commonly used in the artillery have been very successful in operation in this theater. Observers report, however, that a few additional sets could be used to distinct advantage. The problem of complete front line coverage by field artillery forward observers reaches such proportions that with existing personnel and equipment a field artillery battalion must plan on training and using company grade infantry officers as forward observers.

Using a battalion combat team as an example, the direct support battery is equipped to send out only one FO team. Since this team can be in only one company's sector at a time, this leaves one and often two companies that must relay their requests for fire through the infantry battalion commander,



"I'm saving the radio batteries by having him send the fire mission back."

the artillery LnO, and then to the artillery FDC, no matter how urgent the mission.

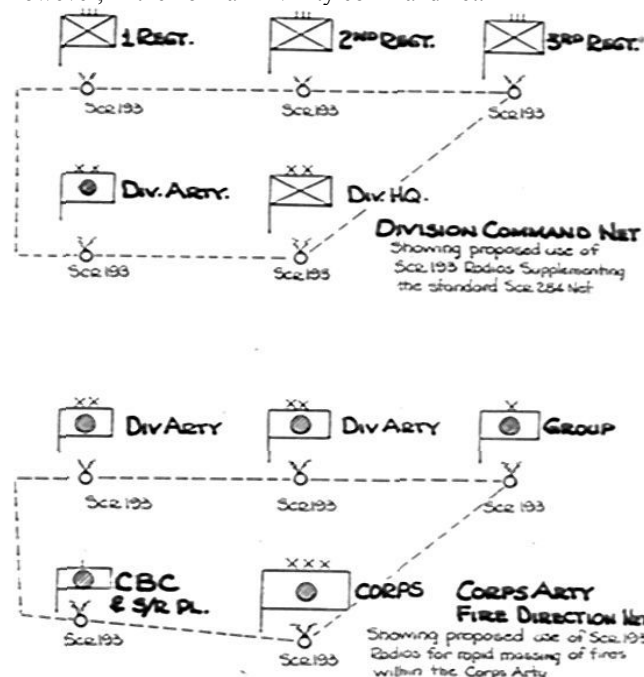
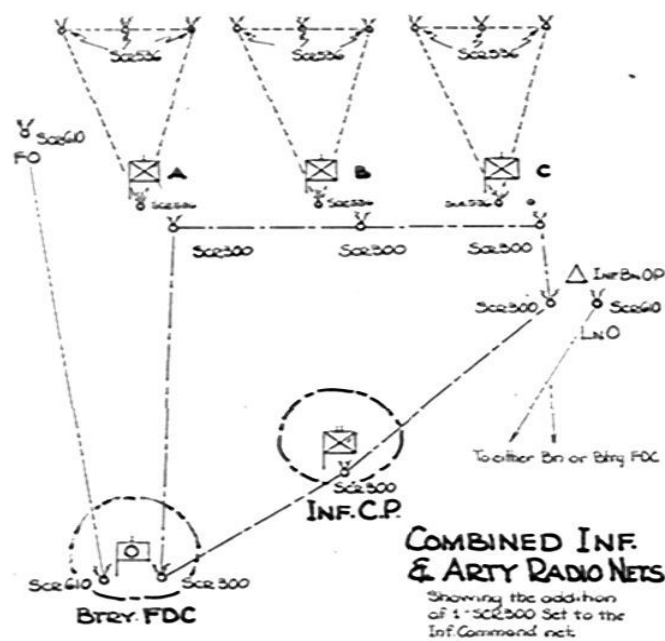
Each infantry commander and the battalion commander has at his disposal an SCR-300 radio that operates in the infantry battalion command net. By adding one SCR-300 base set to the equipment of the battery FDC (or in the case of the regimental combat team, 3 to the battalion FDC), fire missions could be requested by any front line company or platoon. The addition of this set does not decrease the efficiency or interfere with the operation of the infantry battalion command net, nor are any additional channels needed. In some instances, platoon leaders are in a position to call for and adjust very effective artillery fire. These missions would be sent in to the company commander over the platoon leader's SCR-536 and relayed only once over the SCR-300. This system provides a means for either calling for or stopping fire with great rapidity by all infantry officers in the front line, from the battalion commander down to the platoon leader.

For massing the fires of two or more battalions a command net using SCR-193 radios has proven desirable. In this case the infantry regimental commanders, the DivArty commander, and the division commander are in constant communication with

each other, and the fire of the entire DivArty can be massed by request.

When two or more divisions are operating as a corps, or when (as in most cases) several groups of artillery are attached to a task force, massing of fire through normal communications channels is quite difficult and slow. An SCR-193 net having a set with each group CO and one with the corps or task force artillery officer, will greatly expedite the massing of all the artillery fire.

Radio nets as discussed above would require the addition of 3 SCR-300 radios per light battalion (or a total of 9 for a DivArty) and 2 SCR-193 radios per DivArty headquarters. Where counterbattery work is indicated, an additional SCR-193 could be used to an advantage by the medium battalion. In supplementing artillery nets with the above sets, it must be remembered that existing radio nets and TE equipment are inadequate only because of difficult terrain and somewhat abnormal but necessary tactical functions. The SCR-193 radio is recommended in preference to the SCR-284 because of its greater dependability and range; the SCR-284 should be used, however, in the normal DivArty command net.



USING THE G.I. BUFFALO TO LAY W-110

By Lt. Melvin C. Monroe, FA

In one of the recent New Guinea landings our battalion wire crew laid W-110B telephone wire through the sea 3½ miles to an island where our supported infantry regiment were readying for a main attack the following day.

One of our two battalion "buffalos" was rigged with two reels RL-31A, one on each side of the after decking. A HQ Btry wire crew of four men operated each reel separately, and the crossing was made in about 50 minutes. Two more circuits were laid on the return trip. One of these shorted out and was abandoned but with the three remaining metallic circuits simplexed we still had five circuits, which proved

adequate for the job. These lines were used by artillery liaison officers and forward observer parties of two artillery battalions, plus command channels for the infantry and higher headquarters, including the field artillery group regimental liaison officer.

A switching central consisting of a BD-71 switchboard and three operators was set up. Lines were laid from it to a similar set-up on the island. Trunk lines were brought in to the switching central by Field Artillery Group, the artillery battalions, and HQ.

We had previously studied the surface features of the ocean floor from whatever navigation charts we had available, and by allowing for the depth of the ocean and existing currents we had a fairly accurate *K* to add to our map distance to give us the amount of wire to load in the buffalo for each crossing.

On the second day of the attack, the buffalo was used again to extend the lines. This time it carried additional W-110 wire, extra radio batteries, 10-in-1 rations, and water for the forward observer parties and liaison officer. Incidentally, the latter was our battalion commander, Lt. Col. Dwight E. Beach, who spent the two days of the main attack on the front lines, firing the battalion almost constantly, stopping the suicidal charges of the Jap Tiger Marines, knocking out pillboxes and machine gun nests by day and shooting the protective wrap-around-the-perimeter barrages we fired at night.

When starting to lay the wires, we first tagged the ends "Forward Switching" and tied to a coconut tree with enough slack to run overhead to the switchboard. With this ready, the buffalo, reeling out the wires, was driven straight out from shore till it was riding just beyond the breakers, a distance of about a hundred yards. There, slowly idling forward, it held the lines taut to keep them from washing back ashore. The switchboard operators stripped off their clothes and, tying sandbags to the wires with 3-foot lengths of W-110 at about 30-foot intervals, pinned them down as far out as they could wade with sandbags. They then went back and dug in the wire to a depth of 3 feet across the beach to prevent its being torn out by beach traffic. When the sandbags had been attached, the crew on the buffalo sandbagged the wire where they were sitting and again about a hundred yards farther out, then set their course for the island.

On reaching the end of a DR-5 mile of wire the buffalo was stopped, slack was pulled off, and while a new reel was being spliced on the machine was set to idling slowly in reverse while

the driver kept it pointed on the original course by use of his compass. This procedure was necessary as through the channel was a current of 2 knots, which would have thrown the buffalo off its course and put a terrific strain on the wire if the machine had been allowed to drift. When a new drum was in place on the reel the wire sergeant gave the "Go Ahead" signal to the driver, who again moved out on his course.

In making splices for under-water laying we used double wraps of both rubber and friction tape and then covered the entire splice with a thick coating of vehicle waterproofing grease.

On approaching land we thought it better not to bring the wire in on the sandy beaches where the LCVs landed, so we chose a rugged section of the shoreline that had a coral reef extending about 50 feet offshore and just high enough that landing craft couldn't get over it. We headed for this point and the versatile buffalo clambered up over the reef, plunked into the water again, and swam ashore.

As the coral was very sharp, we began sandbagging when about 200 yards offshore and placed sandbags at 10- to 20-yard intervals where the wire was brought up over the reef, to keep the current from dragging it across the coral. On shore the wire was again dug in up to the tree line and placed in the "Island Switching Central" board.

When extending the wire again the next day, the buffalo was unexpectedly commandeered by regiment, and it made several trips from the beachhead over the hill to the front lines at the edge of the airstrip, carrying ammunition, rations, and water and returning with dead and wounded through an area heavily infested with snipers.

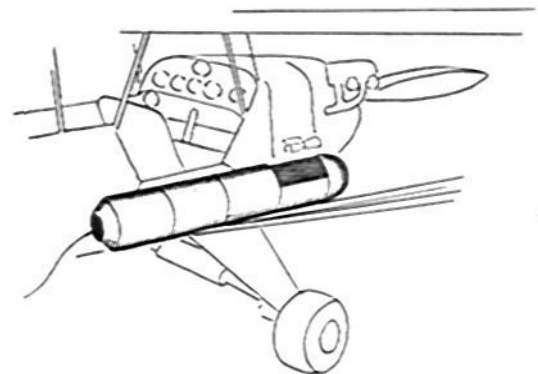
This wire laid through the salt water remained in service about a week till it was replaced by cable and so was no longer needed. During that time it gave perfect service.

Use of Field Artillery Liaison Planes in Wire Laying

By Capt. Richard Leffers, FA, and
Lt. George W. Maddox, FA

Wire laying by air has changed in the communications officer's mind from an interesting but impractical experiment to a very important part of training and operations. Searching for a rapid and practical means of overcoming terrain difficulties in wire laying, he inevitably arrives at the conclusion that the use of the liaison plane is the answer, if he can make it work. Many experiments have been made and many methods of wire laying by air have been tried, but for some reason there has been very little written on the subject.* Necessarily any work done with planes had to start with nothing and, by trial and error, end with a workable plan.

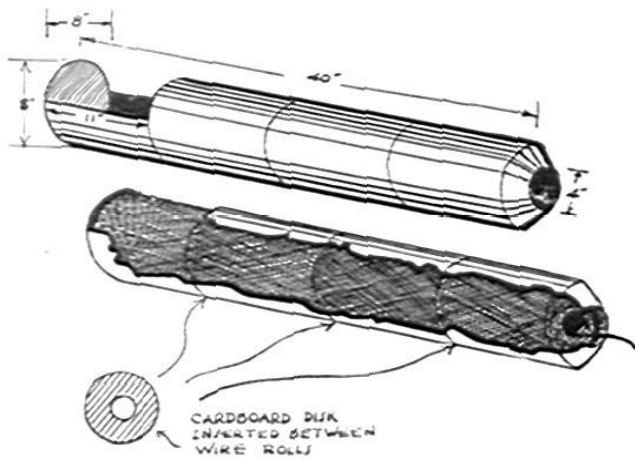
The most important step in the entire process of laying wire by plane is that of winding the wire in such a manner that it will play out at the rate of from 65 to 70 mph without tangling or



binding, and with a minimum of friction. This can be accomplished by winding it in bindertwine fashion so that it will feed out from the center of the reel. Extreme care and patience are required to accomplish this most important step satisfactorily.

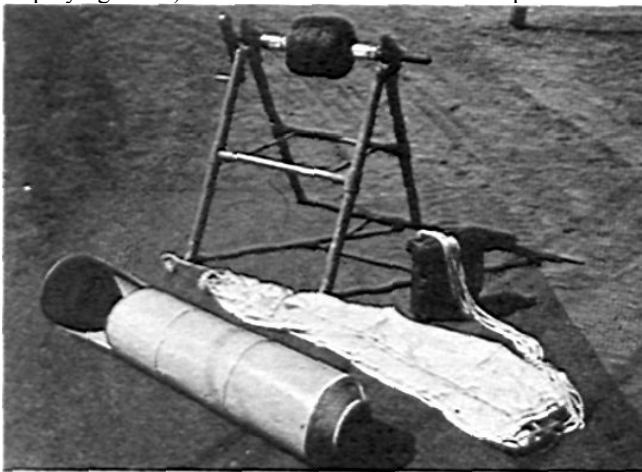
It has proven practical to employ for this purpose an RL-31 with the axle wrapped in heavy cardboard (so as to expedite the removal of the completed roll from the axle without the danger of tangling the inside of the roll). The wire must be tightly wound, working diagonally from one side to the other, taking care that as the roll becomes larger it is built up as straight and symmetrical as possible on either end. No loop should overlap in length any previous loop, as there is a tendency

*The first published material on this subject appeared on p. 566 of this JOURNAL for August, 1944—Ed.



to bind if this is done. The size of the roll is limited as to both length and diameter because of a tendency for the roll to collapse as it is being laid. Limiting the proportions of the roll to 10" in length and 8" in diameter has proven successful. A roll of this size contains about .4 mile of W-130 wire.

As the velocity of the wind tends to blow the outer layers of the roll into the path of the wire playing out of the center, thereby increasing the possibility of entanglement or friction that will skin or break the wire, it has been necessary to improvise a container to eliminate this possibility. Proportions of the container are also restricted as to size and weight so as to be manageable inside the plane during take-offs and in flight prior to laying. A cylindrical tube 40" long and 8" in diameter, with a funnel arrangement at the rear through which the wire can pass and a cover over the front to keep out the wind, is the answer to this problem. The hole in the funnel arrangement should not be less than 4" in diameter so that if a small tangle occurs it can pass through without breaking or skinning the wire. At the front of the tube half of the cylinder is cut away longitudinally for 11", leaving an aperture through which the wire is placed in the container. The tube will hold four rolls spliced together, or a total of about 1½ miles. Additional rolls may be carried in the plane and placed into the cylinder during flight. In this way from 3 to 5 miles can be laid depending upon the weight of the pilot and observer. As the roll within itself does not rotate, the problem of balance (as when employing a reel) is eliminated and variations in speed have no



Equipment used in laying wire from L-4 plane

noticeable effect on the efficiency of laying. A piece of heavy cardboard between each roll minimizes the possibility of successive rolls' entangling. A 4" hole should be cut from the center of these disks, through which the wire passes. Handles may be attached to the cylinder for holding it outside the plane while laying, but it has proven more advantageous to secure the cylinder to the wing struts, as near the fuselage as possible.

After an aerial reconnaissance is made of the route and the points of origin and destination have been determined, the actual laying of the wire is the easiest part of the whole procedure. Flying at from 200 to 250 feet has proven to be the best altitude from which to lay. The leading end of the wire to be dropped at the point of origin is tied to a telephone, and by employing a parachute about 6' in diameter the telephone with the wire attached will settle gently to the ground with a minimum of strain on the wire line itself. The drift of the 'chute due to wind and drag of the wire is negligible from this altitude. If properly packed the 'chute will drop from 30 to 50 feet before opening, thereby eliminating the possibility of becoming entangled in the control surfaces of the plane. No case of either the wire or the 'chute endangering the plane or its occupants has been encountered over an extensive experimental period. Not only is this method ideal for isolated outposts or patrols that have been cut off, but also excellent for use with forward observers who must sometimes cross terrain where it is impracticable to carry wire laying equipment. In laying lines of this sort it is advisable to lay from the forward position to the rear. In instances where a telephone is needed by both parties, a second phone can be dropped separately by parachute.

In heavily forested areas a weight attached to the leading end of the wire may yield greater accuracy in hitting a selected spot, such as a jungle artillery FO position. Wherever possible the points of origin and destination should be in a cleared area, as it is quite difficult both to find and to reach the wire in the top branches of tall trees. Both the leading and trailing ends of the wire should be marked with a brightly colored streamer so as to be easily located. Good wire that has been thoroughly tested should be used, as maintenance over jungle terrain of wire laid by this method is out of the question. In case of line trouble a new line should be laid.

An organization should prepare a number of these rolls in advance. Each should be checked for breaks or shorts and then wrapped and sealed. The wrapping should be so done as to prevent injury to insulation during storage and handling, and to prevent uncoiling. If the wire is not prepared in advance it is unlikely that there will be time to wind it into rolls after the need for this type of wire laying becomes apparent.



Plane with tube and telephone in position

The winding of the wire *is* slow and tedious!

At 32 lbs. per mile, the total weight of the W-130 wire and cylinder does not greatly exceed that of the observer's SCR-610 radio. To avoid overloading the radio should be removed. If the amount of necessary wire overloads the plane or the length of the strip is insufficient, it may become necessary

for the pilot to lay the wire alone.

With the exception of the cylinder and the parachute, no special equipment is needed. The cylinder can be made from scrap sheet metal or tin cans from the kitchen, and the parachute is easily obtainable at any air strip—any flare or small bomb 'chute will work satisfactorily.

COMMUNICATIONS TIPS

By S/Sgt. Edward H. Rhodes, FA

In our wire section we recently needed an extra repeating coil. As a makeshift we tried an old center-tap audio transformer and hooked it up with a box built around it. It worked better than the issue coil.

For extra phones we found that RM-29 remote control sets with TS-13 hand sets work almost as well as EE-8s.

After watching many outfits mount those mast bases with the big porcelain insulators on the standard mast bracket sticking outboard from the truck, we removed the square plate on the body behind the spare tire of the $\frac{3}{4}$ -ton truck and mounted ours through this plate after stiffening it up to withstand sudden shocks. This has saved us from breaking any of those porcelain insulators against trees.

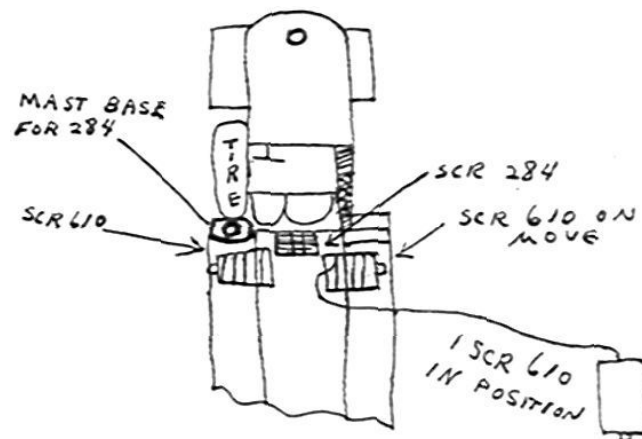
We have now modified somewhat the Radio Direction Center system described on page 484 of last July's JOURNAL. When on the move both 610 base sets are mounted in the $\frac{3}{4}$ -ton truck, where they operate off the vehicle's battery. In position we connect in series 5 CD-509 power extension cords so that one set can be put some distance from the other, where one will not "block" the other when transmitting.

Both of our 608 operators have bent a small piece of coat-hanger wire into hooks. These fasten onto the awning frame of the 608 housing. On them are hung log boards, headsets, microphones, etc., to keep them off the floor when not in use.

Recently we found the source of many of those mysterious radio troubles which you can't seem to trace down. They lie in tubes which test well but which in operation soon heat up and short out. This is especially true of the SCR-610.

We have been trying to speed up radio communications by voice when the net is "hot." A one-call system seems to work pretty well. If the receiving operator is on his toes he should have checked the authentication by the end of the transmission so he can promptly reply with another group from the same authentication code; if he hasn't, he simply says *Wait* and quickly checks it.

One day when we forgot to take along our panels we used OD blankets against a light sandy background. Results were quite satisfactory.



Some of our liaison pilots are using a coiled vertical antenna of copper tubing and report splendid results. Nearly all of them have trick devices of one type or another to improve communications. They have home-made junction boxes for earphones for pilot and observer, skeletonized PE-117C power units to run their sets when batteries are hard to get, and have even used the AN-29C antenna by cutting a small hole in the canopy of the plane. Some of them have tried the throat microphone and liked it; others don't.

T/4 Simeone, a veteran of Guadalcanal who was with our outfit for awhile, gave us a practical picture of the fighting there. He was a forward observer radio operator. With the SCR-194 he found that the shiny AN-29 was an excellent way of spotting a radio operator. A canteen cup filled with wet sand and a pencil formed an excellent low-angle radiation antenna for jungle operation; you adjust it by raising and lowering it above the mast base. He said too that it's a good idea to know how to solder so you can hook together enough BA-30 dry cells to build the voltage you need when batteries are scarce.

WATCH NOMENCLATURE CLOSELY

Strangers to the nomenclature of German and Italian weapons are apt to become confused due to wide difference in the meaning of terms which are written similarly in the two systems.

For example, one of the German Gerlich tapered-bore weapons is designated "28/20," meaning that the bore is 28-mm in diameter at the breech and only 20-mm at the muzzle. That same designation applied to an Italian weapon would mean, however, that the bore was 28-mm in diameter and that the tube was 20 calibers long.

Remember, then, that a double-numbered reference to a German weapon indicates a gun with a tapered bore, whereas the same designation referring to an Italian piece indicates the length of the tube as well as its inner diameter.—Adapted from "The Ordnance Sergeant"

Intra-CP Communications

By Capt. George Sammet, Jr., FA

Nothing makes a command post seem more complicated and more confusing than to have numerous telephone lines running overhead, underground, and mostly underfoot—and seemingly always in somebody's way. Practically speaking, these lines are a hindrance, in view of the fact that if a wire is exposed to the possibilities of being broken it probably will be, and most likely just before it is needed. Thus it is necessary for the communications officer to devise a CP wire installation that will eliminate as many of the possibilities of failure as is humanly possible.

It has been said that if wires are underground, they are out of the way. But along comes wet weather and the lines may short out, thus necessitating taking the wire out of the ground in order to trouble-shoot it. Due to the fact that the insulation on W-130 wire cracks so easily, shorting out in wet weather is often the case. Overhead wires have also proved to be a solution, but when a line goes out it must be removed from the trees in order to be repaired. This fact increases trouble-shooting time accordingly.

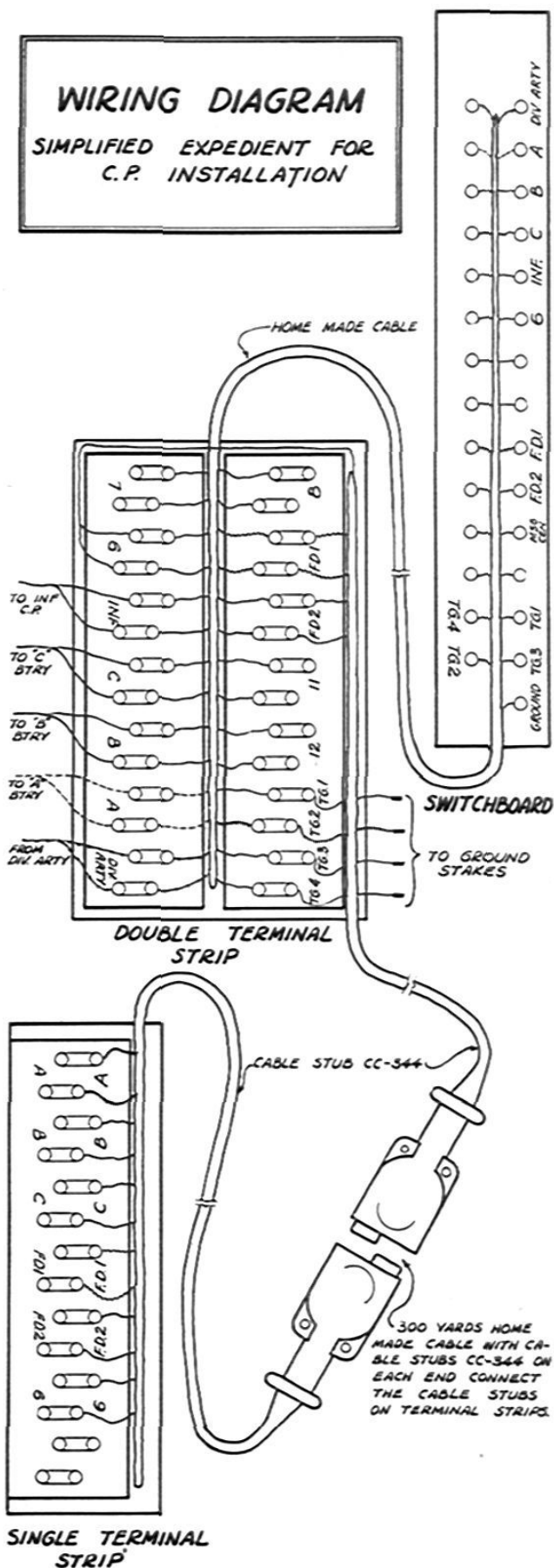
The suggested solution offered here has been used through three maneuvers and has been found to be not only a means of decreasing the possibilities of wires being broken, but also to decrease the amount of time spent in making the initial installation. In over a year of its operation, our unit has had no interruption of communications due to breaks in any wires in the vicinity of the CP.

The principle used here is the combining of all wires into one cable and using terminal strips to hook incoming lines into the established setup. All of the equipment needed is available for issue, except the short piece of cable running from the double panel strip where the incoming lines are connected to the switchboard. Ordinary issue cable contains only 5 pairs of wires while the cable connecting the double panel strip and the switchboard must contain 14 pairs. This cable, approximately 50 yards long, is made by taping 14 pairs of W-130 wire together. Before so taping them it is wise to paint each pair a different color so that if the cable is broken by shell fire or other accident it can quickly be repaired, and no time will be lost trying to find out which wires go together.

For durability it is best to cover the strands of W-130 completely from one end to the other, with at least one layer of friction tape and preferably two or more. This taping adds extra insulation for protection from the weather and other physical hazards. It is also possible to make the cable by using W-110 wire, but we found that a cable made this way was too thick and bulky. Due to the limited amount of truck space available, an effort must be made to limit the size of extra equipment.

The cable running from the double panel strip at FDC should contain a minimum of 6 pairs of wire in order to take care of the 3 computer lines, the 2 fire direction lines, and the "6" phone. Since issue cable contains only five double strands it is necessary either to tape one more line to the issue cable or to make a new cable containing the necessary pairs. It should be approximately 300 yards long.

Placing the double panel strip near a road or lane eliminates



the probability that the big wire trucks from other units will congregate around the switchboard, which so easily happens. By proper education other units which lay wire to you can be taught to run their wire into the panel strip and then to send one man to the switchboard to have the line tested, or to notify fire direction to test the direct line to the battalion concerned, or to test the simplex if that system is used. Thus there is no need for the trucks to come anywhere near the well camouflaged switchboard.

The double panel strip is set up so that either direct lines or simplex can be used between FDC and the batteries. If direct lines are prescribed by the battalion commander in his order (or are SOP, as they are in this unit) the incoming line from Btry A is connected as follows: one strand of the pair to the lead (which on the diagram leads to the ground stake) and the other to the outer TG terminal of the battery concerned on the double terminal strip. If simplexing is wanted, all that is necessary is to connect the ground lead on the double terminal strip to a ground stake.

In a rapid occupation of position this system has proved its merit. The battalion rolls into position, and the switchboard is dropped off at its designated place. Immediately one WT man runs the 50-yard cable with the double terminal strip out from

the switchboard to a place near a road or turn-around which is readily accessible to wire trucks. Another WT man begins unrolling the 300-yard cable toward FDC. A previously designated man in FDC (he may be a computer or headquarters clerk) sets up the single panel strip in a convenient place centrally located to all computers, and connects his cable stub to the stub on the cable coming from the double panel strip. Just as soon as the FDC panel strip is in position, each computer runs a short prepared line from his phone to the terminal strip. A WT man at FDC (the headquarters clerk or a basic may be used) immediately runs prepared lines from the two fire direction phones and the "6" phone to the panel strip.

This entire operation from the time the truck first hits the position until the communication lines in the CP are completed takes only 12 minutes. This time is considerably shorter than in the old method, where the wire section laid six separate lines to the FDC and then spent more time servicing each one. Upon receiving the popular command of "March Order," the entire procedure is exactly reversed and in 18 minutes the battalion, as far as CP communications are concerned, is ready to roll to its next objective. In preparation for a hasty displacement another complete unit is kept in readiness.

BATTERY POSITIONS

Sometimes battery positions are where you find 'em—and if someone else has cleared out some jungle you may do well to take advantage of his work. Your pieces can be camouflaged among the debris, and by taking advantage of the field of fire thus nicely furnished to you your men are saved much labor and the position area is not betrayed by new slashings. Such was the situation of the Bougainville battery of which a part is shown at the right—part of the *U*th FA Bn, described in these pages last July by Lt. Col. Howard F. Haines, who also supplied these photos.

High angle fire plus wide field of fire poses many problems of trail shifting. This outfit met it by making 8 small platforms out of salvaged crating material. These were arranged in checkerboard fashion, with the center square left out; that is where the breech went in recoil. Trail logs were so placed that the piece pivoted about the recoil pit rather than around the sight. Photo at lower right shows how No. 2 steps into the recoil pit with his left foot, when loading the piece.



JAVA

By Col. Conrad H. Lanza

Java is the most important island of the vast archipelago constituting the Dutch East Indies. Its area is less than 7% of the total for the East Indies, but some 56% of all the archipelago's population lives on this one island. In economic and military value Java surpasses all the other islands.

The East Indies occupy a land area of 4,200 miles in length from west to east, and about 1,000 miles wide from north to south. Java lies on the south side, in the west central section, between 5°52' and 8°47' south latitude and 105°14' and 114°38' east longitude. Its length is about 630 miles and its average breadth 77 miles, with a maximum breadth of 125 miles and a minimum of 55. Exclusive of attached islands Java has 48,500 square miles, approximately the same as New York state. Java's shape is not unlike Cuba's, which is 730 miles long but with an average width of only 60 miles, giving an area of 44,164 square miles—about 10% smaller than Java.

Nearly 10 years ago the census gave the population of Java as 41,719,524, exclusive of attached islands, which contained nearly 4,000,000 more people. Java alone had over three times the population of New York and ten times that of Cuba. The present population of Java (which has been increasing at a marvelous rate) is estimated as 45,000,000 without the attached islands and 50,000,000 with them. It is Java's extraordinarily large population which insures its importance. This population is intelligent and civilized, and the island they inhabit is one of the most productive regions of the world.

Java is bounded on the north by the shallow Java Sea, most of which is not over 200 feet deep and no part over 300 feet. On the south side of Java is the Indian Ocean; this is deep close to the island, and falls off rapidly to depths of more than 15,000 feet 50 miles off shore. As Java is the real boundary of Asia, it would seem that the Java Sea may have at some time been dry. To the west Java is separated from the adjacent island of Sumatra by the Sunda Strait, which varies in width from 15 miles at the north to 65 miles at the south. There is usually a strong southward current through the strait, so local pilots are generally required to navigate this section. Within the strait is Krakatao, one of the most active volcanoes in the world. On the east Java is separated from Bali by Bali Strait, only 1½ miles wide at the north end but widening to 15 miles at the south. Bali Strait has strong and variable currents, and pilots are ordinarily used to navigate it too.

Java has three natural divisions—west, central, and east. In the west, mountains are grouped on the west and south sides, leaving on the north side a wide plain filled with villages and cultivated areas; it is about 200 miles long and averages 90 miles in width. The center sector is 130 miles long and 60 miles wide, with two parallel mountain ranges (the main one nearer the north side of the island). The east sector is 300 miles long and 75 miles wide; here also are two separate chains of mountains, continuations of those in the central sector.

The great mass of the population (and of the cultivated area) are in the flat country north of the mountains. This is divided into two parts: a low coast hardly above sea level, and a flat plateau in rear. The coast sector varies in width from 3 to 25 miles and nowhere exceeds 50 feet above sea level. In the west sector the plateau rises to 300 feet or more; in the east, to 1,600

feet or over. In the center the coast is narrow and the plateau merges quickly into the mountains.

Mountains are of two classes, ranges and volcanoes. The regular ranges are largely but not exclusively of limestone formation. A northerly range parallels the coast in the east sector and passes over into the island of Madoera, which is attached to Java for administration. The main (southerly) range parallels the entire south coast. Both ranges are broken by a wide, low saddle in the west part of the east sector, which in that area facilitates communication between the north and south shores. Elsewhere the south shore is reached only with difficulty over the adjacent mountains.

The volcanoes occupy a belt nearly in the center of the island, with west, central, and eastern groups. There are some 125 volcanoes listed, the exact number depending on the method of classification. Of these 15 are classified as presently active, but several have exhibited only minor activities in recent times. As Java is one of the great volcanic centers, violent eruptions are to be expected. The volcanoes have generally conical, or truncated conical, shapes, and rise to altitudes exceeding 10,000 feet. As many of them smoke continuously they are a characteristic of the Java landscape. Their location is such that eruptions are not likely to cause any great damage.

Volcanoes are the source of Java's fertility. Streams flowing from the numerous cones carry broken down lava and distribute it over and through the lowlands. To supplement this source, sewage from innumerable settlements is discharged into the nearest stream, regardless of the fact that the same stream lower down may supply other communities.

At one time Java was jungle covered. Nearly all of the jungle has been displaced by cultivated areas, however. This island is one of the greatest demonstrations of what can be done to reclaim jungle territory. In a few sections, though, some jungle remains. There wild animals—the tiger, rhinoceros, etc.—still roam in limited numbers, but the great mass of the inhabitants have never been in contact with these areas. All of the low land and a large part of the mountain area is cultivated to an extraordinary extent. In some provinces 80% of the soil is under cultivation. For the entire island 60% is cultivated—an unusually high figure.

There are many good roads, and in normal times automobiles are common. Villages are everywhere. On the outside they are scrupulously clean. Inside the houses, cleanliness is not always found.

In the very low country rice is the staple crop. Per acre it will easily produce up to 2½ times as much food as wheat; for Java's very dense population this is an important consideration. In higher country most of the grains and vegetables of the temperate zones are grown. Maize is a large crop. Sweet potatoes, peanuts, cassava, and soy beans are raised in large quantities. Many kinds of tropical fruits abound, the coconut and banana being the most important. European vegetables (such as the carrot, bean, pea, etc.) are grown in the higher altitudes.

Cattle are numerous, exceeding four million, exclusive of

active volcanoes. Near Tjiandjoer is Tjipanas, which was the country residence of the Governor General. On account of its altitude the climate around Soekaboemi and Tjiandjoer is noticeably cooler than on the low north coast, where the greater part of the population live. It is suitable for a rest area and for care of sick and wounded.

Eastward from Cape Genteng the south coast presents no practicable place for an invasion for 150 miles. This stretch is thinly populated, and contains many wild and jungle-covered mountains. Roads are lacking, trails are few.

In the mid section of Java are beaches suitable for landing. Exposed to the Indian Ocean, they often have rough surf. There are no sheltered bays, no ports, and but limited anchorage. Sand dunes in 2 or 3 belts (but not exceeding 50 feet in height) generally line this shore. These are an obstacle to motor vehicles.

With interruptions, this type of coast extends for 125 miles, from Panandjoeng Bay on the west to the mouth of the Opak River on the east, both inclusive. The rough limestone mountains of the southwest coast do not extend over this area. There is a coastal zone, highly cultivated and populated up to the central volcanic mountain zone. Four lines of advance are found into the interior or across the mountains into the thickly populated north coast provinces.

The first, on the west, is Panandjoeng Bay and Maurits Bay just to its east. A coast road extends westward between the limestone mountains and the coast, but has no issue. At the east end of Maurits Bay the mountains end at the Tjitandoej valley, up which the road from the bays turns northward; there is also a branch railroad. 35 miles inland these connect at Bandjar with the main west-and-east highway and railroad from Batavia through Soekaboemi and Tjiandjoer.

On this route, 40 miles east of Tjiandjoer and 80 west of Bandjar, is Bandoeng, on the high ground between the volcanic central mountains and the south range. Bandoeng was the site of the Dutch War Department and the headquarters of the C-in-C. It was one of the initial objectives of the Jap invasion in 1942 and was taken by an advance from the north. As already discussed, it can also be reached from Wijnkoops Bay, and as now seen from Maurits Bay. It is an extensive town, and was supposed to be an ideal place for a position in readiness from where troops could be easily despatched in any direction. An invasion and subsequent advance to Bandoeng from Maurits Bay is limited to the one road and railroad, and the uncertainties of unloading over beaches liable to interruption on account of heavy surf.

Adjoining the Tjitandoej valley on the east and close to the shore is Lake Segara Anakan, 8 miles wide and 10 long and noted for its lake dwellers and mangroves. It is separated from the sea by the narrow Noesa Kambangan Island, 24 miles long. The lake has water passages, nor useable for ships, around both ends of the island, which is a continuation of the south limestone mountain range and rather famous for its caves and grottoes.

East of the lake are swamps, 5 miles deep, and then the second landing area—Tjilatjap, at the west end of Schildpadden Bay, which is a slight indentation of the coast 25 miles across. At the west end the already-mentioned island of Noesa Kambangan projects into the bay. Just behind this point is Tjilatjap, which is thus protected from south and southwest winds and seas. There is no developed port, but there are limited shelter, a pier, and anchorage. This was an escape port for the Allies in March, 1942.

Tjilatjap is bounded on the west and partly on the north by mangrove swamps. It has the reputation of being in an unhealthy district. A branch railroad connects this port with the main south shore line at Maos, 15 miles away. There is an excellent road to the same town. A coast road extends all along Schildpadden Bay to the east end at Cape Polengi, which is rocky and unsuitable for landing. Maos lies within the coastal plain. It is an important road and railroad center.

The main south shore line from Soekaboemi to east Java passes through Maos. A second main railroad from Batavia follows the north coast to Tjerebon, then cuts southeast across a mountain pass to Maos. There are thus two rail lines and also two roads from this point to Batavia. Branch rail and road lines extend also to the northwest, serving mountain valleys largely devoted to sugar plantations. Landings can be made generally along Schildpadden Bay and afford an opportunity to advance inland over a number of lines, depending on the location of other invasions.

East of Cape Polengi the coast is straight for 40 miles to Semangi. Back of the dunes is cultivated country and a continuous coast road. The main west-and-east road and railroad average 10 miles inland. This is a densely populated rice and sugar zone. North of Semangi a spur from the central volcanic mountain range comes down to the shore. The railroad and main highway approach close to the sea to pass this obstacle. Along the west side of the spur is an excellent road leading clear across Java to Semarang on the north coast. An invasion from the south passing northward up this road would cut Java in two.

East of the Semangi mountain spur is the fourth practicable landing area in south mid-Java—20 miles, as far as the Opak River. East of this river begins the rough mountain country of east Java. The area between Semangi and the Opak is part of the province of Jogjakarta. There is no port in this area but it would be practicable, subject to weather and sea conditions, to land and advance inland.

A good coast road connects with an excellent highway leading north from Brosot on the sea across to Semarang on the north coast. This highway joins that from the west side of the Semangi spur at Magelang, in the center of the volcanic range and not quite halfway across Java.

Sixteen miles inland from Brosot on the main road is the city of Jogjakarta, the principal one in this part of Java. The main east-west railroad passes through this town. Just east of the Opak River the coast limestone mountains start in again, and the coast road ceases. After passing Jogjakarta the railroad and road bend eastward, north of the coast range.

Jogjakarta is the capital of the province of the same name, which is ruled by a Sultan whose headquarters are at the Kraton. This is an area over a mile square enclosed by a wall 12 feet high and 15 feet thick. Within this enclosure live 15,000 people, constituting the court and retinue of the reigning Sultan. It is a maze of buildings, roads, ponds, canals, gardens, palaces, and barracks. The Sultan maintains ancient traditions, and annually conducts most elaborate ceremonies perpetuating Javanese customs. The Sultan was allowed by the Dutch to rule his own territory, subject to his consulting a Resident before any important measures were taken. His military forces were limited to his personal guard, and he was not authorized to communicate with foreigners—even a simple tourist—unless the Resident had first approved a permit to do so.

Extending northeast from Jogjakarta is a broad level area, breaking through the central volcanic mountain range in a northeasterly direction. Forty miles away is Soerakarta. At this place is the headquarters of another native ruler, whose title is the Soesoehoenan. He too lives in a Kraton, but it is smaller than that at Jogjakarta and his court consists of only 10,000 people. It is reputed to be more similar to ancient Java than the larger one. Soerakarta is the residence of many ancient Java nobles, who are not found elsewhere.

Jogjakarta and Soerakarta are the only provinces in Java (out of 17 in all) which retain native rulers. In all others the government is Dutch, under a Dutch Governor who is, however, aided by a very large number of natives in subordinate positions.

From Soerakarta the Bengawan River flows northeasterly through a break in the volcanic range to the north end of Soerabaja Strait. After the first 50 miles the main road and railroad do not follow this line, but bend to the south of the volcanoes and, passing through a low pass, follow the connecting Widah, Brantas, and Mas Rivers. The latter empties into the sea at Soerabaja. A second railroad extends due north from Soerakarta, crosses the volcanic central range, and joins the north shore railroad from Batavia, which continues on to Soerabaja down the valley of the Bengawan. An excellent road extends northwest from Soerakarta to Semarang. These various lines pass through highly cultivated territory.

Eastward from the Opak River for not quite 200 miles, the south Java coast presents an unsuitable area for invasions. Much of the shore is lined with cliffs up to 150 feet high. The limestone mountain range is only a short distance inland; there are no roads across it, and only three trails are reported. Neither are there any worth-while objectives in this area.

Dampar Bay is 100 miles west of the southeast end of Java. It is an open bay, but although subject to sea and winds landings are practicable here. The coast range turns inland just west of the bay, joins with the central volcanic range, and continues on to the east. There is a thickly populated area 20 miles deep from the south coast, devoted to sugar, rice, tobacco, and rubber. The mountain range to the north is crossed by a railroad and a road through Klakah Pass.

A second exit from the Dampar Bay area extends northeastwardly clear across the island to Cape Patjenan. An excellent road and a railroad follow this way. The two passages out of the Dampar Bay area are separated by Lamongan volcano (which is not very high but is very active) and Mt. Argopoera (which is 10,290 feet high but inactive).

While it is practicable to land on Java at Dampar Bay, the difficulties which might arise from unsuitable seas or weather, and the absence of objectives, make this an unsuitable place for an invasion.

THE EAST COAST

Fronting the strait of Bali, the east coast is about 75 miles long. Near the south end is Pangpang Bay. The coast in this vicinity is rice land, hemmed in by mountains. The Dampar Bay area can be reached by road over a pass about 3,000 feet high. The only other exit is an excellent road which follows the coast along the strait and then continues westward along the north coast. This latter road is confined in places to a narrow passageway between the mountains and the sea.

It would be easier to land in Dampar Bay than to reach its rear areas by landing on the Strait of Bali and fighting across a mountain pass. It would also be easier to land on the north

coast road near some suitable objective, rather than at its extremity and fight along a series of defiles.

North from the Strait of Bali landings are possible in limited places near the northeast tip of Java—Cape Sedano. The same objections arise as to landing here as further south, with the added one that the possible landing beaches are restricted in size.

THE NORTH COAST

Starting at Cape Sedano and extending west 30 miles is the delta of the Sampean River. Up this valley are the road and railroad to the Dampar Bay area. 25 miles further west is Besoeki, where another practicable route to Dampar Bay starts. 30 miles beyond this is Prabalingga, whence still another road and railroad run to Dampar Bay.

At Prabalingga there is a small port suitable for small craft. It is composed of two piers extending into the sea. The engineer who designed this port had the peculiar idea of having the outer ends of the piers diverge from each other. The result is that when the wind is from the north the water piles up near the base of the piers, causing waves and currents.

Prabalingga is suitable for a small base, and might become useful to supply troops operating further west. There are numerous good quarters available. The surrounding country produces rice, maize, and sugar, while on the hills to the south European vegetables are grown.

25 miles west of Prabalingga is Pasoeroean. This used to be the principal port of east Java but it has declined in recent years. For military purposes it could be used again. It would be practicable to land on either side of this town, with a view of thereafter marching on Soerabaja, 35 miles to the north.

The coast between Prabalingga and Soerabaja can be landed over, although the beaches are none too good. The country is heavily cultivated and an excellent road net leads to Soerabaja, which is a first class objective, being an important naval and air base and a prime commercial port. The low country to the south is not easy for operations. It includes much rice land and numerous canals and irrigation ditches. In the wet season cross-country movements for vehicles would be difficult.

Soerabaja is the second city of Java, with a population exceeding 350,000. It contains a naval base, an arsenal, and quarters for a garrison. It is situated on the Strait of Madoera, only 3 miles wide. The city extends some 6 miles from north to south, the sea being on the north. Its width averages under 2 miles. The naval and commercial ports are adjacent. They were built by constructing piers out into the shallow strait. The surrounding country is low, and a landing in the vicinity would meet numerous water obstacles of ditches, canals, and rice fields.

Soerabaja is most important as a commercial center. It has excellent road and railroad communications to all points in Java. All the commerce of Madoera Island, just across the strait, centers here. Although the city is not a desirable residence area, the harbor has good warehouses and would be suitable for a major base.

In the city warehouses, good residences (none too many), poor residences, shops, etc., are all jumbled together in no order. The residences are not detached as is customary elsewhere, but front directly on streets, solidly built up against each other without gardens. There is not a separate European section, although the majority of white people live in the upper town (the district furthest from the water front). Most streets have no trees; houses are generally white and reflect the sunlight with maximum efficiency, resulting in living conditions

being generally hot and uncomfortable. Water supply from the hills is good and has been ample. The upper town has shade and gardens and is preferable for living purposes.

Soerabaja is connected with Batavia with two lines of railroad—one via Soerakarta and the central section of Java, and another north of the volcanic range but south of the north coast range, which is also of limestone formation. This range extends westward from Soerabaja for 120 miles with a narrow coastal belt between it and the sea. A good road follows all along the shore. In the immediate vicinity of Soerabaja is an extensive alluvial plain, across which are road and rail connections to the south and east.

Off Soerabaja is the island of Madoera, with a population of about 2,000,000. It is an extension of the north shore limestone mountain range, prolonging it 100 miles to the east. The average width of the island is 24 miles. Madoera consists mostly of plateaus, on which maize and cattle are raised. In the lowlands rice is the principal crop.

Madoera affords good sites for air bases. With control of the sea and air it could be seized and bases established from which a major attack against Java could later be launched. There is a road completely around the island close to the shore. The north shore is almost straight and can be landed over in all sectors. The south shore has rocky coasts at both ends; otherwise it also can be landed over. A narrow gauge railroad extends along the south side of the island. On the north and south sides of this island deep ravines lead from the coast toward the interior. The entire island is under cultivation.

Extending westward from the Madoera Strait is the Rembang coast. The limestone mountains form flat plateaus, with steep, curiously warped borders. 50 miles west of Soerabaja is the small port of Toeban, and 50 miles beyond that in an air line is the larger one of Rembang. Both of these towns were debarkation points for the Japanese in 1943. It would be possible to land at nearly all points in between.

The Jap landing at Toeban had Soerabaja as its objective. That at Rembang moved south and southwest toward Soerakarta, with the mission of cutting Java in two. It is 90 miles by rail from Rembang to Soerakarta and slightly more by road. Motorized troops could operate with facility as the roads are numerous and good.

West from Rembang is a 20-mile stretch of coast suitable for landing as far as Djoewana, a small town near the mouth of a river of the same name. From Rembang the main road and a railroad extend due southward across the limestone mountains. From Djoewana the road and railroad extend southwest to Semarang (55 miles away) by cutting across the Moerja peninsula. Half way to Semarang the limestone mountains end, and roads and railroad turn southward toward Soerakarta and the south Java coast.

West of Rembang coast is the Moerja peninsula, mostly covered by limestone mountains. No coast road borders it. The peninsula is 30 miles across and projects into the sea about the same distance. It is the home of the kapok tree. Coconuts and other trees grow, and large areas are cultivated.

At the west base of the peninsula is the city of Semarang, which has a good harbor, available for all except the larger ships. Its population exceeds 100,000. It used to be more important than at present. In recent years much of its former trade has gone to Soerabaja.

The harbor of Semarang is formed by a canal perpendicular

to the shore. At the mouth two piers extend 2,000 feet into the sea, thereby extending the canal that distance. The harbor thus formed has good warehouses and rail connections. The city lies inland south of the harbor, and several miles from the sea. The coast is here lined with fish ponds, and is not suitable for debarkations except at the established places.

The north port of Semarang has houses (usually of two stories) built solidly together. Streets are narrow, without trees, and generally hot and dusty. The more modern section lies to the southwest, and is very attractive with detached houses and gardens. At the far end the elevation is about 300 feet above sea level.

From Semarang a good road and railroad lead to the south side of Java. One branch of the road goes to Soerakarta, the other direct to Jogjakarta. To the west of Semarang lies the great north plain of Java which extends to beyond Batavia, and which is one of the most densely populated and cultivated regions of the world.

Semarang would be suitable for a base. There is a large air field to the east, and its road and rail connections are excellent. Large ships can anchor off shore and discharge cargoes and passengers into lighters for trans-shipment to shore.

Batavia is 250 miles west of Semarang, in a direct line. Good road and rail nets are found throughout this distance. The entire coast is low. In general, a narrow mangrove belt borders the sea. In rear of this are fish ponds or rice fields. The rivers bring down much sediment. In the rainy season floods are frequent, and the rivers deposit the sediment over the surrounding fields. The floods are controlled by an intricate system of canals and ditches. During the rainy season operations across country are difficult, but they are not impossible provided the proper equipment is supplied. In 1942 the Japanese operated over this country without being unduly delayed by terrain or climate.

All along the coast are small towns where debarkations could be made. The main town, which is just halfway between Semarang and Batavia, is Tjerebon. There is no harbor at this place, but ships can anchor and discharge into lighters. A similar and smaller open roadstead is Pekalongan, which is only 50 miles from Semarang.

While landings are possible along this coast at many points, there are no objectives warranting a landing over the greater part of it. The location of the enemy's main forces will have much to do with the plan of invasion. The great ports and centers of activity of Java are Soerabaja on the east, Semarang in mid-Java, and Batavia in the west. These are the only important cities having good ports.

The Japanese in their invasion attacked these three places simultaneously. The first two were secured by landing along the Rembang coast. Batavia was taken by a landing on the north shore near Cape Indramajoe, 100 miles east of Batavia and the Dutch Army. This landing was unopposed. With the good Java road net, motorized troops can move rapidly in any direction.

Between Cape Indramajoe and Tjasse Bay, 50 miles to the west, landings can be made as desired. The coast road from Semarang continues as far as this bay, and numerous other roads lead into the interior. This stretch of coast is opposite Bandoeng, 60 miles inland and within the volcanic mountain range, as already described. Bandoeng was not only the location of the Dutch GHQ and War Department, but also the site of the Department of Public Works and an important administrative center. There are two roads from the coast to Bandoeng, one to the east and the other to the west

of Tanghoeban Prahoe volcano (6,436 feet). The Japanese advanced over both routes at the same time.

Other roads lead to Buitenzorg, some 75 miles from this coast. That town, as previously noted, was the headquarters of the Dutch Governor General.

There are three main objectives for an invasion landing at or west of Cape Indramajoe:

Bandoeng—military headquarters, plus some civil establishments

Buitenzorg—administrative headquarters

Batavia—other administrative establishments, and main port and commercial center

West from Tjasse Bay, as far as the vicinity of Batavia, the coast is very low and much cut up with water passages. It is not very suitable for invasions, especially if the enemy has strong forces in the Batavia area.

The port of Batavia is 5 miles east of the city, and is named Tandjong Priok. It is artificial, being partly cut out of the land and partly formed out of the sea by huge piers extending from the shore. The piers enclose the outer harbor, which had a huge dry dock. The inner harbor as well as the outer is lined with excellent warehouses, with complete installations of cranes, railroad tracks, and roads. Connection with Batavia is by road, railroad, and canal.

Batavia at last census had a population of 450,000. As it was growing rather rapidly, it is probably close to the half million mark by now.

Like many East India towns, in Batavia there is a lower and an upper city. The lower city contains the main business establishments. It is separated from the sea by fish ponds which would make a direct debarkation difficult. There is a sand beach just east of the port. The upper town, known as Weltevreden, is an immense park with numerous fine villas. It is the finest residence area in the East Indies and one of the finest in the Far East. The people of Batavia are a mixture of Javanese, Sudanese, and other tribes. They use a local language similar to but different from the regular Javanese. There is a considerable Chinese colony.

The north coast of Java extends 60 miles west from Batavia, to Sunda Strait. The coast is low, bordered by mangroves, and generally unsuitable for landings. In 1942 a Japanese landing was reported in Bantam Bay at the northwest tip of Java. A landing here is possible, and there are a good road and a railroad to Batavia. The Japanese landing failed—the only one that did. At this date it is still uncertain whether this landing may not have been a feint.

THE SUNDA STRAIT OR WEST COAST

Sunda Strait has strong currents, making navigation difficult. The Java side is bordered by the Karang Mountains. Through the narrow coast sector are a road and a railroad extending from Batavia via the north coast. Near the narrowest part of the strait is the small port of Anjer. From here there was normally a ferry across to Sumatra. This little port is too small for an invasion landing, but would be useful as an auxiliary.

Thirty miles below Amjer is Peper Bay, with a small port—Laboehan. The good coast road from the north ends here. A

direct road and railroad extend through a pass to Batavia, 75 miles away. This pass in the rough Bantam Mountains affords good defensive positions. Peper Bay would be a possible landing place for an auxiliary force.

An invasion of the west coast would be affected if the enemy held Sumatra, as he does at present. Sumatra would afford air bases from which to attack shipping in Sunda Strait.

COMMENTS

The Japanese invasion in 1942 was in three operations.

The west invasion, via Cape Indramajoe, was unopposed. Troops advanced directly west to Batavia, with a detachment toward Buitenzorg; while two columns followed the two roads to Bandoeng, where the main Dutch force had been concentrated. Batavia was reached in 5 days and Bandoeng in 6. This campaign only took one week. Main fighting was near Bandoeng. Cause of Dutch defeat appears to have been largely lack of ammunition and supplies back of Bandoeng, without which further resistance was impracticable.

The center Jap invasion landed near Rembang, then proceeded west. A detachment went to Semarang while the main body turned south to Soerakarta and Jogjakarta. The latter reached the south coast and thereby separated east Java from west Java. There seems to have been little opposition to this enemy force, and only 5 days were needed in all.

The east invasion landed east of Rembang near Toeban. It turned east to Soerabaja. There was some opposition to this Jap force from the local garrison, but when news was received of the surrender of the main Dutch force in the Bandoeng area Soerabaja gave up.

The Japs secured the entire island within 10 days.

A main reason for the quick Japanese success was that the vast Malay population was neutral and took no part in the war. Had they been armed, which they were not, their numbers could have been the basis for a powerful defense.

The Japanese have recognized this situation. Since their arrival they have been engaged in a vast propaganda scheme to induce the natives to organize and fight for *Asia for the Asiatics*. How much success the Japanese have had in this is not known.

The upper Malay classes have desired independence. Their numbers are small. The great mass of people have not particularly cared who ruled them. As the Dutch government was honest and efficient, there was no active opposition. Nevertheless, the Dutch Government took precautions. The natives were not armed. Foreigners were not permitted to travel anywhere without a permit from the government. Anyone who might seem to be capable of arousing national ideas among the natives did not get a permit.

The success of a new invasion of Java will depend upon whether the natives will or will not aid the Japanese. Malays can be ferocious fighters. If trained, Java could produce good troops. Education is sufficient to form officer and NCO material.

The north coast of Java is the easiest for an invasion. The main objectives are more quickly reached from this side. The sea is not so rough, and ports exist. The south side has no good ports and but few poor ones; objectives are behind mountains and reached over limited road approaches.

Nevertheless, the south coast can not be neglected. An invasion over the south coast alone would probably not succeed. If made in conjunction with invasions on the north coast, operations from the south might bring major results. Invasions on both north and south coasts at the same time presuppose that the Allies will have a superiority of men, materiel, and ships.

Air forces to support invasions are a necessity. The island of Madoera is the natural place for an advanced air base. Still, as Java is full of crops and vegetation and of innumerable small villages, observation of enemy forces from the air is quite difficult. Bombing by the invaders is important but it probably would not be decisive.

Java is the prize of the East Indies, probably the greatest single prize of the Far East. It should be expected that the enemy will profit by his experiences in the war to date to organize a ferocious resistance.

TO FORWARD OBSERVERS

Be sure to use the same pattern of speech when reporting a target, regardless of whether or not you know the general line of fire of the adjusting battery. If you do know that line, your report is the familiar "St. Luke's Church is 200 right, 20 above, 500 short, antitank gun, will adjust." If you don't know that line, use the same sequence—such as, "St. Luke's Church is one quarter mile southeast and 20 yards above antitank gun, will adjust"; or, "CR 824 is 300 yards east, 10 yards below, and 100 yards south of antitank gun, will adjust."—Adapted from FM 6-135, *Field Artillery Forward Observation*, now being printed.

High Angle Fire Direction Technique

By Lt. Col. William S. Penn, FA

In combat it has frequently been desirable or necessary from a tactical standpoint to fire artillery at very high elevations, in order to fire out of or into steep defilade. High angle fire may be required especially in jungle or mountainous terrain, and in city fighting. This type of fire may be requested by the observer based on the terrain around the target, or ordered by the S-3 due to the terrain in the position area.

THEORY

Before considering the special technique necessary to mass high angle fire let us consider briefly the theory of high angle fire. The following points should be kept in mind and stressed while training FDC personnel:

1. An increase in elevation decreases the range, and vice-versa.
2. A plus-measured site requires a decrease in quadrant elevation, and vice-versa.
3. Value of the factor c changes so rapidly that its use during adjustment is impractical. Elevations for ranges are read from the Graphical or Tabular Firing Table.
4. The practical limits of elevations limit the range spread which can be covered with any one charge, limit the range overlap between any two consecutive charges on the howitzers, and cause dead space which cannot be reached by any charge on the guns.
5. The high maximum ordinate and long time of flight inherent in high angle fire exaggerate the effect which weather has on deflection and range.
6. In identifying rounds and in sensing, special account must be taken of the time of flight. When the battery fires the forward observer must be given the time of flight or preferably be given the warning command *Burst* approximately 5 seconds before impact time.
7. Drift is always great in high angle fire and must be considered in preparing initial data. Within any one charge the effect of drift is to displace the apparent gun position to the right with a consequent change in the apparent angle T and the associated factors s and d . Remember that drift decreases as the

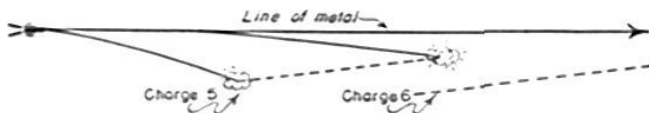


Figure 1—Drift effect in high angle fire. Dotted lines represent trace of rounds fired at different ranges at the charge indicated, with the same deflection setting on the piece.

range increases; Fig. 1 illustrates this effect. During adjustment no attempt should be made to compensate for the drift changes within any one charge. When during adjustment it is necessary to change charges account should be taken of the difference in drift, at a range common to the two changes (in the overlap). The required shift is *left* for an *increase* in charge and *right* for a *decrease*. For the 105-mm howitzer a constant shift of 20m in the proper direction will correct for the drift difference when changing charges.

8. The angle of fall with high angle fire is so great that ricochet fire is exceptional. Time fire is not feasible because the

fragmentation of a time burst is approximately a plane at right angles to the line of fall and therefore practically parallel with the ground; consequently a very slight error in height of burst raises the fragmentation so high as to cause practically total loss of effect.

The effect of HE shell fuzed with the super-quick fuze is a plane of fire approximately parallel with the ground, leaving only about 4% of the shell fragments in a very shallow crater. The effect of HE shell fuzed with a delay fuze is usually excessive penetration of the ground with all fragments trapped in a hole and practically no effect above the ground. Therefore, the normal fuze for high angle fire in neutralization is fuze quick.

An exception is made when firing into heavily wooded terrain. In such an impact area rounds fired with fuze quick have a tendency to explode in the tops of the trees, causing very little damage to troops or materiel below. Delay fuze therefore may be used to allow the shells to penetrate through the covering branches before exploding. Combat experience has taught that a good solution is to use half quick fuze and half delay fuze when firing into jungle or heavily wooded terrain. For precision registration, better sensings will usually be obtained by using fuze delay in fire for effect because of the narrower column of smoke and dirt.

9. In an emergency it is possible to fire at elevations greater than 1160m by digging in the trails or by emplacing the pieces on a reverse slope. High angle fire has been conducted with the 105-mm howitzer at elevations as high as 1440m with good results.

HANDLING OF SITE

For observed fires, unless the angle of site is very great (at least $+50\text{m}$) it may be ignored at the discretion of the S-3. Site should be included in registrations and in unobserved fires.

In case site is to be considered, the 10m Si scale on the GFT can be used to compute the correction to compensate for any appreciable measured site. As an example, assume that for the 105-mm howitzer firing charge 4 the GFT has been set with elevation 1085 opposite 5540. It is decided to fire on a target at a map range of 5950 yds. From the firing chart the site is $+32\text{m}$. From the GFT read the 10m Si factor as 5.4 and the elevation as 1021. If data are sent to the battery in the form of site and elevation, the initial commands include: *Site 283* [$300 - (5.4 \times 3.2)$], *Elevation 1021*. If quadrant elevations were used the elevation commanded would be 1004 [$1021 - (5.4 \times 3.2)$].

When one is using the tabular firing table, the site is determined by combining the angle of site and the complementary angle of site in the usual manner, paying particular attention to signs.

Frequently in high angle fire the battalion is massed following the adjustment of one battery. The adjusting computer figures his site command by using the angle of site given him by the VCO and the 10m Si scale on his GFT, as in the example above. During the adjustment the 10m Si factor may change considerably. This will result in a different effective site at the end of the adjustment than that used in the initial commands. This error must be corrected if the battalion is to

mass on the target. An example, with no correction on the GFT:

Battalion mission, Baker adjusting.
HCO Data: Baker 6000, R 180
VCO Data: Site Baker +60.

In computing his initial commands computer Baker moves his indicator to 6000 charge 4 and reads 8.0 on the 10^m Si scale. His site command is then 252 [300 — (8.0 × 6)]. The site command in high angle fire *always* differs in sign from the angle of site.

The adjustment is now complete and the range corresponding to the adjusted elevation (1128) in charge 5 is 6450. The 10^m Si factor at this range, elevation, and charge is 2.6. Therefore the effective site is 284 [300 — (2.6 × 6)] instead of 252. The correct adjusted elevation now is:

Adj elevation	=	1128
Site used	=	252
		1380
Correct site	=	284
		1096
Correct Adj Elevation	=	1096 = 6760 yards.

If the target had been replotted without making a correction for the change in site during adjustment, an error of 310 yards in range would have resulted.

DUTIES OF FDC PERSONNEL

With the above rules concerning high angle fire in mind, let us consider in detail the duties which each member of the fire direction team must perform while massing high angle fire.

S-3

In his fire order the S-3 includes the command *High angle* fire and leaves the choice of charge up to the computers. Due to the dispersion in range caused by weather and the use of different charges, all batteries will normally fire at center range.

After inspecting the plot, the S-3 should notify the VCO and the computers whether to ignore or include site. In a unit it may be SOP for the VCO and computers to ignore site during *observed* missions unless the S-3 tells him to include site, or vice-versa.

Massing of high angle fire requires S-3's close and continuous supervision.

HCO

If there has been no registration with high angle fire, the HCO announces *Corrections all charges, 0*.

If high angle registration has been completed with one or more charges, the HCO initially announces the correction for the charge being used by the adjusting battery only. After replot, when data are given to the 2 non-adjusting batteries, the

deflection correction is given for the charge to be used by each battery. This task will be made easier for the HCO if he will mark the maximum and minimum range limits for each charge (high angle fire) on his range-deflection fan. These range limits can be placed so as not to interfere with the deflection correction scales on the edges of the fan. The deflection corrections for each charge can be entered within that charge on the fan (see Fig. 2).

On a "will adjust" mission the HCO announces chart data for the adjusting battery only. When the adjustment is completed a replot is *always* made, after which data are announced for the other two batteries.

VCO

If it is necessary to consider site, the VCO figures the angle of site from the chart but does *not* compute complementary site. The angle of site is given each computer when requested. VCO must keep a record of all angles of site given to computers because angle of site is *not* included in the adjusting computer's data for replot.

Computers

When a battery has registered using high angle fire with a certain charge, the computer of that battery must announce to the other computers the GFT setting for the charge used. He must also strip the drift at the adjusted range from the total deflection correction at that range and announce the result to the HCO.

Example: Baker battery registered on the base point using charge 4, map range 6040, adjusted elevation 982, site 0, adjusted deflection BDL 57; computer Baker announces to the other computers "GFT setting for charge 4, 6040/982." He announces to the HCO, "Deflection correction charge 4, L21" (L57 + R36 drift).

In selecting the charge to use, the adjusting computer should choose the one which gives the most range spread on each side of the announced range. If there is no choice between two charges (the announced range is in the exact center of the overlap between two charges), the lower charge is used due to the reduced drift and time of flight.

The computers of the non-adjusting batteries use the same charge as the adjusting battery, if possible.

In a "will adjust" mission the non-adjusting computers receive no data until the adjustment is completed. Initially, however, they should alert their batteries, warn them that high angle fire will be used, and give the approximate base deflection shift, the number of volleys to be fired, and the type of fuze to be used; this procedure will save time at the batteries.

Each computer determines the base deflection shift by adding the deflection correction and chart shift as announced by the HCO for his battery, plus left the amount of drift at chart range.

When site is to be included, the computer is given the angle of site by the VCO upon request. The site command is computed by using the 10^m Si scale on the GFT *or* by applying the complementary site to the chart site given by the VCO when the tabular firing tables are used instead of the GFT. It must be remembered that the site command or the site used to compute the quadrant elevation will *always* differ in sign from the measured angle of site.

During an adjustment the computer of the adjusting battery ignores changes in drift between ranges within a charge. When a change of charges is made during an adjustment a deflection shift is made to correct for the difference in drift between the charges. The amount of this difference in drift may be determined by sliding the indicator to the overlap between the two charges and reading the drift for each charge under the indicator. For an increase in charge a left shift is

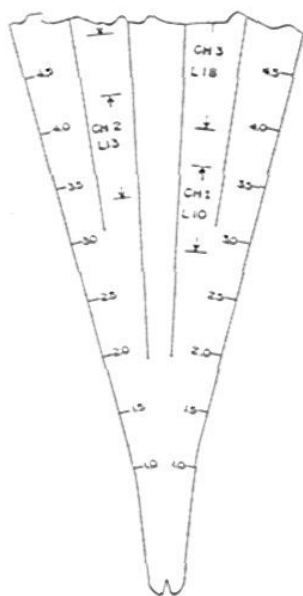


Figure 2 — Suggested method for placing range coverage and deflection correction for each charge on the range-deflection fan.

made, for a decrease in charge a right shift is made; for the 105-mm howitzer a constant value of 20[#] may be used.

When an observer's sensing comes into the FDC during an adjustment, the computer of the adjusting battery moves his indicator to the new range on the GFT (the factor *c* is not used). If the range change requires a change in charge, that command is given. The deflection shift is figured by using the 100/R factor at the new range. This is combined with the shift to correct for a change in charges, and the deflection command is given. Finally, the elevation corresponding to the new range and charge is given.

When the adjustment is complete the computer of the adjusting battery determines data for replot. The base deflection shift is the algebraic sum of the initial base deflection command for his battery, plus all shifts made during adjustment, plus the drift (*effect*, not correction). The deflection correction for the new charge is stripped from this sum. The result is the base deflection shift for replot. Range is read from the GFT opposite the adjusted elevation. No data on site are given. The charge used for effect is given, and the concentration number. *Example:* Btry A adjusts on enemy troops using charge 4 (GFT setting 5670/1050). The initial deflection command by computer "A" was BDL 160; algebraic sum of all deflection shifts during adjustment was R35; deflection correction for charge 4 is R10; drift at adjusted range (5400) with charge 4 is R47. Computed "A" announces to HCO, "Data for replot Able: BDL 88 [BDL 160 + R35 + R47 + L10], range 5400, charge 4, concentration 14."

ILLUSTRATIVE EXAMPLES

The 60th FA Bn is in position. Surveyed charts are being used. No registrations using high angle fire have been made at this time. Distance between flank pieces: Btry B, 110 yds.; A and C, 130 yds. each.

MISSION NO. 1

GFT setting, all computers, 2000/tick mark.

FO "B" 60th FA Bn: *Fire mission. Check point 2 is 40 above, 1,000 over, infantry assembly area in ravine. Request high-angle fire. Request Bn. Will adjust.*

S-3: HIGH ANGLE FIRE, SHELL HE, FQ, CONCENTRATION 12, BN BAKER, 5 VOLLEYS, WHEN READY.

HCO: CORRECTION ALL CHARGES, 0. BAKER 3270, R88.

S-3 (to VCO and Computers): IGNORE SITE.

Commands by Computer BAKER:

Sh	HE
Ch	1
Fz	Q
BD	R44 [R88 + L44]
SC	—
Si	300
MF	BR
El	1064

ADJUSTMENT:

<i>Observer's Sensings 200 Left, 400 Short</i>	<i>Computer BAKER's Commands CHARGE 2, R35 [R56 + L20], 1096 [deflection shift to nearest 5[#]]</i>
<i>200 Over</i>	1136
<i>25 Left, 50 Short, FFE</i>	R7, B 5 RDS, 1126

Computer BAKER to HCO and VCO: DATA FOR REPLOT, BAKER, BDR 138 [BDR 44 + R42 + R52], RANGE 3520, CHARGE 2, CONCENTRATION 12.

HCO: ABLE 3920, R110
CHARLIE 3580, R186

Commands by Computers ABLE and CHARLIE:

	<i>ABLE</i>	<i>CHARLIE</i>
Sh	HE	HE
Ch	2	2
Fz	Q	Q

BD	R68 [R110 + L42]	R135 [R186 + L51]
SC	3	3
Si	300	300
MF	B 5 Rds	B 5 Rds
El	1042	1114

MISSION NO. 2

GFT setting for all computers is still 2000/tick mark.

Observer at Point A, target area short base: *Fire mission. Instrument reading 1471, Si —62, Range 1910, assembly of about twenty vehicles in dry creek bed. Request high angle fire. Request Bn. Fire for effect.*

S-3: HIGH ANGLE FIRE, SHELL HE, FQ, CONCENTRATION 13, Bn 5 VOLLEYS, AMC.

HCO: CORRECTION ALL CHARGES, 0.

BAKER	4310, R180
ABLE	4580, R153
CHARLIE	4630, R191

S-3 (to VCO and Computers): INCLUDE SITE.

VCO: SITE BAKER	—35	} (when requested by computers)
ABLE	—38	
CHARLIE	—42	

Commands by Computers:

	<i>BAKER</i>	<i>ABLE</i>	<i>CHARLIE</i>
Sh	HE	HE	HE
Ch	3	3	3
Fz	Q	Q	Q
BD	R131 [R180 + L49]	R110 [R153 + L43]	R150 [R191 + L41]
SC	—	2	2
Si	312 [300 + (3.3 × 3.5)]	317 [300 + (4.6 × 3.8)]	320 [300 + (4.8 × 4.2)]
MF	B 5 RDS, AMC	B 5 RDS, AMC	B 5 RDS, AMC
El	1100	1049	1040

S-3 (when all computers are ready): FIRE.

Registrations

Registrations with charge 2, charge 3, and charge 4, high angle fire, have been completed.

BAKER registered on the base point. HCO data: 3840, BD; VCO data: SITE BAKER + 12. Adjusted data: CH 2, BDL 34, SI 295, El 1076

DEFLECTION CORRECTION CHARGE 2, R12 [BDL 34 Adj. Defl. + R46 Drift = R12].

GFT SETTING CHARGE 2: 3840/1076 [correct site was used].

ABLE registered on check point No. 1. HCO data: 4450, L110; VCO data: SITE ABLE —10. Adjusted data: CH 3, BDL 153, SI 303, EL 1096.

DEFLECTION CORRECTION CHARGE 3, R5 [BDL 153 + R48 = BDL 105; BDL 110 to BDL 105 = R5].

GFT SETTING CHARGE 3: 4450/1096 [correct site was used].

CHARLIE registered on check point No. 4. HCO data: 5960, R237; VCO data: SITE CHARLIE + 15. Adjusted data: CH 4, BDR 191, SI 292, EL 1018.

DEFLECTION CORRECTION CHARGE 4, L7 [BDR 191 + R39 = BDR 230; BDR 237 to BDR 230 = L7].

GFT SETTING CHARGE 4: 5960/1018 [correct site was used].

Computers make a record of all GFT settings determined from registrations. The HCO is given the deflection corrections by the computer.

MISSION NO. 3

Air observer: *Fire mission. Check Point 2 is 800 left, 70 above, 400 short, enemy command post in heavily wooded area behind steep hill. Request high angle fire. Request Bn. Will adjust.*

S-3: HIGH ANGLE FIRE, SHELL HE, ABLE FQ, BAKER AND CHARLIE FD, CONCENTRATION 21, BN ABLE, 3 VOLLEYS, WHEN READY.

HCO: CORRECTION CHARGE 3, R5.

ABLE 4950, R282.

S-3 (to VCO and computers): IGNORE SITE.

Commands by Computer ABLE:

Sh	HE
Ch	3
Fz	Q
BD	R 250 [R282 + L37 + R5]
SC	2
Si	300
MF	BR
El	997

ADJUSTMENT:

<i>Observer's sensings</i>	<i>Computer ABLE's Commands</i>
400 <i>Short</i>	CHARGE 4, L20, 1111
200 <i>Right, 200 Over</i>	L40, 1136
50 <i>Left, 50 Short, FFE</i>	R10, B 3 RDS, 1130

Computer ABLE to HCO:

DEFLECTION CORRECTION CHARGE 4?

HCO to Computer ABLE:

CORRECTION CHARGE 4, L7.

Computer ABLE to HCO and VCO: DATA FOR REPLOT, ABLE, BDR 259 [BDR 250 + L50 + R52 + R7], RANGE 5200, CHARGE 4, CONCENTRATION 21.

HCO:	CORRECTION	CHARGE	3, R5
	CORRECTION	CHARGE	4, L7
	BAKER		4890, R305
	CHARLIE		5300, R298

Commands by Computers BAKER and CHARLIE:

	<i>BAKER</i>	<i>CHARLIE</i>
Sh	HE	HE
Ch	3	4
Fz	D	D
BD	R272 [R305 + L38 + R5]	R240 [R298 + L51 + L7]
SC	—	2
Si	300	300
MF	B 3 RDS	B 3 RDS
El	1010	1117

MISSION NO. 4

CHARLIE Exec: *Fire mission. BC now adjusting on troop concentration, using high angle fire. Initial data Shell HE, Charge 3, FQ, BDR 210, SI 300, BR, EL 1066. Request Bn.*

S-3: HIGH ANGLE FIRE, SHELL HE, FQ, CONCENTRATION 24, BN, CHARLIE NOW ADJUSTING, 4 VOLLEYS, WHEN READY.

Computer CHARLIE to HCO: CORRECTION CHARGE 3?

HCO to Computer CHARLIE: CORRECTION CHARGE 3, R5.

At this point the FDC must wait until Charlie Executive reports adjusted data. It would serve no useful purpose to make a plot using the initial data because the HCO and VCO do not give the non-adjusting batteries chart data until a replot has been made from the adjusted data.

CHARLIE Exec: ADJUSTED DATA CHARGE 3, FQ, BDR 185, EL 1114.

Computer CHARLIE to HCO and VCO: DATA FOR ADJUSTED PLOT, CHARLIE, BDR 230 [BDR 185 + R50 + L5], RANGE 4340, CHARGE 3, CONCENTRATION 24.

HCO:	CORRECTION	CHARGE	3, R5
	BAKER		4060, R218
	ABLE		4290, R184

S-3 (to VCO and Computers): IGNORE SITE.

Commands by Computers BAKER and ABLE:

	<i>BAKER</i>	<i>ABLE</i>
Sh	HE	HE
Ch	3	3
Fz	Q	Q
BD	R167 [R218 + L56 + R5]	R138 [R184 + L51 + R5]

SC	—	2
Si	300	300
MF	B 4 RDS	B 4 RDS
El	1157	1122

MISSION NO. 5

High angle fire can be fired using either the GFT or the tabular firing tables. This mission is included to illustrate the massing of high angle fire using the tabular firing tables.

FO "B": *Fire mission. Check Point 2 is 150 Above, 1200 Over, heavy mortar fire coming from a ravine. Request high angle fire. Request Bn. Will adjust.*

S-3: HIGH ANGLE FIRE, SHELL HE, FQ, CONCENTRATION 25, BN BAKER, 4 VOLLEYS, WHEN READY.

HCO: CORRECTION CHARGE 2, R12. BAKER 3800, R103

S-3 (to VCO and Computers): INCLUDE SITE.

VCO: SITE	BAKER	—45
	ABLE	—48
	CHARLIE	—54

NOTE: Adjusted Elevation Base Point (range 3840) using charge 2 was 1076.

From the Tables: Elevation for 3840 = 1059.

The elevation was *increased 17* in order to hit the Base Point.

An *increase* in elevation *decreases* the range.

Therefore the *K* is *minus*.

$$K = \frac{17 \times 4 \text{ (yds/} \cancel{\text{min}} \text{)}}{3.8} = -18 \text{ yards } 1000.$$

Commands by Computer BAKER:

Sh	HE
Ch	2
Fz	Q
BD	R68 [R103 + R12 + L47 (drift for range 3700)]
SC	—
Si	315 [300 — 45 + 60 (45 × +1.34, comp site)]
MF	BR
El	1090 [elev. for range 3700]

NOTE: Since the adjusting computer does not give corrections to non-adjusting computers in high angle fire, he applies his *K* to the chart range and takes the result to the nearest 100 yards for computing initial data. This is done only when using the tabular firing tables in high angle fire. Under those circumstances the practice results in greater speed with no appreciable loss in accuracy.

ADJUSTMENT:

<i>Observer's Sensings</i>	<i>Computer BAKER's Commands</i>
200 <i>Short</i>	1045 (elev. for 3900)
50 <i>Right, 100 Over, FFE</i>	L13, B 4 RDS, 1068 [elev. for 3800]

Computer BAKER to HCO and VCO: DATA FOR REPLOT. BAKER, BDR 88 [R68 + L13 + R45 + L12], 3870 [3800 × 1.018], CHARGE 2, CONCENTRATION 25.

HCO:	CORRECTION CHARGE 2, R12.
	ABLE 4210, R65
	CHARLIE 4200, R116

Commands by Computers ABLE and CHARLIE:

	<i>ABLE</i>	<i>CHARLIE</i>
Sh	HE	HE
Ch	2	2
Fz	Q	Q
BD	R41 [R65 + R12 + L36]	R92 [R116 + R12 + L36]
SC	3	3
Si	332 [300 — 48+80 (48 × +1.66)]	335 [300 — 54+89 (54 × +1.66)]
MF	B 4 RDS	B 4 RDS
El	983 [elev. for 4130]	986 [elev. for 4120]

FIRING SITE CHART

By Lt. Col. Frank H. Skelly, FA

Our Firing Site Chart shown here has been tested in battle on the Italian Front and found to be very practical for accurate and rapid determination of the Firing Site. Briefly, the Firing Site is determined by visualizing the point of intersection of Range and Target altitude rays. The value of this point in mils is interpolated, by inspection, to the nearest mil.

A separate chart is used for each charge. The chart we are using is approximately 18" x 24", with curves plotted for each 5th. Ranges in yards are plotted along the upper and lower margins. In the left margin is a scale of Differences in Altitude in meters above and below a Zero Line. Site curves are plotted for the particular charge, to include complementary site corresponding to the Ranges and Differences in Altitude. In the right margin are three target altitude scales, in meters, to the same scale as at the left; these are set up so that, for the positions occupied at the particular time, the altitude of each

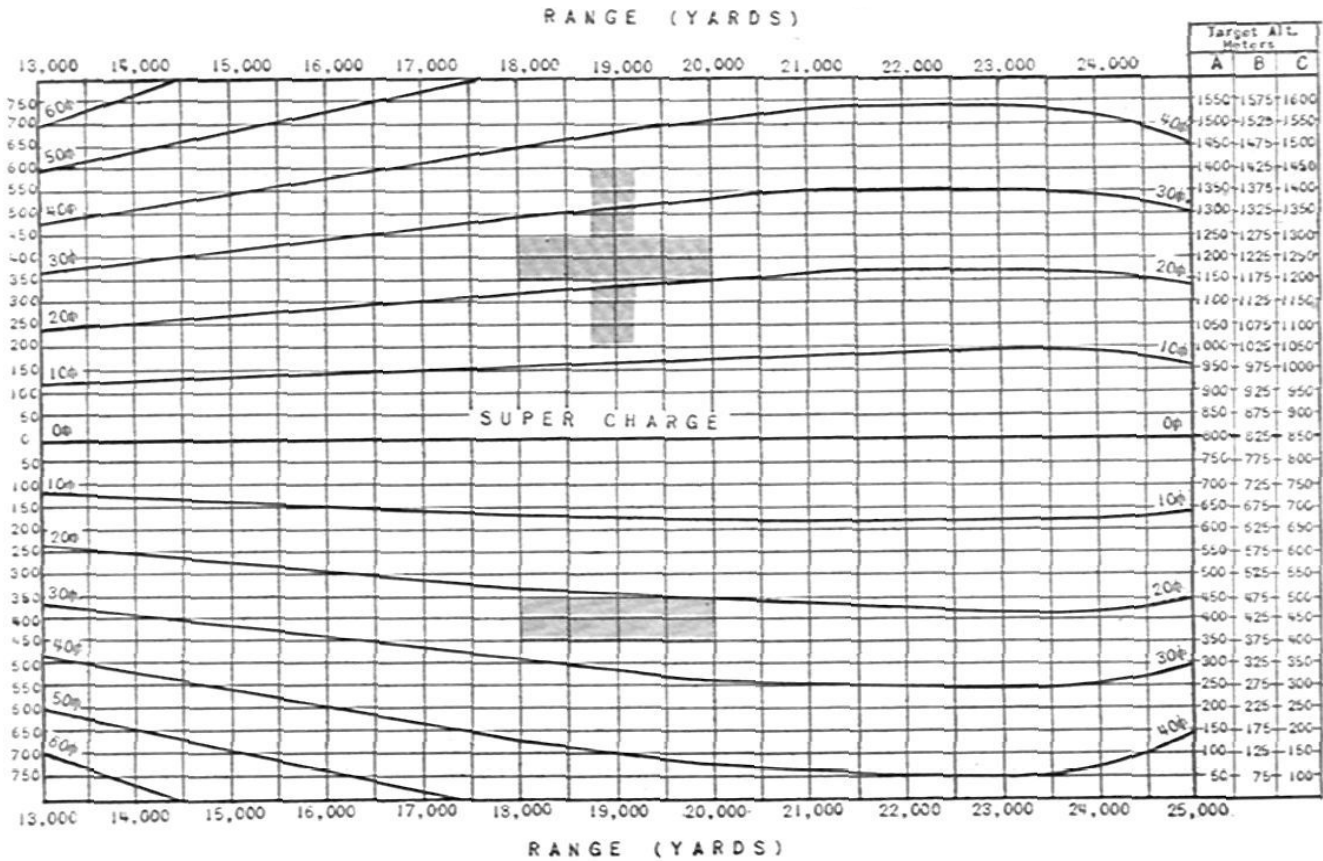
battery is at the Zero Line of the chart. This automatically establishes the Difference in Altitude at the Target Altitude reading.

To use the chart:

- (1) Determine the range to the target and its altitude.
- (2) At their intersection on the Site Chart, read the Firing Site for each battery in turn.

Without the chart, the following operations would be necessary for each battery:

- (1) Determine the range to the target, and its altitude.
- (2) Determine the Gun-Target difference in altitude.
- (3) Convert the difference in altitude from meters to yards.
- (4) Determine the true site.
- (5) Look up the complementary site factor.
- (6) Apply the complementary site factor to the true site to obtain the firing site.



REPEAT PERFORMANCES

Reference his article on Grasshopper Survey (p. 452 of this JOURNAL for July), Capt. Henri Beurneuf writes:

"Incidentally, this article is the eighth which you have published to be written by a member of this battalion over a two-year period, which shows what a great interest we all take in the JOURNAL. Other authors from this battalion are Maj. Stoddard, Capt. John Casey (two articles), Capt. William Gray (two articles), Capt. Clifford Peterson, M/Sgt. G. O. Lloyd, and T/4 John Folmer, with several cartoons by T/4 Harold P. Lee. As you see, we have a real family interest in your publication."

Site and Comp Site Slide Rule

By Maj. Frank Townend, FA

Although our medium battalion has an extremely efficient VCO, the amount of arithmetic, mental and otherwise, that he has had to perform before he could answer *Si Baker + 14* has always been burdensome. He has had no less than five steps to perform: (1) Calculate the difference in altitude between the battery and the target; (1a) if using maps with a metric contour interval, convert this difference to yards; (2) divide this difference in altitude by the range (in thousands); (3) look up in a book firing table (which is always slow) the complementary angle of site for that charge and range; (4) calculate the comp site by multiplying the angle of site by this comp site factor; and (5) add this result (comp site) to the straight angle of site for the final result.

We therefore concluded that most of these steps could better be performed by a slide rule—and after some three weeks of bewildering confusion developed a rule which will perform in most cases all but step (1) enumerated above. Although our solution may appear obvious and although many units may have a similar or better device, we pass this along for whatever it may be worth. The accompanying illustration shows part of the slide. It is to be used in the stock of the standard 18" GFT and can conveniently be mounted either on paper or directly on the wood on the reverse of the slide for high angle fire.

OPERATION

The difference in altitude (57 yds.) is placed under the range (3,440 yds.) by moving the slide. The window hair line is then moved to the same range where indicated in the center of the slide, for the charge being used (Charge 1). The answer is then read under the hair line in the 33 1/3/R figures on the top of the stock—in this case, 22 1/2. If the difference in altitude were 57 meters the stick would be set in exactly the same way, but the answer would be read under an extra line marked M and drawn on the under side of the window—in such case being 24 1/2. The

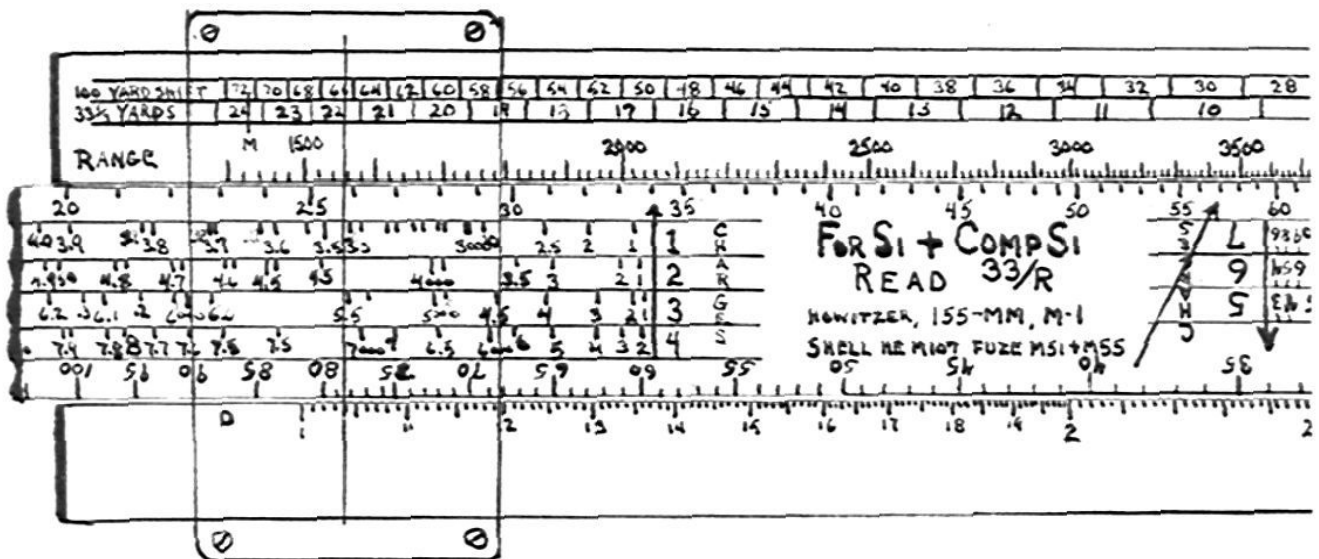
answer is the figure to be announced to the computer, both site and comp site together.

At the shorter ranges for each charge there is no need to differentiate between plus and minus site values. At greater ranges the difference has been arranged for by entering the range tick for *minus* site in red. Thus if the target were 57 yards *below* the battery, in the same problem the answer would be 21 1/2.

If the difference in altitude is over 150 yards, or if the angle of site is such that the scale extends too far out of the left end of the stock, the answer can easily be obtained by obtaining the site and comp site for 1/2 (or 1/3, etc.) of the difference in altitude and then multiplying your answer by 2 (or 3, etc.).

CONSTRUCTION

Reproducing such a slide is an easy procedure and can be done by a VCO in around two hours. First, on both sides of the slide mark in the scale for differences in altitude, according to the logarithmic mounting of the range scale (15 yds. under 1500, 20 yds. under 2000, and so on). Then with your slide in that same position draw an arrow which will point up to the exact center of the red "10" figure in the 33 1/3 yard scale (this arrow will then always give site without comp site). Next, remove your slide and replace it upside down with this arrow lined on the left hand index (1) on the D scale at the bottom. Draw your scale for each charge for the various ranges by setting the edge of the window at the point on the D scale which represents the sum of 1.00 and the comp site factor given in the book firing table. Enter the black (plus) figures first, then the red (minus) figures where necessary and convenient. In a few cases red and black marks (for different ranges) may coincide, in which case we suggest a double mark: red and black alongside each other. After completion of the slide, a few coats of airplane dope will protect the figures from wear.



Metro Slide for GFT

By Maj. C. E. Bartlett, FA

A new metro slide for use with the conventional stock of the graphical firing table in computing meteorological data for the 3" guns M5 (towed) and M7 (self-propelled) employed by TD units has stood up well in tests. In one conducted under controlled conditions the time for computing metro data with the new slide was less than half that consumed in computing the same data by the usual method. Two officers worked 10 problems with the slide in an average time of 1.5 minutes; their average by the usual method was 3.7 minutes. There were three appreciable errors in the results obtained by the regular method, but none in results obtained with the metro slide.

Tables for the new metro slide are based on data from FT-3-Q-1 and are therefore applicable to the 3" guns. Similar slides for use with field artillery weapons can be designed in the same manner through use of appropriate firing tables.

RANGE

The only alteration made in the conventional stock of the graphical firing table for use with the metro slide is the addition of a scale showing "Total Metro Effect in Yards." This, called the M scale, is placed just below the D scale on the lower half of the stock. Net result of computed metro data is read from this scale.

The front of the 3" gun's metro slide is divided into three sections for ranges of 6,000, 7,500, and 9,000 yards. The reverse side has two sections, one for a 10,500-yard range and a second for a 12,000-yard range. The 1,500-yard gap between sections represents one half of the limits to which *K* transfers can be made accurately. These five sections cover ranges at which indirect fire normally will be conducted by tank destroyers reinforcing field artillery units.

Each of the five sections on the slide has six scales, one for each of the elements considered in making a metro calculation. Each scale is designed in the proper relation to its range section and the M scale. From bottom to top the scales are, weight of projectile, powder temperature, air temperature, rear wind velocity, air density, and VE correction. The combination of these factors in their proper relation gives total metro effect on the M scale.

Each range section has a line running through the six scales at a point adopted as standard conditions of materiel, ammunition, and atmosphere in the preparation of firing tables from which this data was compiled (see Fig. 1). This line will be referred to as the standard line. The standard conditions are:

weight of projectile, 1 square; temperature of powder, 70° F; air temperature, 59° F; rear wind velocity, zero miles per hour; air density, 100%.

Operation of the slide rule is best explained by working an illustrative problem in conjunction with accompanying photographs.

EXAMPLE

Situation

A 3" gun is to fire on an 800 μ sector, the Y-azimuth of the center of the sector being 4100 μ . It is to cover ranges from 6,000 to 9,000 yards. The metro check point selected is at 7,500 yards.

Officer in charge of gun reports:

Weight of projectiles, 3 squares

Powder temperature, 31° F.

Metro message information:

Air temperature, 36° F.

Wind direction, 600 μ .

Wind velocity, 35 mph.

Air density, 98%.

Procedure

Step 1. Line up the hairline on the window with the zero on the *M* (total metro effect) scale and the standard line of the 7,500-yard range section (Fig. 1).

Step 2. Set the hairline to the 3-square graduation on the weight of projectile scale (Fig. 2).

Step 3. Move the slide so the standard line of the 7,500-yard range coincides with the hairline (Fig. 3).

Step 4. Set the hairline to 31° F on the powder temperature scale (Fig. 4).

Step 5. Move the slide so the standard line again coincides with the hairline (Fig. 5).

Step 6. Set the hairline to 36° F on the air temperature scale (Fig. 6).

Step 7. Move the slide so the standard line again coincides with the hairline (Fig. 7).

Step 8. The azimuth of the wind is 600, and since the direction of fire is 4100 the chart direction of the wind is 600 + 6400 — 4100 = 2900 μ . From the "Wind Components" tale on the back of the rule (Fig. 8), the wind components

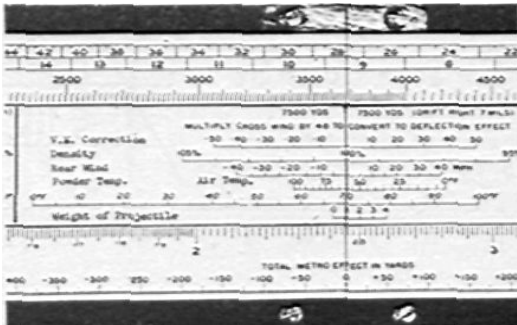


Figure 1



Figure 2



Figure 3

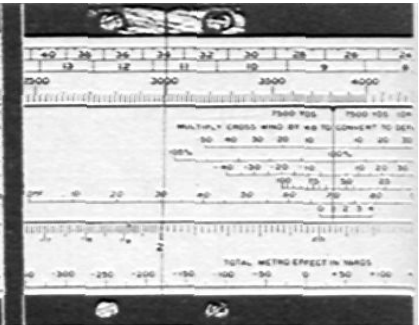


Figure 4

Chart Direction of Wind	Cross Wind MPH	Range Wind MPH	Chart Direction of Wind	Cross Wind MPH	Range Wind MPH
0	0	-1.00	3200	0	+1.00
100	L. 10	-.99	3300	R. 10	+.99
200	L. 20	-.98	3400	R. 20	+.98
300	L. 29	-.96	3500	R. 29	+.96
400	L. 38	-.92	3600	R. 38	+.92
500	L. 47	-.88	3700	R. 47	+.88
600	L. 56	-.83	3800	R. 56	+.83
700	L. 65	-.77	3900	R. 65	+.77
800	L. 71	-.71	4000	R. 71	+.71
900	L. 77	-.65	4100	R. 77	+.65
1000	L. 83	-.56	4200	R. 83	+.56
1100	L. 88	-.47	4300	R. 88	+.47
1200	L. 92	-.38	4400	R. 92	+.38
1300	L. 96	-.29	4500	R. 96	+.29
1400	L. 98	-.20	4600	R. 98	+.20
1500	L. 99	-.10	4700	R. 99	+.10
1600	L. 1.00	0	4800	R. 1.00	0
1700	L. 99	+.10	4900	R. 99	-.10
1800	L. 98	+.20	5000	R. 98	-.20
1900	L. 96	+.29	5100	R. 96	-.29
2000	L. 92	+.38	5200	R. 92	-.38
2100	L. 88	+.47	5300	R. 88	-.47
2200	L. 83	+.56	5400	R. 83	-.56
2300	L. 77	+.63	5500	R. 77	-.63
2400	L. 71	+.71	5600	R. 71	-.71
2500	L. 65	+.77	5700	R. 65	-.77
2600	L. 56	+.83	5800	R. 56	-.83
2700	L. 47	+.88	5900	R. 47	-.88
2800	L. 38	+.92	6000	R. 38	-.92
2900	L. 29	+.96	6100	R. 29	-.96
3000	L. 20	+.98	6200	R. 20	-.98
3100	L. 10	+.99	6300	R. 10	-.99
3200	0	+1.00	6400	0	-1.00

YAZ Wind - YAZ Die Fire

Figure 8

five scales of the selected range section. The total metro effect in yards can be converted into correction in mils by changing its sign, then dividing by "yards per mil" at the particular range

for a chart direction of 2900 are L.29 and + .96. Using the range wind component only, + .96 × 35 mph (wind velocity given) = + 34 mph. Set the hairline to 34 mph on the rear wind scale (Fig. 9).

Step 9. Move the slide so that the standard line again coincides with the hairline (Fig. 10).

Step 10. Set the hairline to 98% on the density scale, and read the net metro effect in yards on the M scale (Fig. 11). Actually there are five adjustments to be made, using

(from range table, in this case at 7,500 yards). Example: + 45 yards ÷ 29 = + 2 ⁷/₁₀ mil correction.

K can be computed by dividing net metro effect in yards by range in thousands of yards (7.5). This K may then be set on the K-scale of the GFT.

A number of variables frequently result in a difference between a K computed from metro data and the K actually determined through registration. Moreover, the muzzle velocity of ammunition is not always standard. This difference, or K-change, is known as the velocity error. It has been included on the top scale of the range sections of the metro slide as "V.E. Correction in Feet Per Second." If known, it is to be applied in the same manner as, and in addition to, the five elements described in the illustrative problem and then converted into the corrected K.

DEFLECTION

To correct for deflection, two constants have been indicated on each range section of the metro slide: drift and cross-wind factor. For example:

1. Drift at 7,500 yards is right 7 mils (Fig. 1).
2. The cross-wind factor (Fig. 1) is to be multiplied by the cross-wind velocity to give deflection effect. Thus, at 7,500 yards and using the chart direction of 2900 from the illustrative problem: Left .29 × .48 × 35 = L 5 ⁷/₁₀ mil (cross-wind deflection effect).

In the above example, since the drift is right 7 mils and the cross wind deflection is left 5 mils, the net deflection effect is right 2 mils. Therefore, the net correction to be made is left 2 mils.

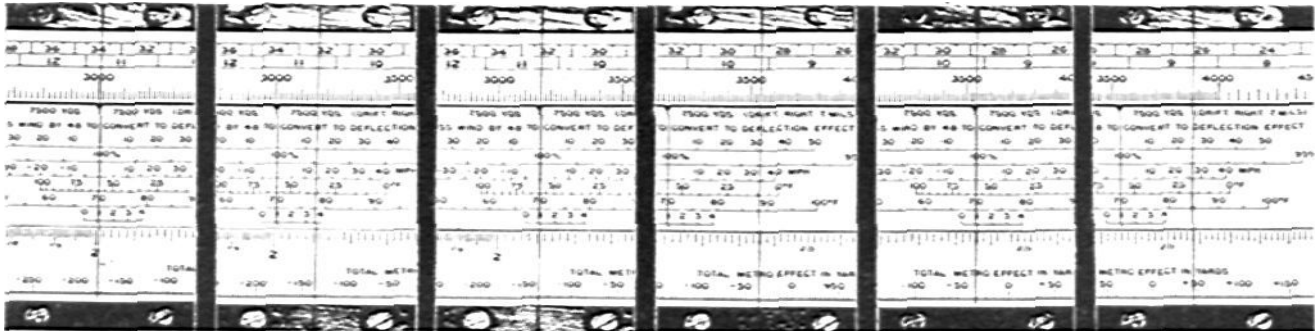


Figure 5

Figure 6

Figure 7

Figure 9

Figure 10

Figure 11

TARGET GETTING AND FIXING

By McKenzie Hill

Performance of American artillery in the current wars has been most commendable. The facility with which it has been able to mass and maneuver fires has greatly contributed to the success of our arms. This has been particularly outstanding during the time when our enemies had the initiative. Now that the initiative is ours, we should analyze our means and methods and see if they are appropriate to the task at hand.

There is never too much ammunition, either manufactured or delivered, at the critical point. It is up to us to make the best use of it. Consider the matter of targets.

Other things being equal, the artillery battalion that can find and fix on a chart the most targets for attack then or later will be the most effective.

Peace tends to develop technique without sufficient attention to target getting and fixing. War gradually develops the need and importance of target getting and fixing. Perfection in the technique of delivery of fire, as well as the technique of getting and fixing (locating) targets, is essential.

Is your target-getting machinery in order, not only for counter-battery targets but also for close support targets? Arrange for fixing them by exercising your command responsibilities in connection with planning for and procuring maps, photomaps, photographs, etc. Their supply is not automatic—*yours* is the responsibility.

Get the infantry to help line in on machine gun flashes. Work with and for them in getting targets.

Corps and Non-Divisional Artillery

SECOND OF TWO PARTS

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

SECTION II—COMMUNICATIONS AND OBSERVATION COMMUNICATIONS

General

In general, the communication system required by the corps artillery is similar to that of the division artillery, except on a larger scale. Lateral distances are greater in corps installations, and distances are greater between FDC and CP (which in the corps artillery are almost never together). For the purposes of discussion this article assumes a centralized operation. Note that, as said before, it is desirable for the corps to prescribe such instructions for independent elements as will facilitate their inclusion in the *whole* plan when the corps takes over.

Wire

In addition to the normal trunks and locals, the corps artillery FDC has a wire to its LnO with each division artillery, preferably through the division artillery switchboard. There is also a wire to the LnO with the air force photographic squadron working for the corps. There is a wire to the assistant S-2 acting as liaison officer with corps G-2. As the FDC is well forward among the battalions to conserve communications, and the CP is back at corps headquarters, it will usually be necessary for the corps signal battalion to install the wire connecting the two. The number of circuits is variable, but should be at least two.

Occasionally the corps artillery will select one or two battalions for executing quick fire missions, and will have a direct wire to these battalions from the FDC, bypassing group or brigade.

Wire communication to division artilleries is often facilitated by incorporating those lines laid by units attached to advanced divisions.

Radio

It is in the use of radio, particularly for fire direction, that corps artillery communications are emphasized in these remarks. Radio has been considered a means to be used only until wire was in or during breaks in wire service. This view unquestionably arose from the experience of using sets with limited range, of perverse and unpredictable habits, continually in need of repair or adjustment, and often years behind commercial development. It is not easy to swallow the conception that in corps artillery the radio is much more than merely an alternate or substitute for the telephone. However, for fire missions involving appreciable numbers of units, or in those missions involving the coordinated inter-borrowing of observation and of fire power between division and corps artillery, the radio is invaluable.

Each artillery headquarters has, or will have, an SCR-193 capable of voice range up to about 30 miles and CW up to about 70 miles. In the corps these sets should habitually be netted on the Corps Artillery Control Channel, with frequency changed at intervals to reduce interference and intercept. The control station is the FDC. Normal operating procedures should be abbreviated somewhat in view of the large number of sets that may be in the net; for example, a fire mission broadcast to eight or ten units simultaneously should not be receipted for by each in turn. Tuning signal should be broadcast by the control station at prearranged times so that all sets can tune in; only those failing to tune need make report (via other channels).

Thus the corps artillery will have a net including the FDC, each brigade, group, and battalion, and the observation battalion. All stations can follow all missions, whether participating or not, thus easing the problem of disseminating new concentration numbers, etc. Although the arrangements for an observer to adjust or conduct surveillance of a particular shoot may often have to be made by the corps FDC, it usually steps out of the picture as quickly as possible and merely listens in on the direct transmissions between observer and battalion (or group). The corps artillery FDC need function as such

only for those missions involving units not having a lower common FDC; it may end the mission or issue other instructions during the fire at its discretion.

As for the division artillery SCR-193 sets, it is suggested that the corps artillery commander recommend that they too be kept continuously on the corps control channel, thus providing a common channel whereby any observer, whether division or corps, can fire any division or corps artillery. If the division sets are kept on their own channels, however, necessary arrangements can be made through the corps artillery LnOs to have the division set switch to the corps frequency when necessary. An example of this would be a request from a direct support observer for corps artillery fire which he adjusts. Note that the observer is on a 609 channel to his home battalion; there must be a relay at that point to the corps channel.

A sample mission, illustrating conduct of fire of a corps group by a division artillery forward observer, will clarify the above remarks:

Call Letters

X Div Arty Bn	RUBY
Corps Arty FDC	EMERALD
Y FA Gp	DIAMOND

a. Message from Corps Artillery LnO at CP, X Div (phoned):
"X FA Fwd Obsr reports tanks at _____. Request all possible fire. Will adjust. Call letters RUBY."

b. Reply (phoned), Corps Arty S-3 to LnO:

"DIAMOND will fire 4 bns. cone 910. Use corps control channel."

c. (Necessary data is transmitted to Y FA Gp, including call letters of observer's battalion.)

d. Corps FDC sits back and listens to the mission.

Had the above been a massed fire mission with location of target accurate enough to warrant surprise fire, the corps FDC would have broadcast the mission in code (for brevity) to perhaps three or four groups, synchronizing the initial impacts by use of a time signal (see remarks under Section III).

Summarizing, it is obvious that the value of the radio lies in the flexibility of assigning observer and firing unit and in the speed with which large numbers of units can be massed. It is emphasized that this is not a scheme whereby the corps artillery can appropriate division observers for its own use. Rather, it is a plan whereby the corps artillery can give quicker and more accurate fire assistance to the divisions, from whom come most of the missions.

OBSERVATION

As corps artillery officer, the corps artillery commander is charged with coordination of matters affecting all the artillery with the corps. As to observation the manuals are not very instructive except to say that direct support gets first priority, flash observation second, and unit observation last. A practical formula might be about as follows.

Except in terrain where there are so few good OPs that careful allotment is necessary, assume that units have adequate observation unless report is made to the contrary. The corps artillery commander usually need not have to worry much about division artillery observation.

As to corps observation agencies, the observation battalion is the mainstay. Their sound ranging is often not only the best source of counterbattery intelligence, but the only one functioning. Where it is not possible for the sound bases to cover the whole front they should be given special areas or directions in which to concentrate efforts; it is often necessary for bases to be "cocked" in a particular direction for best results. The installing of the battery attached to an advance division has considerable bearing on just how the rest of the battalion will go in when the corps comes up. Sound bases can go in almost anywhere, difficulty of survey being the prime obstacle. Sound is usually efficient up to ranges of about 1½ times the length of the base.

Flash observation will establish "corps type" long base intersection whenever possible; sometimes it is necessary to use a combination of long-base and short-base. These posts are given first priority among corps artillery observation and, like the sound teams, may have to concentrate on particular areas when the front is extended. Unit OPs should be used where necessary to cover the gaps.

Use of the observation battalion has such a powerful influence on the success of the corps artillery that full advantage should be taken of it. The battalion commander should be consulted on matters of survey, metro, and observation; his advice should be taken.

In this connection, it has been repeatedly reported that the observation battalion has great difficulty in getting advance parties up forward during combat team or division phases of operations. Column commanders are reluctant to permit even one or two extra vehicles in their columns. The observation battalion commander needs the earliest possible reconnaissance in order to plan survey and observation, and it is recommended that the necessary instructions be issued by corps commanders to permit such reconnaissance, whether the parties are attached or under corps control. Experience shows that attachments to divisions should be entire batteries, not lesser detachments.

As for unit observation, corps artillery observers will not usually find as high a percentage of targets as will those of the divisions. They can conduct surveillance, however. It should be a mandate that all fires be observed whenever possible. This is especially important in smoke missions.

Aerial reconnaissance and photography make up most of the remaining corps artillery observation. The LnO with the photographic squadron is put there primarily to obtain and evaluate photos. He can often coordinate his requests for photos with those initiated by other arms; he works closely with their interpreters. Frequent rephotographing is necessary to confirm intelligence.

Aerial spotters should be given specific targets or areas. It is wasteful to send out a plane with instructions to hunt around for targets. The observer must be given every help. On long range adjustments it is very hard for him to pick up bursts from a particular unit; for this reason he should be given time of flight, smoke pattern fired, etc. It has proven difficult in Italy to pick up 4.5 bursts where smoke was not available.

COUNTERBATTERY INTELLIGENCE

There is no problem in firing counterbattery. The problem is in finding the targets. The observation battalion is the big target-getter,

but scraps of information from various sources all help—aerial photographs, shelling reports, infantry observation, questioning of prisoners, reports by friendly inhabitants, etc. Much information is correlated by time coincidence, and all troops should be impressed with the necessity of including in reports the *exact time* the activity was observed. An orderly system of indexing counterbattery intelligence is absolutely necessary; FM 6-100 shows sample forms and records.

T/Os provide an assistant S-2 for counterbattery intelligence. Other than this there is no special set-up required. All members of the fire direction team should be familiar with the problems of evaluation, and should constantly study enemy organization, losses, etc. Counterbattery fires are discussed in Section III.

SECTION III—FIRE PLANS

As stated earlier, the corps artillery exists for two main purposes:

- (1) To reinforce the division artillery
- (2) To execute corps fires (counterbattery, long-range fires)

The ideal in employing the corps artillery should be to handle corps fires with the minimum artillery needed, making the maximum available to reinforce the divisions. Of course, all fires aid the troops, but by reinforcing fires is meant those that the divisions themselves want fired. They are not often apt to ask for interdiction 20,000 yards away while attacking positions 1,500 yards from the line of departure.

The keystone of coordination is a personal conference between the corps artillery commander and the division artillery commanders. This meeting should take place before division plans are crystallized. At this time the corps artillery commander can go over the general artillery plan, including organization for combat, ammunition supply, survey, communications, etc.; in other words, he gives a preview of what will be in the artillery annex. He should also tell the divisions, if possible, what firepower he will have to borrow from them during the initial phases of the preparation and when it will be released. He should tell them also, if the information has been worked out by S-3, what corps artillery they can count on to reinforce them during the preparation. The divisions make any special requests for fires from the corps artillery, and can advise on roads, terrain, enemy dispositions, etc., affecting the employment of their own or the corps artillery. Problems involving coordination between divisions can often be solved by permitting mutual arrangements, such as for fires overlapping common boundaries. Fires requested outside the corps boundaries,

Legend
 Numbers below 600 - Div Concs
 Numbers 600 and up - Corps Concs
 S - Smoke
 I - Interdiction

Work Sheet (as used by S-3, Corps Arty)
 Remainder of Scheduled Fires

	H-24	-30	-24	-18	-12	-6	0	+6	+12	+18	+24	+30	+36
471 FA Co (2 Bns) (180mm Gun)	632 633 640 644 CVA CFA CVA CVA				611 612 613 614				CVA CVA CVA CVA	TIA TVA			
402 FA Co (4 Bns) (180mm How)	601 602 603 604 605 606 607 610 618 620 621 624	TIA TVA			602 603								Two Bns Free for Div Use
	304 CFA LTA	317 HIA EBA	316 LBA AMA	5 Bnys Free for Div use	600	CFA LTA	HIA IMA	LBA ABA					CFA LTA EBA HIA LBA AMA

Assume: 1 Platoon per smoke, interdiction mission; other numbered concentrations are 1 Bn each. (Repeat counterbattery with one battery)
 daylight is 0600 (H-24).

Figure 1

FIRE MISSIONS			
ATTACK OF 050710 JAN 44			
502d FA Gp: (Note 1)			
Coordi- nates (Note 2)	Time (Note 3)	No. Bns.	Remarks (Note 4)
847	H-45	2	Counterbattery
849	H-45	1	Counterbattery (25% WP,
865	H-39	2	Counterbattery 75% HE)
807	H-39	1	Counterbattery
856	H-33 to H-27	2	Inf Res
859	H-25 to H-19	2	Inf Res
H-17 to H hour: Reinf 11 Div Arty w/3 Bns. Divs will furnish 12 Div Arty w/1 Bn. schedule of fires.			
804	Interdict		Bridge
853	From H-02		Bridge
803	to H-50		CR
864	H-02	1	Counterbattery
807	to	1	Use HE (75%)
849	H-08	1	plus WP (25%)
865		1	
802	SMOKE H-10		
822	until lifted by		
826	order this Hq		
832	or by 11th Div		
819			OP's
By Command of Brig Gen _____			
OFFICIAL _____ S-3			
Note (1): Group or Brig.			
Note (2): Coordinates may be omitted if they have been previously given in daily intelligence bulletin or by overlay.			
Note (3): Where single time is given, impacts must be exactly at that time (subtract time of flight). Where two times are shown, fires may be executed at any time between time limits given, but must lift by second time given.			
Note (4): Neutralization (including counterbattery) concentrations are 5 rds/gun. Others, such as smoke, interdiction, etc., are modified as necessary.			

Figure 2

however, must be submitted to corps for negotiation with the neighboring corps.

CORPS FIRES

Purely corps missions come from counterbattery intelligence, mandates of the force commander, and such other fires as are requested by divisions or prescribed by the corps artillery commander. These missions can usually be integrated fairly early in the planning—at least before division coordinated plans are prepared—and from them the corps artillery S-3, using a work sheet similar to that shown in Fig. 1, can block out the missions for the corps artillery and for borrowed division artillery firepower. He can make a fair estimate of what corps artillery will be available during the preparation to reinforce divisions (reinforcing missions assigned by organization for combat do not bind during the preparation) and what will be

needed for corps fires. The divisions are notified of this information and told to work directly with specified corps groups or battalions for planning and execution of fires during the periods designated. Corps fires should be sent down promptly to the groups, using a directive form similar to that shown in Fig. 2. Operating procedure assists in brevity when assigning missions. Note the latitude given group commanders in executing missions.

This procedure is somewhat of a departure from the custom of requiring divisions to send up their fire plans together with requests for corps artillery assistance. It is felt to be much better and faster, as the divisions get exactly what they ask for, they know early what they can expect, and the process eliminates one set of hands (corps artillery S-3) through which arrangements have to pass. In addition, the group can assist the division artillery in planning. Thus the divisions get all the assistance from corps that is available, with the earlier assurance that plans will not have to be altered radically after corps has seen them. It is obvious that this procedure assumes ample planning time, good intelligence, and capable staffs.

When time is short, however, there is not opportunity for all this coordination. The procedure then should be for corps to estimate its needs, place its artillery (especially the medium) in suitable positions, and instruct that portion not needed continuously for corps fires to deal direct with divisions. After the preparation the reinforcing missions assigned in the organization for combat take care of fires on call. To insure profitable employment by divisions the corps artillery commander should assign secondary reinforcing missions to most or all of his medium calibers.

The corps artillery commander may require that division artillery plans be submitted to him when completed—but this should normally mean at the end of their planning, not the beginning of it.

As for fires delivered, the manuals give descriptions of the general types during phases of preparations. It is to be noted that corps artillery must reserve sufficient artillery to execute "repeat counterbattery" at intervals to maintain the artillery ascendancy obtained in the initial phase. Very often a single battery or platoon can conduct these fires on each enemy battery (although the original massed fire may have been from 3 or 4 battalions), and should be selected from among those firing on the same target initially, as data are available.

It has been found that counterbattery, or any other fire against personnel who have shelter nearby, gets the great majority of casualties in the first few seconds. It is therefore useful to synchronize the initial rounds from all units; this can be easily effected using the common radio control channel. White phosphorus mixed in is effective, particularly with time bursts. The initial counterbattery fire should be at least one battalion to each enemy battery; more is preferable. Repeat counterbattery should come at varied intervals.

SUMMARY

In these remarks the emphasis has been on flexibility, massed power, the use of radio, and personal conference between commanders. Plans should be based on the problems of the lowest unit: *all possible help must be given the forward troops*. In all cases it is necessary to avoid fixed patterns or procedures in corps fires, else the enemy soon becomes educated. And one final point: *time* is essential in planning detailed operations.

IT GETS THERE—AND DOES THE JOB

c/o Postmaster, New York

The material in the JOURNAL is of great interest and value to us these days, particularly the articles based on combat experience. I find that I get many valuable ideas for training from each issue. Keep it coming to us the same way you have been.

Lt. Col., FA

c/o Postmaster, San Francisco

I think that the exchanges of ideas which take place through our association are most vital to all outfits in or out of action. The JOURNAL comes through promptly here with true regularity.

Lt., FA

Extracts like these, from overseas letters, are published not for the purpose of tooting our own horn, but for other reasons: (1) to point out that if you're just reading your JOURNAL instead of using it, you're missing some good bets; (2) to emphasize to all that the JOURNAL is at least as useful abroad as it is here at home, so you shouldn't permit misguided friends or family to allow your membership to lapse, wherever you may be; and (3) to show that the JOURNAL does get through to all overseas installations, even though the shipment of war materiel may at times cause some delay of the mails to some areas.

FIELD ARTILLERY OBSERVATION

PART 1—OBSERVATION

Observation is essential in order that field artillery can accomplish its mission of rendering continuous and close support to other arms. Skillful maneuver of observation is important to the effective maneuver of fire power. Observation is the principal means of the artillery for gaining information of the enemy. It is necessary in the discovery and attack of targets of opportunity and the surveillance of prearranged fires. It serves also as a means of gaining information of our own troops, and in this respect supplements liaison with the supported arm. Artillery observation should cover the entire zone of action (or defensive sector) of the supported unit and should extend sufficiently deep into the hostile position to cover those areas from which fire can be delivered on our troops. In order to cover the entire zone of action or defensive sector to the required depth, field artillery units utilize both ground and air observation. Ground observation is performed by (1) forward observers, (2) observers at battalion and battery OPs, or (3) sound and flash units.

GROUND OBSERVATION

Ground observation is of basic importance for the location of targets and the conduct of fire. It must function day and night. Artillery is charged with the duty of keeping unbroken watch on friendly and enemy troops; enemy activity and changes in the situation must be properly reported.

OBSERVATION POST

A battalion establishes two types of OPs:

(1) *The forward OP* is one established by the forward observer, who is assigned to observe in the zone of action or defensive sector of a given unit and to maintain contact with that unit. From his OP, the observer can distinguish friend from foe and can adjust fire in close support of the attacking or defending troops. Most artillery targets are reported from the front lines.

(2) *The battalion or battery OP* (Fig. 1) is one that is located to give a wider and deeper field of view than the forward OP. It is used for the conduct of registration, surveillance of fires, and intelligence and security. Targets

reported from direct-support battalion or battery OPs are checked through the FDC prior to opening fire to insure that such fire will not endanger our advance elements.

ORGANIZATION AND OPERATION OF THE OP

An artillery OP should be manned by an observation party of not less than three men. The senior officer or noncommissioned officer is responsible for keeping the zone of observation under constant surveillance. Generally, two men observe while the third operates the means of signal communication. When it is necessary to make a written report of observations, one of the two observers acts as recorder. When the enemy is not dangerously active one observer in observation is sufficient, the other observer(s) rests and acts as a relief. The entire observation party should be relieved every 48 hours if practicable.

Upon occupying an OP, the senior observer first determines the map location of the OP and orients his map. With other observers of the party he then makes a study of the terrain under observation with respect to the map, identifying on the ground the base point, check points, reference points, and other prominent features. If not restricted, he should "shoot himself in" by registering on one or more check points. Reference lines should be staked in on the ground for night orientation of instruments.

The senior observer makes a study of the areas in the zone of observation into which he can see, notes those which are defiladed from his view, and marks these areas on his map. An overlay showing these areas and the location of the OP is sent to the battalion CP. A panoramic sketch of the zone of observation should be made showing prominent features, base point, check points, and important targets. This sketch together with the map and a record of adjusted data serves as a record of observations and permits rapid delivery of fire. A panoramic photograph or an oblique air photo can be used instead of a sketch.

Alternate OPs must be reconnoitered and prepared to avoid the possibility of neutralization by smoke, hostile fires, local

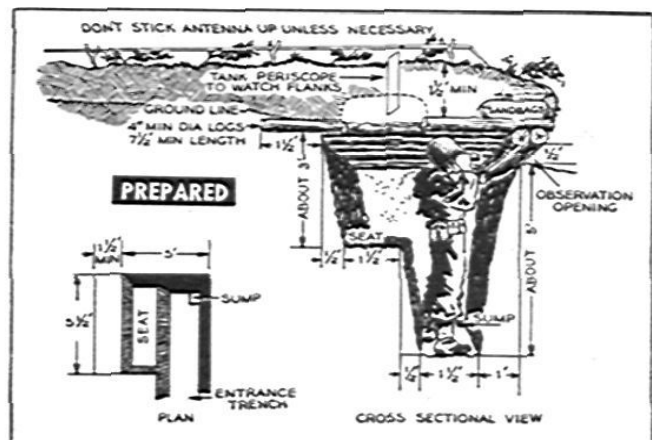
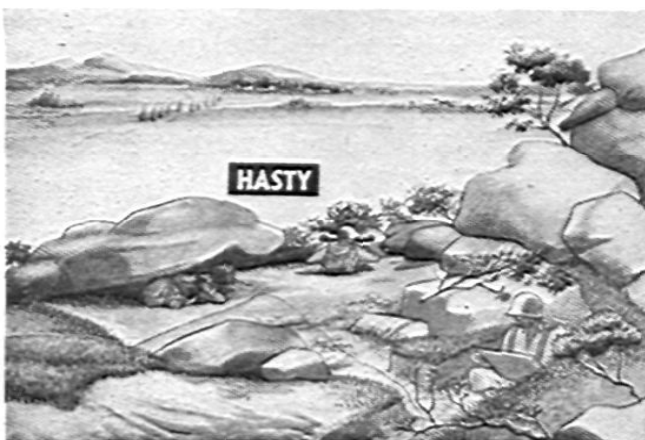


Figure 1. A battalion or battery OP

attacks, or weather. These alternate observation posts must be located so as to assure continuous observation whether the action goes forward or backward or to either flank. Visitors' OPs should be provided for "brass hats," military observers, and correspondents, so that the working OP is not given away by transients.

COORDINATION AND MANEUVER OF OBSERVATION

Coordination and maneuver of observation insures that the entire zone of action or defensive sector is observed by one or more agencies and that bunching of OPs at any one place is avoided. Coordination is accomplished by the assignment of zones of observation, the allocation of ground suitable for OPs, and the assignment of FOs. OPs should be assigned with priority to (1) direct-support battalion, (2) flash sections of the observation battalion, (3) general-support battalions. The maximum exploitation of observation demands a communications net that will enable any observer to adjust any battery within range of his front.

ZONES OF OBSERVATION

Battalion

A battalion's zone of observation usually corresponds to its normal zone of fire. The BnC divides the battalion zone of observation among the three batteries. The battery is responsible for observation in the zone so assigned; it is not limited, however, to observing only in that zone.

Zones of observation may be designated by terrain features, by

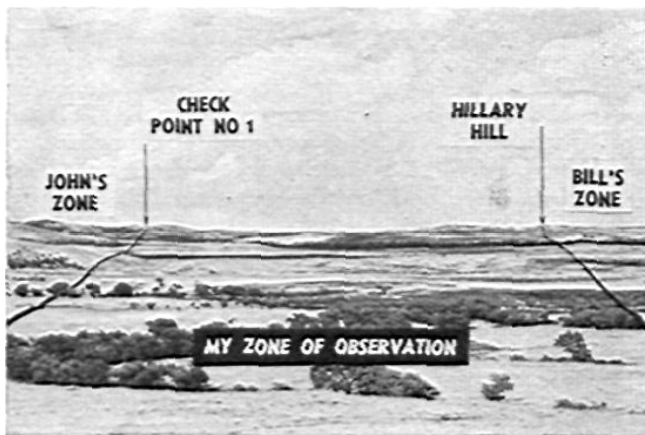


Figure 2. Zones of observation

the zone of action of the supported units, or by distances or angles right and left of a given line (Fig. 2). The battalion establishes necessary observation posts which will, with those established by the batteries, cover all critical areas within the zone of observation (Fig. 3).

The Battery

Upon receiving the battalion order, the BC directs the establishment of the necessary battery OP(s). He displaces his OP(s) as necessary, notifying the battalion commander before displacing.

FORWARD OBSERVATION

Direct-support battalions and (in most cases) battalions reinforcing the fires of direct-support battalions, send out FOs. It is

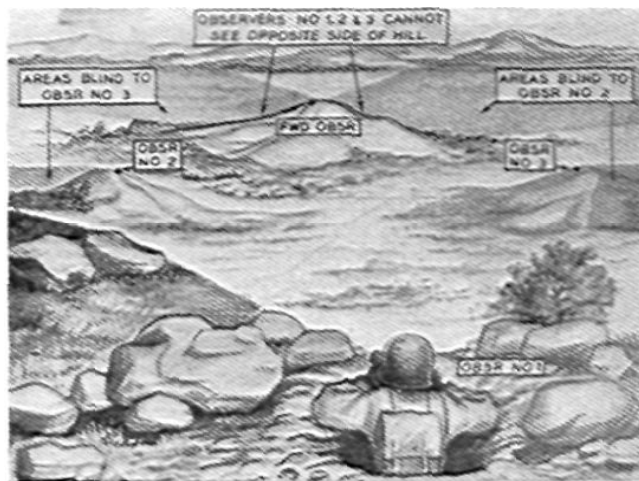


Figure 3. Observation organized to eliminate blind spots

desirable to send them out in the ratio of one to each front line company or similar organization. Often the division artillery commander may authorize the use of FOs of a general-support or reinforcing battalion to augment or relieve the direct-support FOs. The commander of the direct-support artillery battalion, through his liaison officers, will coordinate all the FOs operating in the zone of his supported unit. FOs should be present when the company attack order is issued. The artillery battalion commander, the S-2, the liaison officers, and the FOs comprise the team responsible for the control of the forward end of the trajectory.

DUTIES OF THE S-2

The S-2 makes a continuous study of the battalion observation. Based on this study he aids the battalion commander by coordinating the

- (1) Number and location of battalion, battery, and forward OPs.
- (2) Replacement and relief of observers.
- (3) Replacement, improvement, and exploitation of all communication facilities for the observers.
- (4) Selection of the OP(s) to be maintained on a 24-hour watch.
- (5) Linking of OPs with those of lateral, reinforcing, and general-support units.

SELECTION OF OPs

When selecting an OP, consideration should be given to ease of concealment of location and routes thereto, ease of installation and maintenance of signal communication, and avoidance of outstanding landmarks.

Battalion and battery OPs are selected to give the most extensive view possible of the zone of observation. OPs selected along the axis of advance will save time and wire. Available flank observation should be exploited to give observation in depth and to overcome enemy defilade.

FOs must select OPs from which they can see the movement of the supported unit. Such posts should not be so far forward that the FO and his party will be neutralized and pinned to the ground by hostile fire—the FO must stay out of the fire fight. Neither can they be so far back that contact with the supported unit is lost.

REVERSE SLOPE POSITION (FIG. 4)

Advantages

Can be initially occupied during daylight.

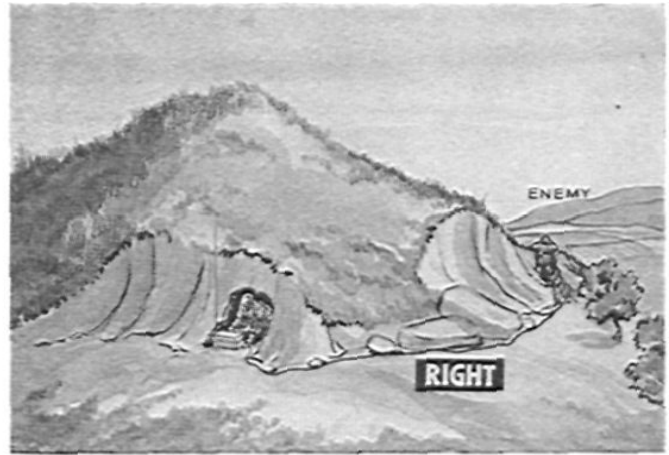
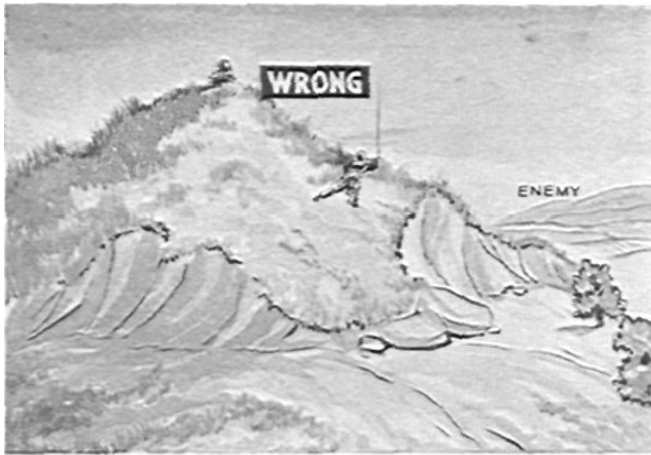


Figure 4. Reverse slope observation

Allows greater freedom of movement to personnel during daylight, although *no* unnecessary movement should be permitted.

Facilitates installation, maintenance, and concealment of communication installations.

Disadvantages

Usually affords a limited view to the immediate front.

Fire adjusted on the crest may neutralize the installation.

Instruments and personnel projecting above the crest are difficult to conceal. This disadvantage is minimized if the hill being occupied blends into another hill farther back. It is at a maximum when the hill being occupied forms the skyline as seen from the hostile area.

FORWARD SLOPE POSITION (FIG. 5)

Advantages

Can be removed from crest so that fire falling on crest will not

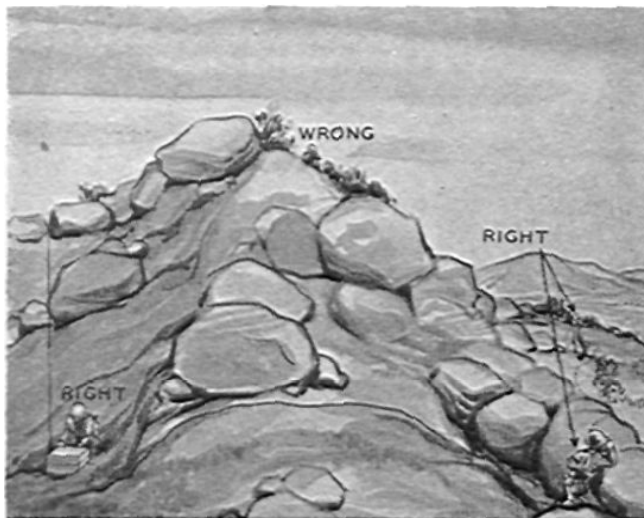


Figure 5. Forward slope observation

neutralize the installation. The enemy is forced to neutralize the entire forward slope to insure neutralization of all OPs thereon.

Affords better view of immediate foreground.

Affords a covering background which facilitates concealment.

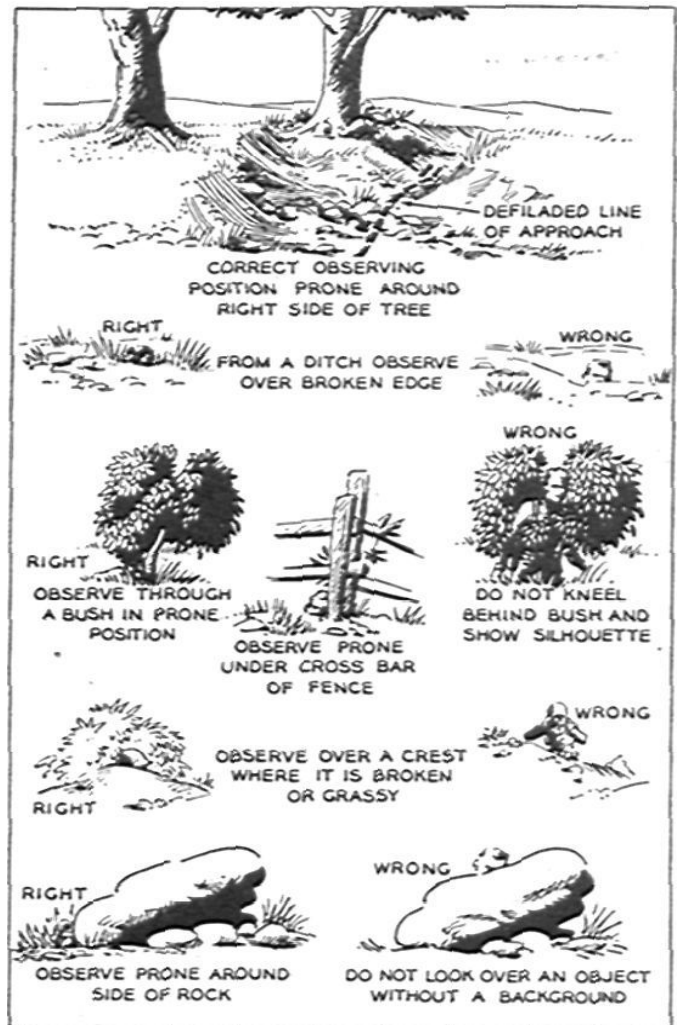


Figure 6. Don't be an obvious silhouette

Disadvantages

Must be occupied under cover of darkness to prevent discovery. Location cannot be changed during daylight without risk of disclosing location.

Daylight maintenance of signal communication is difficult.



Figure 7. Temporary observation post behind a rock or bush



Figure 8. Temporary observation post in a shell hole

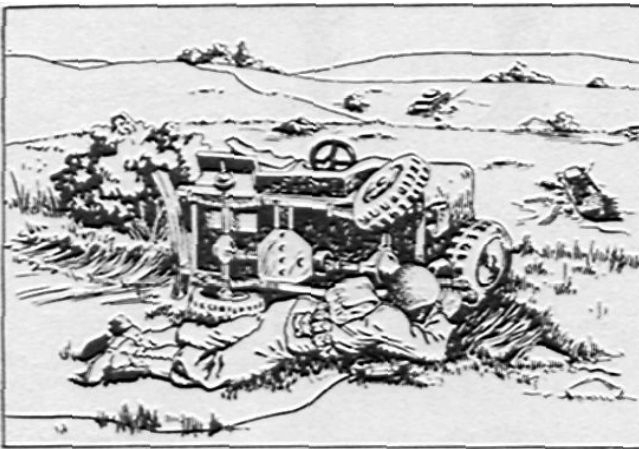


Figure 9. Temporary observation post behind a convenient object, if it is not obvious



Figure 10. Shallow trench observation post

ORGANIZATION OF OPs

Organization of the OP is progressive. Initially the observer takes advantage of such cover as may be available—behind a rock or bush (Figs. 6 and 7), in a shell hole (Fig. 8), or in back of an abandoned vehicle (Fig. 9). As time permits, a trench or prone shelter is dug (Fig. 10). As work continues, the trench is deepened, reverted as necessary, and provided with overhead cover (Fig. 11). A shelter may be dug into a natural fold or slope and apertures cut from within. OPs located on forward slopes should have a covered route of approach or communication trench connecting them to the reverse slope (Figs. 12 and 13).

OBSERVER'S REPORTS

As he makes an observation, the observer reports what he sees directly to the battalion FDC or to the battery (Fig. 14). He should not be required to make any written reports except when he is out of communication with the battalion headquarters or battery. Fires are recorded on his panoramic sketch. His reports are recorded at the FDC. These oral reports have the advantage that the observer is able to concentrate his attention upon the area being observed; he can give a continuous description of enemy action; and speedy dissemination of information is obtained. The observer reports



Figure 11. Dig in and improve as time allows

all activity observed, including the following:

- a. Nature of activity observed.
- b. Location of activity: by coordinates, with respect to a

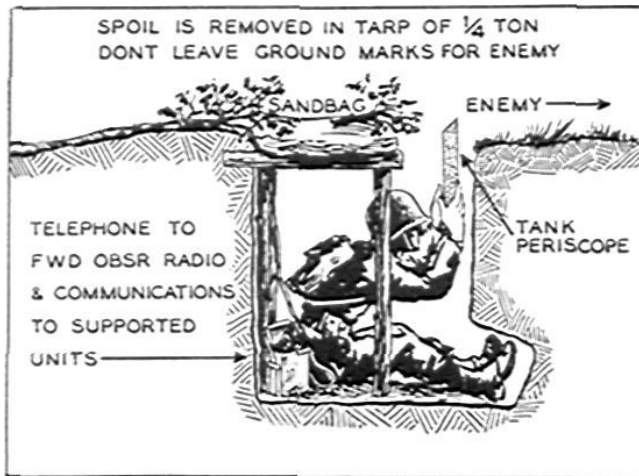


Figure 12. One type of forward observation post



Figure 14. Observer reports what he sees as he sees it

numbered concentration, or by direction and distance from a reference point.

c. Number of units—individuals, vehicles, tanks, etc.

d. Direction and speed of movement.

e. Whether or not he desires fire on the targets, he must report exactly what he observes and not what he infers or deduces from his observation. In addition, a forward observer reports the location and movement of friendly forward elements. During intervals when no activity is observed, he makes periodic negative reports.

f. Effect of prearranged fires, when visibility permits.

CHECK LIST FOR OBSERVER

Here is a helpful check list for the senior observer at the OP:

Can I go to the observation post at night or in fog and rain? Do I know all the fine points of personal navigation?

Are there at least 3 of us here?

Am I keeping the zone of observation under constant surveillance?

When action is imminent, will I have as many eyes watching as possible? Is the radio properly manned during these phases?

Do I need a written record of activities? If so, has someone been assigned to act as recorder?

Have I made arrangements for rest and relief of my observers?

Am I "spotted" and "plotted" on the map? Do I have it oriented?

Have I asked for oblique photos, photomaps, and vertical air photos?



Figure 13. OP dug through crest of hill from reverse side.

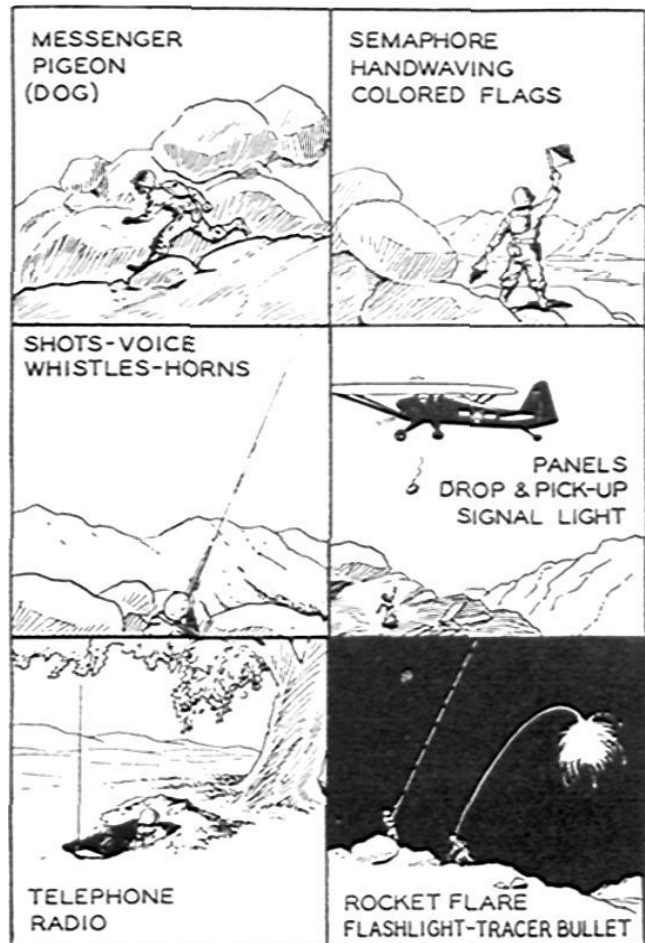


Figure 15. Alternate methods of communication

Have I selected and prepared an alternate OP?

Have I made a panoramic sketch of my zone of observation?

Have I included on this sketch all concentrations, targets of opportunity, and data for these targets?

Where is the base point? Are all the concentrations and check points identified and plotted? If not, immediate steps should be taken to "shoot in" the target area by registering on several check points. Am I restricted on opening fire?

Where are the front lines, our patrol and reconnaissance elements?

Do I have all my instruments? Are they "zeroed" and oriented so that I can work at night?

Is my camouflage perfect or can I improve it?

Do I have plenty of rations and water? Where are my first aid facilities? Are my men as comfortable as possible?

What if it rains? Am I ready? Do I have a waterproof top,

boards on the floor, and a sump hole to drain this place?

Is my security sufficient? Have I set out some booby traps to prevent night prowlers and surprise attacks?

Does the supported unit know my location? Have I run wires to their communication? Can they help with my security? Will they report to me any targets they see?

Have I reported all enemy activity and friendly dispositions exactly as they are without giving anything away over the radio?

Is that a good target for artillery, or could the doughboys handle it better with their mortars or rifles?

What type of fire do I need for that target: percussion, ricochet, time, or smoke?

Is that target so small and immobile that the sheaf should be converged? Is it so close to our troops that pieces must be corrected for displacement in depth?

Have I established and tested all possible means of communication? [See Fig. 15.]

If I cannot get communication could I move my radio or put up a long wire antenna?

Have I my flare gun, rocket launcher, aiming circle, flashlight, compass, map board, air photo, pyrotechnic code, prearranged message code, map coordinate template, weapons, plenty of ammunition, and plenty of hand grenades?

Do I have plenty of spare batteries? Some batteries will last 2 hours, others will last indefinitely.

Is my section properly trained and instructed to carry on even if I am lost?

Do I know how to deal with mine fields?

(To be concluded)

PERTINENT IDEAS, OLD AND NEW—II

From the F.A.S.

COOPERATION is not a substitute for COORDINATION. When both are combined with properly trained and equipped personnel in just the right proportions, a smooth working and unbeatable team results.

Spare moments at the OP used in ESTIMATING probable enemy counterattacks and in PREPARING FIRES to stop them, spare the lives of our "doughboys" and shorten the war.

The skyline observer is easily observed. The observed observer is usually killed. MORAL: Stay low, move slowly, live longer, and see more.

To air photography texture means more than color, but to the air observer MOVEMENT means more than either.

AMMUNITION is never so plentiful that it can be wasted. Make each round count.

Artillery fires must be delivered with all the ACCURACY AND PRECISION permitted by the tactical situation. This means that time, forethought, intelligence, and accurate technique must be used to the utmost.

The supply of maps, photomaps, and photos for TARGET FIXING is not automatic. It should be foreseen and provided for by the top, but must be asked for by the bottom.

A command post which has practiced PLAYS AND FORMATIONS for protection against attack will not be surprised.

A good battalion WITHOUT TARGETS is little better than a poor one.

Supported units can help in TARGET GETTING. Machine gun flashes lined-in for direction, combined with study of photographs, will help to locate targets.

A well-filled sand bag, properly placed, may INSURE FUTURE ENJOYMENT. Keep your INSURANCE in force.

A cross between a panoramic sketch, a range card, and a rapid plot can be of great assistance to an ALERT FORWARD OBSERVER.

Commanders who make their Staff 2 sections "catch-alls" and their Staff 2 personnel "men of all work," have only themselves to blame when INTELLIGENCE falters or fails in combat.

DIRECT LAYING: At a range of 300 yards the vertical displacement of the trajectory due to a 100-yd. range change

with 105-mm Howitzer, M2, Charge 6 (the nearest thing to HE AT shell) is about 3 feet; at 500 yds. it is about 5 feet.

Forward observers frequently visualize the gun-target line by using their SENSE OF HEARING.

Well placed 155-mm shells fired with delay fuze furnish ready made FOX HOLES for our assaulting infantry. Plan with the infantry and give them a LEG UP where they need it.

Duplicate firing charts set up in your FDC will facilitate PLANNING FOR FIRES WHILE FIRING.

Don't put all the BRAINS in the body of the truck. Some in the cab behind the steering wheel will help to get you there.

A lot of RANK plus a little KNOWLEDGE equals DANGEROUS MOTOR GREMLINS.

It takes a lot of nuts to hold a truck together, but ONE NUT can tear it to pieces.

A motor maintenance policy based on repair after failure INVITES FAILURES.

The Air OP can be a veritable gold mine of information, but its yield depends upon INTELLIGENT COOPERATION between the S-2 and the Air OP.

On its landing field A LIAISON AIRPLANE IN THE BUSH is worth two in the open when an enemy eagle happens by.

Airmanship for the grasshopper pilot begins BEFORE HE LEAVES THE GROUND.

As a radio operator you are a SENTRY OF THE AIR. The authenticator is the password by which others get into your net.

WANTED: One switchboard and switchboard operator as replacements for those lost when last operator failed to ground his switchboard.

KNOW, AND USE, your equipment. A remote control unit, a reel of wire, and a telephone will conserve your voice and energy and may save your life.

Dig your own fox hole promptly so someone else won't have to dig your grave tomorrow.

Keep your bubble level and your barrage line straight.

In searching an area with binoculars, move the eyes and not the glasses. When you have thoroughly searched the field of vision of the binoculars, sight on the adjacent area and search as before. Hold elbows against your sides to aid stability.

WHEREFORE "HOWITZER"?

"Howitzer" is derived from the German *Haubitze*, which word was adopted by the Germans in the 15th century from the Bohemian term *Haufnice*, meaning stone-sling or catapult.

WHERE ARE THEY?

Like all organizations throughout the country, your Association has a hard time keeping up with the whereabouts of all its members. Most keep us advised where they are, but some are prevented by local circumstances from sending promptly their full and correct new addresses. Others perhaps do not realize that 4- and 5-figure APO numbers are just a temporary stop-gap, and that unit designation is necessary even though we may have in file the permanent APO or station address.

Whatever the reason, a fair number of members and subscribers are not receiving their JOURNALS as they should. Here are the names of some of them, with the latest ranks which we know. We will appreciate correct factual information concerning their present addresses—not "I think Joe is . . .," but preferably direct word from the people themselves. If any of these are in your neighborhood, will you tell them of this situation? Many thanks.

Lt. Allen D. Ackerson
 Lt. G. Amthor
 Lt. John F. Averill
 Maj. Charles Baron
 Lt. Karl Baron
 Maj. E. W. Bartley
 Lt. Ira D. Beck
 Capt. George S. Beimdick
 Lt. Charles J. Benner
 Lt. James F. Blanchard
 Lt. Robert L. Boone
 Maj. Albert J. Braun
 Lt. William R. Brogan
 Capt. William S. Brooks
 Capt. Woodford B. Brown
 Lt. Emmett H. Burk, Jr.
 Lt. Lee H. Burns
 Capt. Albert H. Buschmann
 Maj. R. J. Byler
 Capt. Clyde W. Cable
 Maj. George P. E. Caesar
 Maj. James F. Cantwell
 Lt. Earle J. Carleton, Jr.
 Lt. Col. R. L. Carmichael, Jr.
 Lt. Col. James V. Cartoll
 Lt. Harold W. Cohn
 Lt. W. E. Colby
 Pvt. Michael P. Collins
 Lt. William Comstock, III
 Lt. J. C. Corr
 Lt. John S. Craig
 Lt. James F. Cragin
 Lt. Ralph M. Craley
 Brig. Gen. Charles G. Davis
 Capt. Emmett L. Davis, Jr.
 Lt. Thomas D. Davis
 Lt. John F. Dodds
 Pvt. Joseph C. Donnelly
 Lt. W. A. Dunn
 Lt. Col. Leo A. Dupre
 Lt. Lawrence W. Durance
 Maj. Malcolm S. Eakin
 Lt. Joe E. Edens
 Lt. Harvey W. Edwards
 Sgt. George R. Else
 Lt. Kenneth D. English
 Capt. Thomas P. Ewing
 Lt. William Farber
 Lt. Harry G. Fender
 Capt. William E. Fitzgerald
 Lt. Col. John K. Flemming
 Lt. Vernon C. Foster
 Lt. Charles E. Frankenberg, Jr.
 Lt. Gaylord C. Gale
 Maj. H. L. Gasaway
 Sgt. John M. Gilday
 Lt. Kenneth K. Gjemre
 Capt. Rae S. Guistwite
 Lt. Luther K. Hall
 Lt. Col. Joseph L. Hardin
 Lt. Willis S. Hardcastle
 Lt. Col. Azel F. Hatch
 Lt. Sam Hattem
 Lt. James B. Hathaway
 Lt. John S. Hayes
 Col. B. F. Hayford
 Lt. Alvoid Haygood
 Lt. Norman W. Hazel
 Lt. Donald W. Hennerman

Lt. James S. Henriksen
 Lt. Edwin C. Herbert
 Lt. Clloyd U. Hill
 Col. John A. Hoag
 Lt. L. D. Hubbard
 Lt. George K. Huffman
 Lt. William H. Hyde
 Lt. William A. Ihlenfeldt
 Lt. Col. Irving W. Jackson
 Col. F. C. T. John
 Capt. Albert Jones
 Lt. Leo S. Kaufmann
 Lt. Russell L. Keefer
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 Lt. Harold R. McDonald
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 Lt. James J. McGoff
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 Lt. Herbert T. McKennett
 Lt. Charles Manteufel
 Sgt. Warren L. Martin
 Lt. Preston M. Mecum
 Lt. Tom W. Mehler
 Col. Frank C. Mellon
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 Sgt. Paul L. Wilkerson
 Lt. Stuart E. Witty
 Lt. Jack I. Wolle
 Lt. Col. Charles S. Wunder
 Maj. Ralph W. Yuill
 Maj. William A. Zoeller
 Hq & Hq Btry, 18th FA Bn
 Btry C, 83d A FA Bn
 Special Serv Off 117th FA Bn
 Hq & Hq Btry, 174th FA GP
 Hq Btry, 322nd FA Bn
 Btry B, 337th FA Bn
 Btry C, 337th FA Bn
 Btry B, 338th FA Bn
 Btry A, 391st Arm'd FA Bn
 Btry B, 598th FA Bn
 Co B, 646th TD Bn
 Btry B, 751st FA Bn
 Co C, 819th TD Bn
 Hq Btry, 913th FA Bn
 Hq Co, So Calif Sec, WDC
 Tr E 34th RCN SQ MECZ
 Co C, 170th Inf
 Co L, 350th Inf
 Recreation Officer, 3d Marine Brig
 Hq & Hq Btry, XIII Corps Arty

ADDRESSES INCOMPLETE

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 Lt. Col. Samuel L. Austin
 Lt. William E. Bacon
 Brig. Gen. Rex W. Beasley
 Lt. James W. Bennett
 Lt. Jules J. Bielizna
 Lt. Paul R. Blew
 Capt. Anthony P. Bonaffon
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 Pvt. William G. O'Connor
 Capt. Herman Paaso, Jr.
 Lt. Euan J. Parker
 W. O. James W. Peterson
 Capt. Samuel W. Pray
 Capt. Ernest F. Preis
 Lt. Col. O. P. Robinson, Jr.
 Maj. E. N. Rubel, Jr.
 Lt. Joseph R. Ryan, Jr.
 Capt. Frederick M. Sammis
 Lt. John J. Scocchio
 Lt. Lawrence A. Schlitten
 Maj. Robert B. Simpson
 Lt. James W. Smith
 Maj. Loran L. Stewart
 Capt. Edmund D. Taylor
 Lt. Clyde A. Thorpe
 Lt. Eddie S. Tiffin, Jr.
 Lt. Col. D. Des. Trenholm
 Lt. William J. Walsh
 Lt. Col. Ivan W. Ward
 Maj. Elmer E. Welty
 Col. Garland H. Williams
 Col. Richard B. Willis



Many Pacific islands have practically no beach. The jungle growth comes right to the water's edge and helps the creation of a mud bottom. In such cases Marsdon mats are invaluable, as they furnish a firm footing for vehicles unloading from LCTs and other craft.

Water-Borne Artillery

New Georgia



Beaches are narrow and coral-strewn, jungle growth is heavy. Here is an excellent idea of just how close LCTs approach shore.

Equipment must move inland quickly to minimize congestion.



A 155-mm howitzer of the 136th FA is manhandled onto its Marsdon mat platform at the very water's edge. Positions like this require minimum movement after landing, and no slashing to obtain a field of fire.



Blocks and tackle are needed at times. Often only a few vehicles are landed, as the more important weapons and ammunition must have full priority. Irregular shorelines compel irregular emplacement of the pieces.



Positions are organized quickly. Trail trench is dug promptly, and camouflage immediately placed in front of exposed pieces.



Nets are stretched for concealment from the air. Trees substitute for some of the poles in this position, which is already somewhat hidden by the fronds of cocoanut palms nearby.



Firing gets under way promptly. This Schneider 155 is in full recoil. No. 2 is already squeezing out his sponge, so no time will be lost in wiping out the powder chamber to remove any sparks.



FDCs are partly dug in, partly revetted.



In the pursuit to Zieta, later in the campaign, jungle mud compelled extensive corduroying of the newly hacked roadway.

Battalion Reconnaissance in Combat

By Lt. Col. Joseph R. Couch, FA

Reconnaissance for an artillery battalion in combat must be performed under a great variety of conditions and situations. Obviously no hard and fast SOP can be successful, but here as in any military task definite, pre-arranged plans must be employed to save time and to avoid confusion. Each RSOP must (1) enable the artillery battalion to accomplish its mission, (2) be rapid and timely, and (3) use a minimum of personnel and vehicles.

Our battalion of 155 howitzers (corps artillery) has developed and employed a type battalion RSOP. Our methods were cut and tried the hard way during the Tunisian, Sicilian, and Italian campaigns. This outline is presented from the viewpoint of the battalion commander, with little detailed description of the actions of other personnel.

COMPOSITION OF PARTIES

Dependent upon the enemy situation and upon the speed required for occupation of a position, we use parties of two sizes: "standard" and "reduced."

The "standard" reconnaissance party is formed according to the following plan:

VEHICLES	PERSONNEL	EQUIPMENT
1. Bn CO's jeep	Bn CO S-3 Driver	1 610 radio set
2. Survey Officer's jeep	Survey Officer Survey Sgt Driver	
3. Survey weapons carrier	Remainder of survey party Driver	Survey equipment
4. CommO's jeep	CommO Wire Chief Driver	1 RL-31 (mounted on vehicle) 1 mile W-110 wire 1 mine detector
5. Wire weapons carrier	Wire Cpl 6 Linesmen Driver	1 RL-31 (mounted on vehicle) 1 BD-72 Switchboard 6 miles W-110 wire 1 mile W-130 wire 6 telephones

Three howitzer battery parties, each consisting of:

VEHICLES	PERSONNEL	EQUIPMENT
6. BC's jeep	BC Chief of Detail Scout Cpl Driver (radio operator)	1 610 radio set 1 aiming circle Gun-marking stakes
7. Wire weapons carrier	Wire Cpl. 3 Linesmen Driver	1 RL-31 (mounted on vehicle) 5 miles W-110 wire 2 miles W-130 wire 5 telephones 1 mine detector
8. RO's jeep	RO Inst Cpl Driver (radio operator)	1 610 radio set 1 BC 'scope Field glasses Compass M2 Maps, pins, protractor, etc. Bed rolls

Our "reduced" reconnaissance party is used in rapidly-moving situations or where use of vehicles is restricted. It is composed as follows:

VEHICLES	PERSONNEL	EQUIPMENT
1. Bn CO's jeep	Bn CO S-3 Driver (radio operator)	1 610 radio set
2. Survey Officer's jeep	Survey Officer Survey Sgt Driver	
3. Survey weapons carrier	Remainder of survey party Driver	Survey equipment
4. CommO's jeep	CommO Wire Chief Driver	1 RL-31 (mounted on vehicle) 1 mile W-110 wire 1 mine detector 3 telephones

Three howitzer battery parties each consist of:

VEHICLES	PERSONNEL	EQUIPMENT
5. BC's jeep	BC Chief of Detail Scout Cpl Driver (radio operator)	1 610 radio set 1 aiming circle 1 mine detector Gun-marking stakes
6. RO's jeep	RO Inst Cpl Driver (radio operator)	1 610 radio set 1 BC 'scope Field glasses Compass M2 Maps, pins, protractor, etc. Bed rolls

In addition to the listed vehicles we normally have one jeep carrying the BC of our attached AA unit, with his reconnaissance party. The number of vehicles could be reduced by cutting down parties and by requiring several BCs to ride together, but this is not advisable. Each battery commander would be hampered in his reconnaissance, and the danger of losing several valuable officers from one mine or one enemy shell is too great.

RECONNAISSANCE PROCEDURE

The hypothetical situation described below is typical of the many RSOPs conducted by our battalion since first going into action in North Africa. The basic principles developed in Tunisia have been found satisfactory for the rocky trails of Sicily and for the mud and mountains of Italy.

We are the ABth Bn, one of three battalions under the CDth Group HQ whose mission is direct support of the Zth Inf Div. The Zth Div has just crossed the Volturno River in central Italy. Our battalion is still within range and firing, but the steady forward progress of the friendly infantry indicates that a displacement will soon be necessary.

At the first indication of a probable displacement the battalion commander has made a study of maps and available air photos, and has made a brief preliminary reconnaissance of all suitable areas as far forward as he is able to go. This preliminary reconnaissance enables him to advise the group commander concerning position areas, roads, bridges, and enemy

mines. We have often received orders for displacement when little or no daylight remained, and have been thankful many times over for such previously-gained information. Normally the BnC is able to make this preliminary reconnaissance alone in a jeep, requiring no part of his reconnaissance party.

The battalion CO receives a telephone message to report to the group commander at the latter's Cp. The message also states that a forward displacement may be expected.

Leaving orders that battery and battalion reconnaissance parties are to be formed and held in readiness, the battalion commander with his S-3 reports to group headquarters. The battalion commander has decided to move two battery OPs forward and to leave the third in place. Two battery ROs are instructed to dismantle their OPs and join the reconnaissance parties.

At group headquarters the group commander outlines his plan. It is to displace the ABth Bn forward immediately while the other two battalions of the group remain in position. After the ABth is in position and ready to fire, another battalion of the CDth Group will be echeloned forward.

The group commander indicates on a map the general areas allotted by the Div Arty Commander of the Zth Div. Because of his previous sketchy reconnaissance the battalion commander is able to indicate the best positions and routes of approach. The group commander then allots the ABth Bn a position, and informs its CO that road clearance has been obtained from 2100 to 2200 hours. In a brief oral order the group commander also outlines enemy and friendly situation, special instructions concerning fire missions and sectors of fire, ammunition and supply data, CP locations, and details of communications.

The battalion commander then returns to his own CP, where he outlines to the battalion executive the field order, the battalion mission, and orders for the march. The time, route, order of march, battalion release point, and any special instructions are indicated. It is highly important that he give his executive all possible information, for such knowledge will better enable the Bn Ex to make any decisions required in an emergency. Nearly any battalion that has seen action can tell of many instances of cancelled march orders, traffic blocks, blown bridges, and sudden changes in the enemy situation.

By this time the complete battalion reconnaissance party has been formed at the CP. Before moving out the BCs are given complete information in the form of a brief oral field order from a map. Assembly on a hill, pointing out the front lines and base point on the ground, etc., have never been found feasible in the combat experience of this battalion.

Next the parties are marched to the vicinity of the new position. There they are placed in rendezvous while the battalion commander and S-3 make a rapid circuit of the position and decide upon areas for three howitzer batteries and the headquarters battery.

Each howitzer battery commander is shown his area and is given a compass direction of his base line. The CommO is directed to his allotted area, where he is given instructions concerning the disposal of the component parts of the CP. After being thus guided to his area each BC proceeds with the preparation of his position. All battery areas are inspected for enemy mines, and must be thoroughly swept if presence of mines is indicated. We have learned to be self-reliant in dealing with mines. The Engineers are willing and capable, often helping us to clear dangerous areas, but they cannot always spare the time nor are they always available.

The Battalion Survey Officer has been present during his CO's outline of the field order. He has in his possession maps, lists of trig points, and knowledge of the corps survey control to be used in the sector. Any unusual requirements of the survey are given him by the Bn CO, and he proceeds rapidly with the gun position survey. If a target area survey is possible that will come later. The howitzer battery commanders must cooperate in leaving markers for the survey officer and in selection of place-mark and base piece.

Each battery is allotted a zone of observation, and its RO is given orders to search for an OP that will enable him to observe into his battery's sector. Here the Bn Co assumes the duties of the Bn S-2. Most of the "briefing" of the RO is done from a map. In combat the selection and establishment of OPs is a slow, difficult, and dangerous job. The RO must have all available information. He must be alert and curious to learn the latest information from infantry or other units as he goes forward.

The commander of the attached AA Bn must not be forgotten. He needs to hear the field order, and to know details of the march into position plus the location of the howitzer batteries. He then establishes a perimeter AA defense of the battalion position. He is like life insurance—you may not need him often, but when you do you need him badly—so the battalion commander must instruct him carefully.

To complete the reconnaissance the battalion commander assists his BCs in any necessary readjustment of areas, checks routes of approach, and arranges for markers at the battalion release point. He then awaits the arrival of the battalion.

Selection of the battalion rear echelon is seldom made at the time of the RSOP for the howitzers. We normally place Service Battery from five to ten miles in rear of the position. A general area is indicated to the S-4, usually after the howitzer and headquarters batteries have moved forward. The S-4 then makes a detailed reconnaissance, and marches the rear echelon to its new area.

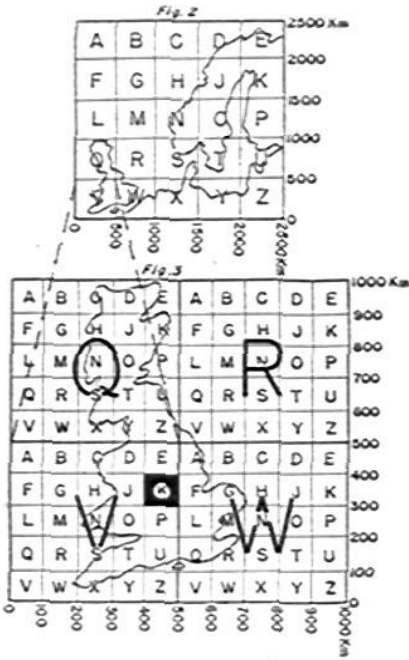
A good SOP for a battalion reconnaissance in combat will aid such reconnaissance greatly. It will *not* substitute for clear orders and careful, on-the-spot decision of the battalion commander and his officers.

SURVEY ALTIMETER MANUAL

For some time many field artillery battalions have had their 2 altimeters, surveying, 6,000-ft., 10-ft. divisions, type 6, Wallace and Tierman, model FA-112. They have lacked, however, any instructions in the care and feeding of these instruments. Consequently they have refrained from trying to adjust them for use, not wanting to risk damaging the delicate mechanism. All will be glad to know that TM 5-9420 is now being distributed. In three parts it gives complete information about these altimeters, as it combines an operators' manual, maintenance manual, and parts list.

BRITISH MODIFIED GRID

By Lt. Samuel J. Tobin, FA



The British System, which was suitable only for large and medium-scale maps, was replaced by the Modified British System in 1927. This latter is now used on all military maps of Great Britain. The British have surveyed the various parts of the Empire and have superimposed their Modified Grid System on the local maps of other areas of the world (see Figs. 1 & 6). In areas outside the British Isles most British maps are of scales 1:25,000 and 1:100,000, due to the prevalent use of those respective scales by other nations. Within the British Isles maps are made with scales in terms of inches to miles (e.g., 1" = 10 miles, 1/4" = 1 mile, etc.). Graphic scales for measuring distance in both meters and yards are found on all maps.

A series of non-overlapping zones of varying sizes comprises the system. The basic element covers a square, each side of which extends 2,500 km. from the

point of origin in the SW corner, known as the false origin (see Fig. 2). The true origin, from which the actual survey is taken, is at the intersection where the Standard Meridian crosses a parallel of latitude near the center of the zone. For example, the Standard Meridian of the English zone (Figs. 1 & 3) is the 500-km. grid line running through the Isle of Wight and Mansfield, in Nottingham. Direction information for the center of the sheet or declination diagrams are found in the margin or on the map itself.

Each basic square, having sides of 2,500 km., is divided into 25 smaller squares of 500-km. sides, as in Fig. 2. The English zone (Fig. 1) consists of 500-km. squares Q, R, V, and W. These squares are designated alphabetically from left to right and from top to bottom, with the letter "I" omitted.

Each 500-km. square is in turn subdivided

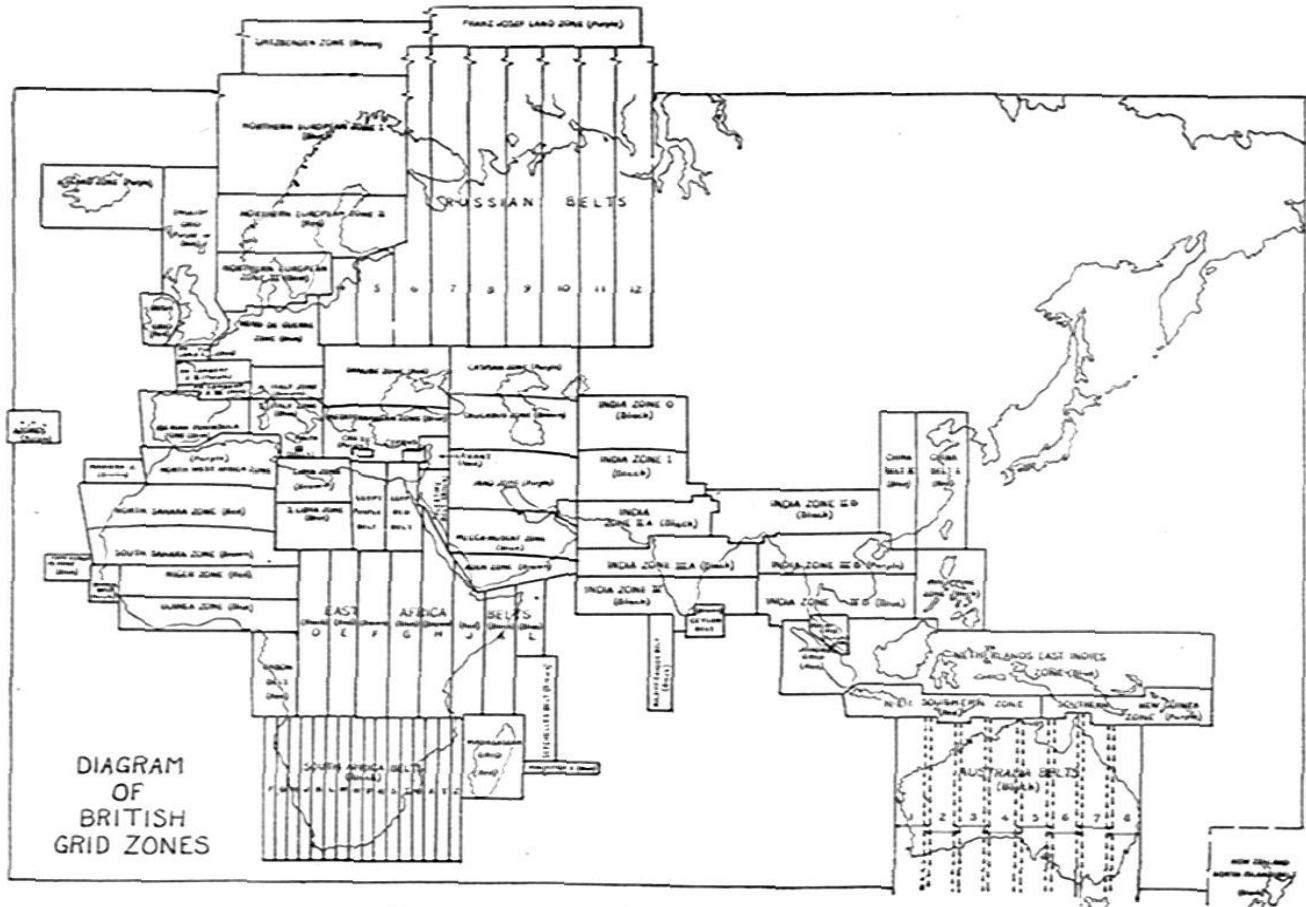
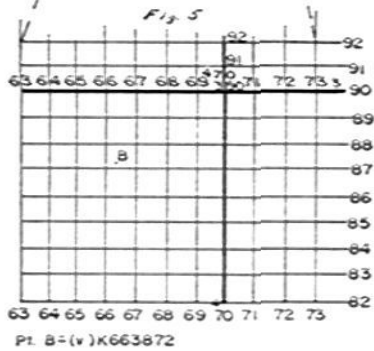
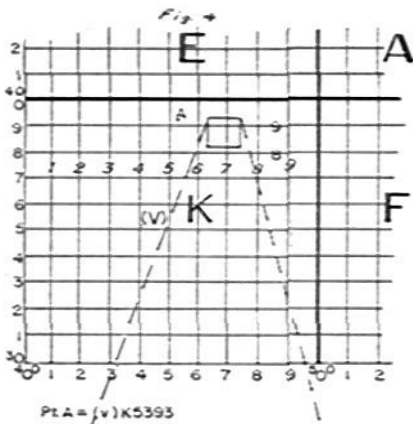


Figure 1



into 25 100-km. squares (see Fig. 3). These squares are also designated alphabetically in the same manner as the 500-km. squares (from A to Z, omitting the letter "I"). The letter V designates the lower left square of each lettered grid (see Figs. 2 & 3).

100-km. grid squares are subdivided into numbered 10-km squares, which are subdivided into numbered 1-km. grid squares on large-scale maps. Every tenth line is printed heavy (see Fig. 5). Thus coordinates can be read to the nearest 10 m., or even to the nearest meter if necessary.

On small-scale maps the sides of the 100-km. squares are printed heavy. Designation of the square is shown by a large capital letter. A small capital letter (usually inclosed in brackets) gives the letter of the 500-km. square. The 10-km. grid lines are numbered in the margin of the map, and the number of the 100-km. grid line is indicated by a smaller number next to the zero (see Fig. 4).

Coordinates are read from left to right (W to E) and from bottom to top (S to N), as are our own. The respective

readings are referred to by the British as "easting" and "northing." Map references include the letter of the 500-km. square, the letter of the 100-km. square, and the "easting and northing." No decimals, brackets, or dashes are used in writing the coordinates (see Fig. 4). The grid reference of point A to the nearest km. (1,000 m.) is (v)K-5393. The full grid reference of point B (Fig. 5) to the nearest 100 m. is (v)K-663872.

Marginal information of a map overlaid with the British Modified Grid contains the dates of original survey, publications, and revision or reprint, the agency of publication, and a reference index giving grid square and sheet numbers.

Relief is indicated by contours, form lines, hachures, spot heights, trig points, colors, and shading.

A translation of the conventional signs and symbols is usually found in the margin if the map is of foreign origin. British symbols for common objects differ only slightly from those of other nations. FM 30-22 contains an excellent section on British signs and symbols.

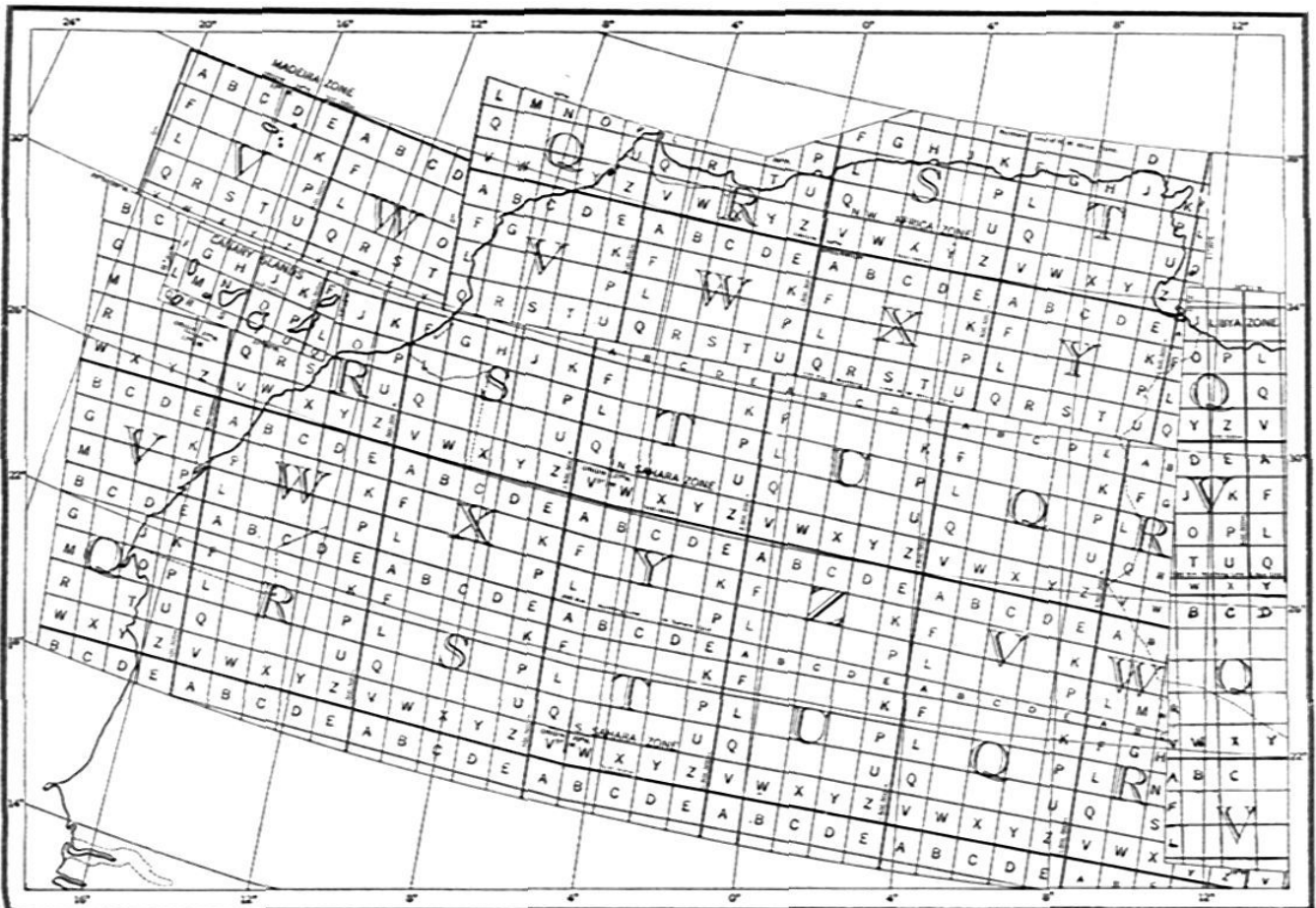


Figure 6

TRUE COORDINATES FOR MORE ACCURATE REINFORCING FIRES

By Capt. Malcolm Shaw, Jr., FA

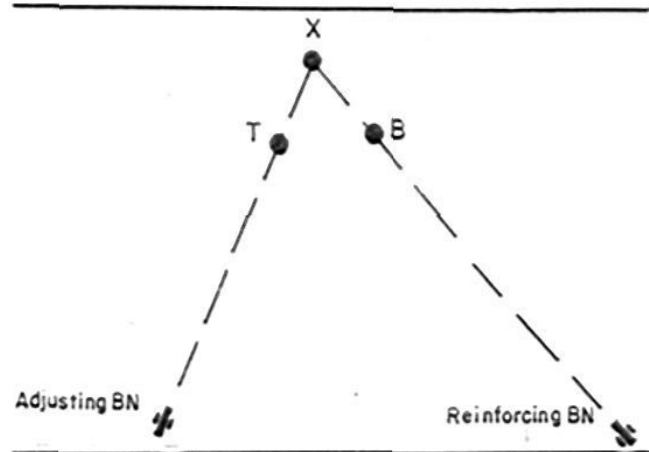
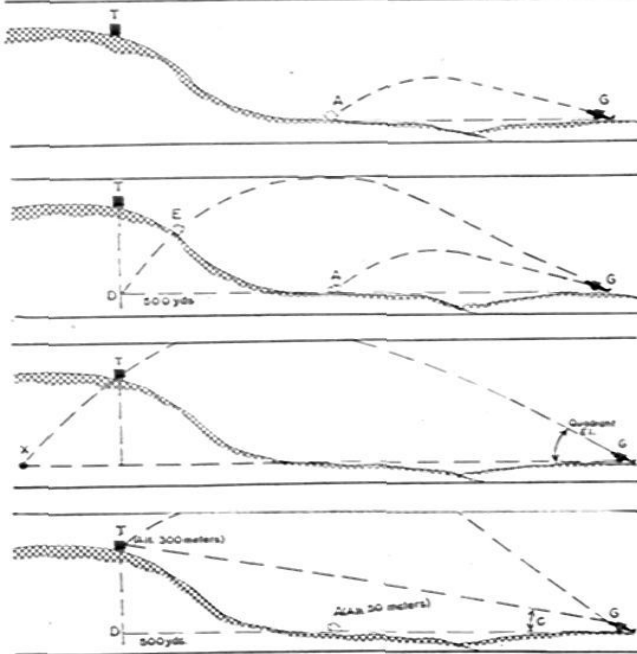
During recent operations I have had the opportunity to test a simple process whereby targets adjusted upon can be replotted with true map coordinates. Only requirement: an accurate, contoured map must be used in conjunction with the firing chart. But let us first see what happens using the present method of replotting targets.

Initial coordinates are plotted at "A" on the grid sheet. Site is determined from the same coordinates on the map. The map range is measured from "G" to "A." The actual target is "T," but the site is governed by the altitude at the initial coordinates "A."

The observer's first sensing is *500 short*. Adding 500 yards to the range, we are actually shooting at the point "D"—but slope of the hill interrupts the trajectory at "E." The observer makes his next sensing from "E."

When the correct range is fired, all we have is an adjusted quadrant elevation. The target is replotted on the grid sheet and marked with the altitude of the initial coordinates, since the site for that point was used. Since, however, the site cannot be determined for the replot, the target will be replotted at the false coordinates (X).

The target is replotted at "X," but its true location is "T,"



where the trajectory was interrupted by the slope of the hill. The reinforcing battalion fires at "X" with false range and site, the trajectory being interrupted at "B" by slope of hill. The resulting error is the distance TB. This may or may not be a large error, depending upon the observer's error in his initial coordinates and the amount of the change in altitude.

For area targets, the above method gives excellent coverage because of the replot error. It is for small area targets, such as enemy batteries, that my method proves more accurate. A light artillery battalion adjusts on many batteries, neutralizes them, and reports the coordinates to corps counterbattery headquarters, thus enabling corps medium or heavy artillery to place more destructive fire on the enemy battery.

With our system, when the observer asks for the range to be increased *500 yards*, I increase the range by that amount (the distance AD) and also increase the site "C" by determining the difference in altitude between "A" and "T." The VCO follows the sensing on his map with a deflection fan and announces "up (so much)" to the computer. (VCO has constructed a chart of sites (including comp. site) for changes in altitude.) The horizontal distance between point "T" and point "A" is the distance AD. Thus the adjusted elevation gives the replot range GD, and the adjusted site is the proper site to use for the altitude of point "B."

My method above is used only when the initial coordinates are greatly in error. In mountainous country such as Italy, initial coordinates are often in error 1,000 yards or more when front line observers are adjusting artillery fire.

FIELD ARTILLERY GUIDE: *What they say about it:*

"I have been using this volume for some time but I am very glad to have an extra copy to put with my field kit. This book has been strongly recommended by me for purchase by all officers. Some unit commanders are requiring each officer to have a copy. The majority of officers in this brigade either now have a *Field Artillery Guide* or have ordered one."—Brig. Gen., USA.

"The [*Field Artillery Guide*] seems to be complete and should be of great value to the Field Artillerymen in the army, especially the recently commissioned officers."—Col., FA.

TIPS FROM OVERSEAS—II

By Lt. Col. Bernard J. Rauch, FA

Here are the answers to the \$64 questions you asked me:

My personnel section has a tent, a 2½-ton truck, and a trailer. I leave them about 10 miles behind whenever I can, with the S&A Btry. It works OK and also makes a place to send men from the batteries for a few days of rest and quiet when they need it.

We are supposed to keep right even on T/O but are usually short. Most of the time, though, we have a few extra second lieutenants who are attached to us for combat training. On T/E they are not so fussy over here, and we get almost everything we ask for except extra trucks and guns. Extra camouflage nets, sand bags, stoves, clothes, shoes, wire, telephones, telephone equipment are issued when we need them, and we are always "over" on this sort of thing.

By the way, if you can, get combat boots for all your officers and men. The "tank" type. You can have about a 6" piece with two or three straps sewed on to the tops of regular G.I. shoes that work swell. The men all love them and make them from old salvaged shoes which they cut up.

Most of the equipment lost or destroyed or worn out is replaced at once or as soon as possible. The QM tries to run a shower in the rear areas where we send the men, who wash and then are issued *new* clothing from head to foot on an exchange basis. It works fine.

Combat soldiers and officers wear what they please, including fatigue clothing, the only requirement being that they shave, keep hair cut to 1", stay neat, clean, and tidy. We are still in woolens and I think we will wear them through the summer.

Reconnaissance is quite different from what we were taught in the States. Over here it works sorta like this: As corps artillery we are given a mission of general support or reinforcing the fires of such and such divisions. Divisions of course "own" all the land in their sectors, so I usually go see each pertinent DivArty Commander and find what areas he has open. We look at his map and I make big goose eggs in the areas he tells me I can use. Then I take the map and go have a look at the areas to determine if I can put a battery here, a battery there. After selecting the general area I come back and give each battery CO an area in which to pick a position. They then make a careful reconnaissance and tell me what they can do. I then go to the divisions, the group, the brigade, and the corps and get an "OK" and a "clearance" and a "claim" on these areas. I think everything is OK—but then suddenly find some other Corps or Army battalion has chosen the same area! This goes on and on until at last everyone is satisfied. The best thing to do is to always have *plenty, plenty* of signs saying *Reserved for the 99999th FA Bn* and put men in the holes to "hold the ground."

Of course all of this is done under enemy shell fire, and most of the time under enemy observation. Sorta rough. I have already passed up and refused areas given to me for a battalion area because I thought they were too small—and later have seen 6 battalions in the same position! I like to keep about 1,500 yds. between batteries and the battery fronts from 300 to 500 yds. wide. The *big* things to watch for are: (1) (most important) flash defilade, (2) keep away from houses, towns, crossroads, and any

terrain feature that can be picked up on the map or from the air, (3) keep in the open and away from woods and trees.

We almost always set up an OP for each battery and one for the Bn. We very, very seldom use FOs, as one cannot see much enemy battery firing from the front lines. We carry surveys to the OPs and then check direction by declinated aiming circle. Then we orient all BC 'scopes and man the OPs day and night. We pick up enemy battery gun flashes. All Bns. do this, and any time an enemy gun fires about 50 Y-azimuth bearings get phoned into Corps, they plot the gun and drop a few Bns. on it, and then we look for some more.

No definite distances can be given for the location of OPs: we put them where we can get the best observation, and of course that is on the highest ground. When we are in flat country we put them on the tops of houses. Sometimes they are far ahead of our positions and sometimes far behind, sometimes far to each flank.

Anybody (in the divisions' Bns., tanks, etc.) who can see anything fires any battalion that is not busy or that can shoot on the target. I would say that observed and unobserved fires run about 50/50. It all depends what you can see. We get verticals and mosaics often, promptly, and freely, but do very little firing by a study of the photos ourselves. Corps and Army have a photo and photo interpreter service and they work out locations, etc., of enemy batteries so we get the true coordinates to fire on targets.

All the battalions pool their airplanes and regular scheduled flights are flown so that someone is always up looking and patrolling. Of course we can use our own planes any way we care to, but the patrols are set up to make sure some planes are in the air at all times. In this territory, contrary to what we were taught in the States, we fly at about 2,000 and up and down the front lines. Of course "Old Jerry" will shoot at you with machine guns, rifles, or anything he has, and now and then we get holes shot in the planes. The "grasshoppers" are



Dig 'em deep! The Germans do—we taught them that life is healthier that way. Trench shown here leads into a German 152-mm gun emplacement. A system of deep trenches and dugouts ran throughout the area of this 3-gun battery position.

really swell for observation, reconnaissance, and going places. Again, all planes and FDCs of all corps Bns. are on a common frequency, and any observer in any plane can adjust any Bn. We use the planes to register, also. Our grasshoppers seem to work OK with the heavies and also with adjusting naval gunfire, but we do use the P-39, etc., to adjust on some targets.

Motor marches are always at night and always *blacked out*. Not even a cigarette! And again, it is necessary to get road clearance, IP, times, etc. Marches are made by a Bn. column with what you need to shoot. On ammunition we can usually haul all we can shoot, and usually shoot all we can haul. If we ever get in a jam we just borrow trucks from other Bns. and it works OK. I borrow trucks from the heavy outfits, so they must make out OK.

You can usually get what you want by making your own arrangements. For example, if you see some engineer outfit, it will almost always lend you a bulldozer to dig pits and dugouts. Some batteries and some battalions have their own tractors and bulldozers that they have picked up here or there. Rafters, lumber, wire, pipe, chairs, tables, desks, sewing machines, pots, etc., can be obtained from wreckage.

Rations should be an easy job. Have one truck draw rations for the battalion, break it down during the day, and then deliver at night. No problem at all.

It is impossible to say from what source most of the fire missions come—it all depends on the battle at the moment. You will get missions from FOs, Air OP, group, divisions,



South of Mignano a 155-mm gun, M1, interdicts a distant crossroad.

corps, etc., etc., without end. Sometimes plenty, sometimes not much!

Survey control has been excellent, and it is carried very near Bn. positions. We close and prove all surveys and I have never known a mistake. After laying we make an additional check by having each battery measure the adjusted compass when they have laid on the base angle; this always works out to a mil or so and prevents errors. The Observation Battalions run survey control, give us Metro Messages every 4 hours, and run their sound and flash departments. Sometimes we get them to give us their plots on a high burst adjustment or registration but they are almost always busy, and then again we prefer to work our own high burst registrations. No objections to working direct with them, but it is much better for them to work with Corps on sound and flash locations and Corps to decide and control fires. Corps can then send down coordinates and time on target to four or five battalions (or more), and every one takes time of flight off of the "time on target," fires, and at a certain moment 4 or 5 battalion concentrations fall on the target.

Battalion commanders are allowed pretty much a free hand in how they care to operate and what they want to do. If you wish to live in houses, OK. Some like houses (very comfortable and very ritzy and pleasant) and some like holes in the ground (very unpleasant). Personally, I like holes in the ground. *Everything* is dug in below the ground level and covered with logs and sand bags: Guns, oil, gas, water, kitchens, trucks, trailers, FDC, radios, *everything*—arms, projectiles, powder, and fuzes. No tents are put up, but they are used to cover dugouts. Camouflage must be perfect, and is best checked from the air by use of the grasshoppers. A good rule to follow and practice is always to have your eye on a hole or ditch so that in case they start shelling you, you can dive in. Very, very few men are hit in holes or ditches unless they suffer a rare direct hit. One of my batteries had 500 rounds of assorted 170-mm and 150-mm dropped on it in a 20-minute period! Results: no one hurt or scratched; 2 trucks slightly damaged; not even a gas or water can scratched.

We have also had Hq and Hq Btry about 75 yds. from a a house Jerry used as a base point. Day after day we lived there and day after day Jerry would register (usually with 170-mm stuff) with not much more damage than giving everyone the shakes and making a hell of a lot of racket. Boy—what he did to that house though!

Keep your powder, fuzes, and projectiles separate and in piles of about 30. Keep only 10 rds. in each gun pit. *Do not fuze any round until you are ready to load.*

We have had projectiles hit time after time. Seldom do they explode even though they are tossed 50 to 100 feet. Sometimes they are ruined. When powder charges catch on fire, they can be put out by shoveling mud on them. Easier said than done.

Some battery commanders like to take their kitchens up and put them in their gun positions. Some like to let each section do its own cooking on keen little gasoline stoves that are issued to us—1 per 8 men. I let the BCs do as they choose.

Each of our batteries has a 55-gal. steel drum with the top cut out. They take a 5-gal. drum, cut the top out. They fill the 55-gal. drum with water, fill the 5-gal. drum with gasoline and put it in the water, light the gasoline, and have a hot water shower. There are many variations to this trick but you get the idea, I am sure.

One of your big problems will be the use of your officers. Considering that there is no provision for an air-observer, that

you will be called on for possibly 4 or 5 LnOs, that some officers will be sick and that you'll lose others, etc., etc.—and then having to work 24 hours every day—it really becomes quite a problem.

We run lateral lines between firing batteries and lateral lines between battery headquarters, so we have a chance to keep in communication with the pieces. We use the radios. Each battery keeps an up-to-the-minute firing chart the same as FDC, and we keep them informed of the corrections. Any battery CO can take over and operate as a FDC if necessary. The BC can fire his own battery if fires are cleared through the FDC. We usually register the center battery on a "close in" and "far out" check point each day, and every time a new Metro Message comes in work a new set of corrections using an old VE. If the batteries are far apart or one battery is far to one

flank, then of course we must register each battery. You get the idea!

You *must* be at least 3 deep in everything, otherwise you cannot operate day in and day out for 24 hours a day. If anything happened (and things *do* happen) then you would really be in a hell of a fix. Replacements are not so well trained as combat-seasoned losses and lack experience, so you will get little more than basics. Constant training must go on even while in combat. It's a hell of a job, I assure you. So far, my battalion is the best battalion I have ever seen. Morale is high, *esprit de corps* is excellent, men and officers know their stuff, no trouble with VD or lice, little sickness, courtesy grand (by the way—saluting is done even in combat) —and all this in spite of the fact that "Old Jerry" has given us some real "shellacking" on many occasions.

Know Your Enemies' Weapons

CAPTURED ARTILLERY IN GERMAN USE

FRENCH

<i>German Name</i>	<i>Original Nomenclature</i>
2.5-cm Pak 34 (f)	25 Mle 1934
2.5-cm Pak 113 (f)	25 Mle 1937
3.7-cm Kw.K.143 (f)	37 SA de char Mle 1938
3.7-cm Kw.K.144 (f)	37 SA de char Mle 1918
4.7-cm Kw.K.173 (f)	47 de char Mle 1935
4.7-cm Pak 181 (f)	47 Mle 1937
4.7-cm Pak 183 (f)	47 Mle 1939
7.5-cm K.231 (f)	75 Mle 1897
7.5-cm K.232 (f)	75 Mle 1897/33
7.5-cm Geb.K.238 (f)	75 Mle 1928
7.5-cm Kw.K.251 (f)	frz S.A.
10.5-cm K.331 (f)	105 L Mle 1913
10.5-cm K.332 (f)	105 L Mle 1936S
10.5-cm I.F.H.324 (f)	105 C 1934 S
10.5-cm I.F.H.325 (f)	105 C 1935 B
14.5-cm K.405 (f)	145 Mle 1916
15.5-cm s.F.H.414 (f)	155 C Mle 1917
15.5-cm s.F.H.415 (f)	155 C Mle 1915C
15.5-cm K.416 (f)	155 L Mle 1917
15.5-cm K.417 (f)	frz G.P.F. CA
15.5-cm K.418 (f)	155 G.P.F.
15.5-cm K.419 (f)	155 G.P.F.-T
15.5-cm K.420 (f)	155 Mle 1916
15.5-cm K.422 (f)	155 L Mle 1877-1914
15.5-cm K.425 (f)	155 L Mle 1918
15.5-cm K. G.P.F. (f) Ortsfest	
16.4-cm K.(E) 453 (f)	164 Mle
16.4-cm K.(E) 454 (f)	164 Mle 93/96
19.4-cm K.70/93 (E) (f)	194 Mle 70/93
19.4-cm K.G.P.F. (f)	194 G.P.F.
19.4-cm K.485 (f) (Sfl)	194 G.P.F. sur chenilles
22-cm Morser 531 (f)	220 C Mle 1916
22-cm K.532 (f)	220 L Mle 1917
24-cm K.(E) 557 (f)	240 Mle 93/96 M
27.4-cm K.(E) 592 (f)	274 Mle 17
28-cm Mrs.601 (f)	Mortier 280 14/16
28-cm Mrs.602 (f)	Mortier 280 sur chenilles
32-cm K.(E) 657 (f)	320 Mle 70/84 or 70/93
34-cm K.-G1-(E) 673 (f)	340 Mle 12 (à Glissement)
34-cm K.-W-(E) 674 (f)	340 Mle 12 (à Berceau)
37-cm H.(E) 711 (f)	370 Mle 1915
37-cm K.(E) 714 (f)	370 Mle 75/79
40-cm H.(E) 752 (f)	400 Mle 1915/16
52-cm H.(E) 871 (f)	520 Mle 18

RUSSIAN

4.5-cm Pak 36 (r)	russ 37
4.5-cm Pak 184/1 (r)	russ 37
7.62-cm Pak 36 (r)	(converted) russ 36
7.62-cm I.K.H. 290/1 (r)	russ 27
7.62-cm F.K.295 (r)	russ 02/30L/60
7.62-cm F.K.295/1 (r)	russ 02, 30L/30
7.62-cm F.K.296 (r)	russ 36
7.62-cm F.K.297 (r)	russ 39
7.62-cm K.307 (r)	russ 38
10.7-cm K.352 (r)	russ 10/30
12.2-cm I.F.H.388 (r)	russ 10/30
12.2-cm K.390/1 (r)	russ 31
12.2-cm K.390/2 (r)	russ 31/37
12.2-cm s.F.H.396 (r)	russ 38
15.2-cm K.H.433/1 (r)	russ 37
15.2-cm K.H.433/2 (r)	russ 10/34
15.2-cm s.F.H.433 (r)	russ 38
15.2-cm s.F.H.445 (r)	russ 09/30
15.1-cm Kw.H.450 (r)	russ 38/40

JUGOSLAV

7.5-cm F.K.239/1 (j)	jug 04 Kp.
7.5-cm F.K.239/2 (j)	jug 04 Schn.
7.5-cm F.K.249 (j)	jug 12
7.5-cm F.K.284 (j)	jug 7 and 7A
7.65-cm F.K.300 (j)	jug 5/8 Sk.
7.65-cm F.K.303 (j)	jug 17
7.65-cm F.K.304 (j)	jug 28
10-cm I.F.H.316 (j)	jug 14/19
10-cm I.F.H.317 (j)	jug 28 Sk.
10.5-cm K.339 (j)	jug 36 Sk.
15-cm K.403 (j)	jug 28 Sk.
22-cm Mrs.538 (j)	jug 28

DUTCH

7.5-cm F.K.243 (h)	holl L/30
10.5-cm K.335 (h)	holl 27B

BELGIAN

7.5-cm F.K.234 (b)	belg G.P.H.(I)
7.5-cm F.K.235 (b)	belg 06 TR
7.5-cm F.K.23 G (b)	belg.160.P.III
12-cm K.370 (b) Ortsfest	belg 31

CZECHOSLOVAK

German Name

- 3.7-cm Kw.K.M.34 (t)
- 3.7-cm Kw.K.M.38 (t)
- 3.7-cm Pak 34 (t)
- 3.7-cm Pak 37 (t)
- 4.7-cm Pak 36 (t)
- 4.7-cm Pak (t) Kfz.
- 4.7-cm Pak (t) Sfl.
- 4.7-cm Pak (K) 36 (t)
- 7.65-cm F.K. 5/8 (t)
- 7.65-cm F.K.17 (t)
- 8-cm I.F.H.30 (t)
- 8-cm F.K.M.30 (t)
- 8.35-cm Flak 22 (t)
- 10-cm I.F.H.14/19 (t)
- 10-cm I.F.H.30 (t)
- 10.5-cm Geb.H. (t)
- 10.5-cm s.K.35 (t)
- 15-cm s.F.H.14/16 (t)
- 15-cm s.F.H.25 (t)
- 15-cm s.F.H.37 (t)



Among the spoils of Normandy we are finding many an obscure weapon. To date this one is not definitely identified, even by true experts. Says one of them, "It is probably a French piece of around 155-mm—possibly a Peteux. The carriage appears of late World War I vintage with possible more recent modification (even by the Germans). It could be a Maginot Line fortification unit, put on wheels, etc. I feel sure it is not German in origin."

- 15-cm K.15 (t)
- 15-cm K.15/16 (t)
- kz. 21-cm Mrs. (t)
- s.24-cm K. (t)
- 30.5-cm Mrs. (t)

POLISH

German Name

- 7.5-cm F.K.97 (p)
- 7.5-cm F.K.02/26 (p)
- 10-cm I.F.H.14/19 (p)
- 10.5-cm K.13 (p)
- 10.5-cm K.29 (p)
- 15.5-cm s.F.H.17 (p)
- 22-cm Mrs.M.32 (p)

AUSTRIAN

- 7.65-cm F.K.5/8 (ö)
- 7.65-cm F.K.17 (ö)
- 8-cm I.F.K.18 (ö)
- 10-cm I.F.H.14 (ö)
- 10-cm I.F.H.14/37 (ö)
- 10-cm Geb.H.16 (ö)

Since the very start of the war, the Germans have been making maximum use of every serviceable piece of artillery on which they could lay their hands. These have been adopted, adapted, modified, remounted on AT carriages and tanks, enlarged in their powder chambers—in short, put to every conceivable use. This not only illustrates German ingenuity,

but indicates the rather sad state of her own artillery production: many of these weapons, although fine in their day, are now at least obsolescent. They are still being used against the Allies, however. We hope that this list of captured weapons in German use will be of direct help to troops in the field, particularly as an aid to battlefield intelligence.

FIREWORKS ON THE FOURTH

By Harold Denny

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WITH THE AMERICAN FORCES, IN FRANCE, JULY 4.—The bright spot of today's fighting was a Fourth of July celebration arranged by Lt. Gen. Omar N. Bradley at the expense of the Germans.

By Gen. Bradley's order, every available piece of artillery—some hundreds of them—fired one shell at its specific target in the German positions precisely at noon. This fire was in addition to the normal artillery activity. General Bradley himself pulled the lanyard of one field piece.

I was climbing to Hill 131 when this salvo went off. First one gun let go, then all along the front its brothers roared, their echoes reverberating through the valleys. A few seconds later their bursting shells shook the hillsides where the Germans were holding back our infantry with machine guns and mortars. What the Germans made of this sudden salvo more than sixty miles broad can only be guessed.

[The Americans followed the salvo by firing thousands of pamphlets explaining to the Germans that this was the Americans' way of celebrating Independence Day and asking the Germans how they liked it, The United Press reported.]

On the sector that I watched our artillery did not leave it at



"The Fourth" in France, 1944

that but kept banging all afternoon to smooth the way for our infantry. Again today it was largely hedge fighting, with little chance for active air support because of the breast-to-breast character of the fighting.

The most spectacular single action of the present drive was capture of Hill 131 at one bound yesterday. Hill 131 was the best place from which to watch today's crawling advance toward La Haye. It gave a view over a great expanse of some of the most beautiful country in the world—dark green wooded hills and valleys, marked here and there by steeples and clusters of gray stone homes around them. It was marked, too, by black puffs of bursting projectiles and white mushrooming phosphorous shells.



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 WAR IN RUSSIA (19 June to 18 July 44)

At the commencement of the period the Russian armies were actively engaged only in Finland. A campaign to overcome that country had been launched on 10 June, and had made good progress. South of the Gulf of Finland, preparations were being made for the major Russian attack of the season.

CAMPAIGN AGAINST FINLAND

On 18 June, Finland was defending the line:

Liza River (30 miles east of Petsamo)—Notosersk (Russian)—south branch of Lake Nuot—Lake Pyav—Magovoritsk (Finn)—Lake Yushk—Onda River—Lake Vyg—Lake Onega—Svir River (with Finn bridgeheads on south side)—across Lake Ladoga—Taipale (F)—Rautu (?)—Lake Suvanto—Lake Vuoksi—Lake Muolaa—Leipaesuo (F)—Summa (R)—Koivisto (R).

That portion of the line opposite the White Sea was held by a German army of 6 or 7 divisions,¹ the remainder by a Finnish Army estimated as 15 divisions. Only the territory between Lake Ladoga and the Gulf of Finland had yet been involved in the fighting. This region, known as Karelia, is an isthmus 75 miles wide. The Russians had control of Lake Ladoga with light naval forces. The Finns with Germans had superior naval forces in the Gulf of Finland. There was no direct connection between Karelia and the front east and north of Lake Ladoga.

Karelia

On 19 June the Russian Karelian Army Group (Marshal Leonid Govorov) attacked astride the adjacent road and railroad leading into Viipuri (Viborg).² It had been expected that the Finns would make a strenuous resistance, but they didn't. The Russian attack was preceded by a powerful artillery preparation, the infantry was covered by an unusually strong air force of both bombers and fighters. At the end of the day the Russians had reached Rokkala (only 10 miles south of Viborg), Kaemaerae (10 miles southeast of that city), and Kuusa (12 miles southeast of Heinjoki).

On the 20th the Russians continued, entered Viborg and Heinjoki. Their extreme right reached the vicinity of Aeyraepaeae on Lake Vuoksi. This lake is long and narrow; approximating a river, it is an excellent defensive line. The Russians failed to take Aeyraepaeae, where the Finns held a bridgehead on the south side of Lake Vuoksi.

Now the Finns were on a line where the number of lakes and water lines afforded their inferior force a good chance. Next day the Russians were stopped 2 miles outside of Viborg. They then brought up more artillery and renewed their attacks for three successive days. The battle was severe, but the Finns held.

On 25 June the Russians made an especially strong attack against the 5-mile front from Viborg northeast to Tali. Russian tanks penetrated intervals between strong points and reached Finn rear areas, but the strong points stopped the infantry following in rear. This left the tanks without support. Finnish tanks and infantry hunted them down.

Not discouraged, on the 26th the Russians extended the attack 12 miles as far as Heinjoki.

¹On 8 July, Colonel General Luther Rendulic assumed command of this army rice Dietl, killed in an air accident.

²This Army Group had previously borne the name of Leningrad Army Group.

On the 27th the Russians extended the attack still further to the right, as far as Aeyraepaeae. They demonstrated all along the Vuoksi front with artillery and air forces. None of the attacks had any material success, but the Russians advanced beyond Tali on the 28th and 29th.

In view of the Russian advance on 27 June, a strong detachment of the German Air Force attacked the Russian forces, with special attention to armored vehicles. This, together with the Finns' ground resistance, brought the Russian advance temporarily to a halt in the vicinity of Ihantala (5 miles north of Tali) on the 30th.

On July 1st the Russians initiated new operations against the flanks of the Finns. An amphibious expedition attempted to cross Viipuri Bay on the left, while new attacks were delivered against Aeyraepaeae on the right. The attack against Ihantala was continued.

The amphibious expedition was attacked by German and Finn air forces and light naval forces, and suffered considerable losses. On account of the comparatively narrow water passages, the invaders' fleets were subject to both air and artillery attack. They continued with the operation daily to include 7 July, then gave it up.

The attack toward Aeyraepaeae had better luck. An attack on 8 July was preceded by an intense air and artillery preparation, captured the Finns' bridgehead, and the Russians established one of their own on the north bank. Attacks on 10 and 11 July to enlarge this were not successful. This attack was renewed daily to include 15 July, without gains.

North Finland

Between Lakes Ladoga and Onega is the Aunus isthmus. The Finns held the line of the Svir River, which is canalized and navigable for destroyers and similar size ships.

A Russian offensive was launched on 21 June along the entire line. The Finns had foreseen this, and did not seriously contest their bridgeheads—all of these passed into Russian hands on the first day. At Lodeinoe Pole the Russians crossed the Svir and established a bridgehead. On 22 June this was widened but not appreciably deepened. On the 23d a second bridgehead was established near Svirstroi, where the railroad crosses the river. Next day the Russians started a general advance which made steady progress and by the 26th reached Olonets.

On 29 June a Russian amphibious force on Lake Onega landed north of Petrozavodsk, while at the same time troops approached overland from the south. In view of this threat, the Finns abandoned Petrozavodsk, after leaving a rear guard, and withdrew along the railroad toward Suojarvi. On the 30th their counterattack severely mauled the pursuing Russians.

In general the Finns made no serious resistance until they had reached the vicinity of Suojarvi. The Russians attacked on 6 July, entered Suojarvi on the 11th. Continuous fighting has not materially changed the line in this sector.

The isthmus between Lake Onega on the south and Lake Seg on the north is Maaselkae. The Finns held the canal connecting the two lakes, which is navigable for small ships of the destroyer type. The Russians attacked the line on 21 June, same day as the attack on the Aunus (Svir River) line. Povenets (at the south end of the canal) was taken by storm, and the advance continued westward. Artillery was rushed forward; on the 22nd it fired a very strong preparation, after which the Russians attacked toward Medvezhgersk, at

the head of Lake Onega. The Finns resisted stubbornly, so the Russians did not capture the town until the 24th.

Now the Russians moved south from Medvezhegorsk and cleared the railroad to Petrozavodsk. They also moved west to the new Finnish line established along lakes about 20 miles to the west.

At the end of the period the line was unchanged to Lake Vyg; from there it was

Kerlskaya (F)—Suojarvi (R)—north edge Lake Ladoga—Taipaie—Rautu (?)—Lake Suvanto—Lake Vuoksi (with Russian bridgehead near Vousalmi)—Heinjoki (R)—Karisalmi (?)—Ihantala (F)—Viipuri (Viborg) (R)—Viipuri Bay.

COMMENTS

1. At this season of the year the nights last only three hours and are not completely dark. Air and ground observation are available for practically 24 hours a day.

2. An extraordinary number of lakes and stream lines has made it possible for the numerically inferior Finn army to hold off a superior Russian force, which is better equipped than the Finns are. In the fighting zones German ground troops have been reported in Karelia only, and then only a single battalion. Some German specialists are present, and a very considerable detachment of the German Air Force. German naval vessels have aided.

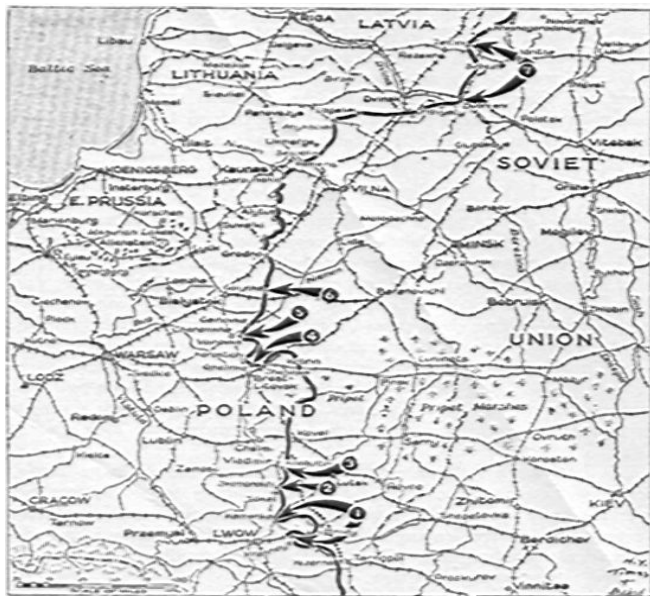
3. Finland is dependent upon Germany for weapons, ammunition and part of her food supply.

4. The Russian advance in Aunus and Maaselkae has reopened to Russian use the ship canal from Leningrad to the White Sea. It is probably too late this year to recondition and reopen the canal; it should be available next year. The railroad from Leningrad to the White Sea is still in enemy possession west of Lake Vyg.

5. The Russian advance in Karelia was about 12 miles in the west, practically all gained during the first days of the period. The advance in Aunus has reached 140 miles, and in Maaselkae about 38 miles.

MAIN RUSSIAN FRONT

This extended from the Gulf of Finland to the Black Sea, and was nearly 1,300 miles long—one of the longest active military fronts ever known.



In a 3-day push at the end of the period along a front between Tarnopol and Kovel the Russians gained up to 31 miles. They captured Brody and threw out toward Lwow two claws of a nutcracker, one of which reached Krasnoye and the other Kamenka (1). In capturing Skomorokhi (2) Soviet forces for the first time reached the line of the 1939 partition of Poland. Just to the north they seized Khobultor (3), 5 miles from the Vladimir junction. Advancing closer to Brest-Litovsk, the Russians occupied Amelinka (4) and at the same time isolated the Kobrin area by severing a rail line. In the direction of Cheremkha the Red Army took Voinovka (5). The drive toward Bialystok moved forward to Golyinka (6). The Russians pushed deeper into Latvia between Dvorcani and Zeltini (7).

At the beginning of the period the line was

Narova River (with Russian bridgehead southwest of Narva)—Lake Peipus—Velikaya River (with German bridgeheads at Pskov, Ostrov, and OPOCHKA)—Idritsa (G)—Chernaya Lusha (G)—Vitebsk (G)—Krasnoe (R)—Gorki (G)—Chausy (G)—Dovsk (R)—Rogachev (R)—Zhlobin (G)—Kalinkovichi (R)—Pripyat River—Prypec River—Turja River (with German bridgehead at Kovel)—Kisselin (?)—Brody (G)—Zalosse (?)—Strypa River—Buczacz (G)—Tlumacz (?)—Ottynia (G)—Zabie (R)—Radauti (G)—Suceava (G)—Harlau (R)—Targu Frumos (G)—line 8 miles north from Iasi—Koroneshty (G)—Orhei (R)—Reut River—Dnestr River.

It had been relatively tranquil for two months, during which the Russians had regrouped their forces with the intent of launching a major offensive.

Apparently the Germans anticipated a Russian main effort south of the Pinsk Marshes, with direction of advance westward into south Poland. Territory within the Russian lines in this sector is thickly settled and farmed. Most of the land is flat and open to observation from the air. The Germans, believing that here lay the greatest danger, massed the greater part of their army reserves in south Poland.

North of the Pinsk Marshes are numerous large forests. Observation from the air is correspondingly reduced. The German line along the Dnepr River had held during the past autumn and winter against very strong Russian attacks. It was believed that it was safe, in the absence of reports indicating any unusual gathering of hostile troops opposite it.

Order of battle of the German armies was:

North Army Group (Col. Gen. George Lindeman):

18th Army in Estonia,

16th Army in Latvia.

Central Army Group (Field Marshal Ernst Busch):

3rd Panzer Army astride the Dvina River,

4th Army in the Orsha and Mogilev area,

9th Army about Bobruisk,

2nd Army north of the Pinsk Marshes.

South Army Group (Field Marshal Walther Modl):

1st Panzer Army in vicinity of Kovel,

4th Panzer Army opposite Lwow.

To the south the Carpathian Mountains were held by a Hungarian command, and still further south a mixed German and Romanian command held the front. The main reserve, as planned, was in rear of the South Army Group.

Against this organization the Russian plan was to attack first north of the Pinsk Marshes, and south of them only after the advance to the north had about reached a north-south line through Kovel. It seems that the Russians had hoped to wind up the Finland campaign in time to withdraw troops from that sector for use in the much more important campaign in Russia proper. As Finland failed to break, as some had thought would happen, it became necessary to go ahead with the Finnish campaign. The latter was slowed down, however.

For the proposed major campaign the Russian order of battle is known only as to Army Groups, the Russian word for which is front and which is translated literally in most instances. In order from north to south the Army Groups were:

3rd Baltic (Col. Gen. Ivan S. Maslennikov)

Boundary: Sorot River—Jaunlatgale—Balvi

2nd Baltic (Gen. Andrei I. Yeremenko)

Boundary: Sebez (to 2nd)—Nitsgall—north boundary of Latvia

1st Baltic (Gen. Ivan C. Bagramian)

Boundary: Lepel—Narocz Lake (both to 1st)

3d White Russian (Gen. Ivan D. Chernyakovskiy)

Boundary: Mstislavl—Skhlov—Borisov (all to 2nd).

2nd White Russian (Col. Gen. Matvei Zakharov)

Boundary: Bykhov (to 2nd)—Zavishin (to 2nd)—Stolbtsy (to 1st)

1st White Russian (Gen. Konstantin Rokossovskiy)

Boundary: Narodichi—Olevsk—Kovel (all to 1st)

1st Ukraine (Marshal Ivan S. Konev)

The 2nd, 3d, and 4th Ukraine Army Groups (in the order named) covered the front south of the 1st Ukraine to the Black Sea. During the period, these latter commands had no active role.

At date of writing the details of many movements are yet unknown. Only the general outline of the campaign can be given at this time.

The campaign started on 22 June by a combined offensive of the 1st Baltic (who attacked Vitebsk from the northeast and north) and by the 3d White Russian, which attacked the same German strong point from the southeast. Vitebsk and vicinity were defended by 5 German divisions under Maj. Gen. Fritz Gollwitzer. He expected

the attack, and thought he was prepared for it. The Russians had had ample time to install a very large artillery force, with which they commenced the battle with a terrific preparation which leveled a considerable number of the defenders' works. There was very strong air support. The preparation lasted for several hours, and covered a 20-mile front. At the end the artillery and air force laid down a rolling barrage. Infantry broke through north and south of Vitebsk on comparatively narrow fronts, then dashed forward.

On 23 June the north (1st Baltic) column turned left and attacked Vitebsk from the left rear. The south (3d White Russian) column similarly turned to the right and advanced against the German right rear. Both Russian forces made excellent progress against light opposition. On the north Sirofino (28 miles northeast of Vitebsk) was reached, and a part of this command reached the road and railroad from Polotsk to Vitebsk. On the south the Russians crossed the Orsha—Vitebsk RR at Zamostochnye. At this point they were 25 miles away from the north column.

In view of the fact that the Russians were entirely through the German fortified zone, Gen. Gollwitzer during the night 23/24 June wished to order his 5 divisions to abandon Vitebsk and march toward the southwest. This seems to have been disapproved by higher authority, who instead ordered the army reserve of about 2 divisions to proceed immediately to southwest of Vitebsk with the mission of keeping communications open to that fortress.

On 24 June the German reserves duly attacked the advancing south Russian column, but were hopelessly outnumbered and driven back. The north Russian column closed in. German abandonment of Vitebsk was thereupon ordered for the night 24/25 June, during which the garrison marched out toward Bezhnekovich. As most of these Germans were slow-moving infantry divisions but the advancing Russians were motorized, the Russians reached Bezhnekovich first. The Germans were able to drive them out, and occupied the town in the afternoon of the 25th.

As there was only a single road, the tail of the Germans had not yet cleared Vitebsk when the Russians arrived from the west (1st Baltic) and from the south (3d White Russian). The latter found the bridge across the Dvina intact, as there still were Germans north of it—but there were not enough to hold the city, and it fell. The 3d White Russian then turned west against the rear of the Germans assembling around Bezhnekovich, while the 1st Baltic attacked from the three other sides. Thus the Germans found themselves surrounded within 24 hours of their departure from Vitebsk. Divisions from their reserve were driven southwestward and were already too far off to aid their surrounded comrades.

Slow-moving German infantry divisions (identified as the 4th, 197th, 206th, and 246th Inf Divs and the 6th Air Field Div*) fought all day during the 26th. They held their own and continued to do so during the early morning of the 27th. At this time their ammunition gave out. The German commander has accepted the blame for this, stating that he under-calculated the quantity to be taken from the Vitebsk dumps. It seems probable the horse-drawn trains failed to clear Vitebsk in time. The Russian commander sent a demand for surrender. A little before noon the German commander accepted this. He had only 10,000 men left. The Russians estimated that 20,000 more had been killed. As Gollwitzer was supposed to have had at least 50,000 men, these figures leave 20,000 Germans unaccounted for.

Meanwhile the right of the 3d White Russian had, commencing with 24 June, extended the operation by a strong attack westward from the Krasnoe area. The method was the same as that which had given such good results on both sides of Vitebsk. The immediate objective was Orsha, but the main effort was some miles to the north. As before, the Russian artillery and air force punched through the German lines a hole through which the Russian troops, mostly motorized, rapidly advanced. They temporarily ignored Orsha and went west. This advance met some delay due to heavy rains: as Russian roads are not hard surfaced, they quickly become difficult whenever it rains for any length of time. Swollen streams made travel across country slow. By 25 June the Russians were at Khlyustina, 14 miles northwest of Orsha, and their numbers were being constantly augmented by more troops that poured through the gap. Next day the Russians were across the road from Orsha

*German Air Field Divisions perform service functions at air fields, including AA defense.

to Borisov, at Tolochin. That night the Germans abandoned Orsha and appear to have made good their retreat. But another one of the Dnept River strong points had gone down.

The 2nd White Russian attacked on 23 June straight from the Chausy area toward the west. On that day they cleared out the German advance zone and arrived opposite the fortified Pronya River line. This attack had a front of 30 miles. On 24 June a very powerful air and artillery preparation opened a passage across the Pronya River north of Chausy. Some of the Russians pushed straight onward while others turned south to attack Chausy, through which ran a good road and a railroad. Chausy was taken on the 25th.

On the 26th the Russian advance, meeting very strong German resistance, reached the Dnepr River north of Mogilev on a 16-mile front. This river was crossed on the 27th. As in the case of the Pronya River, part of the Russians turned south and advanced toward Mogilev while other troops drove on to the west.

The German command at Mogilev itself seems to have been two divisions—the 12th and the 337th. During the night 27/28 they withdrew, leaving one regiment of infantry as a rear guard. Next morning Russians attacked the rear guard from the north, while other Russians reached the river south of Mogilev. There was little resistance, and a crossing was made. Troops turned northward to Mogilev. Still other Russians attacked Mogilev from the east side. Under these three attacks the rear guard was badly mauled, but the main body got away.

The 1st White Russian joined the general offensive on 25 June. On this date two attacks were delivered, each of which was preceded by the usual powerful air and artillery preparation. The north attack had a 20-mile front just north from Rogachev, the south one a 22-mile front just south of the Berezina River. Both attacks broke through. The north column reached Retka (15 miles northwest of Rogachev) while the south column arrived on a line 5 miles short of Parichi.

On 26 June the Germans between the two Russian attacks attacked their flanks, while other German troops delivered counterattacks against the heads of the advancing Russians. On the 27th the south Russian column found the Germans falling back toward the northwest to cover Bobruisk. They temporarily ignored this force and, stepping on the gas, by-passed them on the south and reached Glusk without finding much opposition. This was an advance of nearly 40 miles within two days. These Russians did not stop at Glusk: a flank guard was detached at this point, while the main body circled to the north and advanced on Bobruisk from the west. All these Russians were motorized, and were operating in country without steep grades. There were numerous forests.

On 27 June the Germans had in the vicinity of Bobruisk the 383d Inf Div and two Panzer divisions forming their XXXV Corps. In the morning the Army issued orders to leave the slow-moving infantry division at Bobruisk as a rear guard while the Panzer Corps marched north to confront the Russians coming fast from the direction of Rogachev. The German commander, according to his own account, failed to move away as directed. In the evening he was still around Bobruisk, at which time he found himself almost surrounded. Thereupon the Army directed that all troops march off. On account of the slow-moving infantry division the rate of march could not compare with the Russians'. The first march objective was Osipovich (30 miles to the northwest), with a view to joining 2 other divisions retreating from the Rogachev Russians.

Next day the Russians had no difficulty locating these Germans and closed on them from all sides. The Germans reached Osipovich, but by then were practically surrounded.

A hard battle was fought on 29 June near Osipovich. The Russians claimed that all the Germans were liquidated. It seems, however, that although they had serious losses, the main German force (finding the road westward and northwestward blocked) went northward in the direction of Igumen. The intention was to join other troops in that area and to reach Minsk.

The German rear guard stayed around Osipovich. They were joined by German troops which had come from Slutsk. In the entire area between Minsk and Bobruisk troops were very mixed, Germans and Russians being interlaced. The Russian High Command now ordered the 2nd White Russian Army Group (which had taken and passed Mogilev) to head off the Germans by interception from the north. The 1st White Russian would attack from the south in

cooperation, without arresting its main movement westward. The 3d White Russian would proceed on to Minsk.

The German High Command ordered their separated troops to assemble in the general area of Minsk. These were handicapped in comparison with the Russians, as they included slow-moving infantry units which could not keep up with motorized units.

In the meantime the 1st Baltic Army Group, having disposed of the Germans from Vitebsk, on the morning of 28 June resumed their advance westward. There was not much opposition at first, and the troops gained 35 miles that day in spite of road demolitions. The Germans in this area retreated to in rear of the upper Berezina, which the Russians reached on the 30th. The Germans did not wait to be attacked: they assumed the offensive with a view to cutting off spearheads which had gotten too far in advance of their supporting troops. As much territory was covered with forests there were great opportunities for both sides to escape air observation. The Russians were engaged in the same type of maneuver, attempting to rush troops in advance to head off withdrawing Germans. Details of this fighting are not yet available but it was very confused, troops facing, fighting, and marching in all directions.

The 1st Baltic determined to by-pass Polotsk on the south side and pass between that fortified city and the headwaters of the Berezina. A very strong attack on 1 July made a gain. It was continued on the next day, when the Russian center arrived near Glubokoye. The right was south of Polotsk, the left still on the Berezina. A force was detailed to cross the Dvina River in rear of Polotsk and attack that place from the west.

On 3 July the German High Command ordered the abandonment of Polotsk and withdrawal of the front to the lake region across the Dzisna River. The Russians broke into Polotsk but were unable to clear it of German rear elements until the 4th. By this time the Germans had made good their retreat and the Russian left reached the vicinity of Lake Narocz.

Pending the destruction of the encircled Germans in the vicinity of Igumen (40 miles east southeast of Minsk) by the 2nd White Russian and elements of the 1st White Russian, the 3d White Russian was ordered to march on Minsk and the 1st White Russian on Baranowicze. The two latter Army Groups temporarily took over the zone of action of the 2nd White Russian, held back and unable to advance due to strong and active Germans in the Igumen area.

The 3d White Russian had found the enemy on the Berezina and attacked on 30 June, securing several crossings. On 1 July a continuation of the attacks on a 60-mile front between Lepel and Borisov, both inclusive, caused the Germans to give way. Borisov was entered. The Army Group announced that 13,000 prisoners had been taken at the Berezina, in addition to 20,000 previously taken.

On 2 July the 3d White Russian, driving straight to the west, by-passed German troops in the vicinity of Minsk by inclining to north of Logoisk, held by the Germans who were attempting to concentrate in the Minsk area. Part of the Russian armored forces pushed on toward Molodechno and others southwest, and arrived close to Minsk on its northwest quarter. At the same time, the 1st White Russian marching northeast from the Bobruisk area arrived on the south side of Minsk.

On 3 July the 3d and 1st White Russian Army Groups attacked Minsk from the north, east, and south, and captured it. As few prisoners were reported as taken, it is assumed that the Germans withdrew in time. Logoisk was taken on the same day. The Germans who withdrew from Minsk found Russian troops of the 1st White Russian blocking their road in the vicinity of Stolbtsy, 45 miles to the southwest. German Panzer divisions cleared these Russians out, opening the way for the retreating Germans. Now the Germans endeavored to establish a new line of resistance based on Vilna—Baranowicze—Pinsk. New German divisions from the reserve were arriving. It is not yet known where these reserves were taken from, but it seems probable that they were initially taken from the general reserve in south Poland waiting for a Russian attack south of the Pinsk Marshes.

The German High Command still expected this attack, but under the pressure of events north of the Marshes it was necessary to weaken the south sector. This was partially allowed for by ordering the evacuation of the advance post and bridgehead at Kowel, which was carried out without being noticed by the Russians during the 4th and 5th. The 3d and

1st White Russian Army Groups arrived in force opposite the new German line by 6 July and immediately commenced to attack all along the front. During the 6th, 7th, and 8th slight daily gains were made. By this time the extreme left of the 1st White Russian, advancing just north of the Pinsk Marshes, had against light opposition arrived at the Sna River.

After the capture of Polotsk the 1st Baltic had attacked daily. The area they were now in had many lakes, swamps, and forests which confined movements to channels and so was favorable to the German defense. The Russians attacked day and night almost continuously, but their progress was noticeably slowed. In spite of all difficulties the Russians by 9 July had arrived on the line Braslav—Vidzy.

While all this extensive fighting had been going on, the 2nd White Russian had been engaged in a week-long campaign against the German divisions east and southeast of Minsk, in the Igumen area. The Germans attacked the advance of this Russian force on 30 June in the vicinity of Grodzyanka at the crossing of the Berezina. As this river line collapsed by next day, the Germans in this area joined with those coming from Bobruisk, Osipovichi, and other places. Another very confused series of battles lasted for a full week, ending on 6 July. It seems certain that a large part of the German forces were captured or destroyed: Russian reports indicate all were, German reports state that a part got away and made their way to the main line. The battle was fought over a wide area, amid deep forests, between scattered forces, and was most severe. At the end there were no Germans left. The 2nd White Russian had separated three German corps and defeated them. Russian reports claim 15,000 prisoners taken and estimate the German dead as 28,000—a total of 43,000. Assuming that these figures are correct, it would have been possible for 10,000 to 20,000 Germans to have escaped.

The 2nd White Russian was now turned westward and rushed through Minsk to take its place in line again between the 3d White Russian on the north and the 1st White Russian on the south. It was in line and ready to attack by 9 July.

By this date the Russian attacks, already under way for several days, had driven some wedges into the German defensive position. The principal one was at Baranowicze, which was taken as the culmination of a four-day continuous assault on the 8th. A similar continuous attack on Vilna at the opposite end of the line had not forced the Germans out of that place.

On 9 July the battle was renewed. The Germans reinforced Vilna with air-borne troops which the Russians claim were intercepted and never reached there. The 3d White Russian entered Vilna in the east sector and occupied the air port and the railroad station. The Germans retreated to the central part of the town and held it. The left of the 3d White Russian attacked and carried Lida. On their left, the newly arrived 2d White Russian entered Novogrudok, while the 1st White Russian regrouped around Baranowicze. Their left forced a crossing of the Sna River in an advance toward Pinsk.

In view of these Russian gains the Germans ordered a withdrawal to a new line Kaunas—Niemen River—Grodno—Brest Litovsk—Bug River. Vilna was ordered held as an important road block to Russian pursuit. In accordance with this mission the Germans in Vilna held through the 12th. They were attacked continuously, were shelled and bombed, but resisted. On the night of 12/13 July, having accomplished their mission, they got back again to their main force. This German force consisted of detachments from an infantry division and a Panzer division, to which had been added 2 regiments of air-borne troops and one mountain brigade—in all, the equivalent of about 2 divisions under Lt. Gen. Stahl.

The Russians followed on through Vilna. The left of the 3d White Russian pushed on to Grodno. Advance elements of tanks and cavalry entered that city on 13 July but were thrown out by a German counterattack. When on 16 July the right of the 2nd White Russian arrived in the vicinity, a joint attack was made by troops of the two army groups and the town taken.

The center of the 3d White Russians had arrived at Alytus on the 15th. A general attack to force the Niemen was made on 16 July, of which the attack on Grodno was a part. The Russians were able to cross and establish several bridgeheads, but were not able to develop these. In the next two days the Germans, who had received some reinforcements, were able to drive some back and narrow down others.

The 2nd White Russian pushed on. It had reached the Niemen River on a wide front on the 14th, with its center between Skidel and

Lunno. Its left was at Mosty. On the 15th the center failed to effect a crossing of the Niemen, but the left worked forward and got across the Ross River. Next day it reached Svisloch and by 18 July Gainovka, meeting moderate resistance.

On 10 July the 1st White Russian marched southwest from Baranowicze. Against minor opposition it reached the Jasiolda River on the 13th. Here strong rear guards were posted. The left of the Russians, advancing partly by water transportation through the north edge of the Pinsk Marshes, arrived at the same time near the junction of the Jasiolda and the Prypec. An amphibious expedition moved through swamps and back streams to land on the south side of Pinsk during the night 13/14 July. Troops also attacked from the land sides. During the 14th, Pinsk was taken. On the same day Logishin 15 miles to the north was taken, enabling the Russians to turn the German position. The Germans abandoned the river line and fell back toward their main line of resistance from Brest-Litovsk to the Bug River. This line was reached by the Russians on the 18th.

On this day, as this account closes the 1st White Russian launched a new major offensive on a 90-mile front, with center approximately at Kovel. As the Germans had evacuated the area about this city and retired to beyond the Bug River, the Russians drove in the advance troops and reached the Bug.

South of the 1st White Russian the 1st Ukraine Army Group launched a major offensive on 14 July, on a 100-mile front from Luck to Tarnopol, both inclusive. The Germans had long foreseen this attack, and thought they were prepared for it. Their front in this sector had been weakened, however, by the necessity of sending divisions to bolster the front further north.

On 13 July (just one day before the Russians attacked) the Germans withdrew their troops in the Luck area to the west side of the Bug River, just as they had previously done opposite Kovel. When the Russians attacked on the 14th only a weak German observation line was found, and the very strong artillery and air preparation fell largely upon abandoned positions. It was then necessary to displace the artillery forward in order to attack the main German line along the Bug River. This river was reached in part only on the 18th.

During the period of the developing offensive in the south, operations were slower in the north. The 1st Baltic Army Group was endeavoring to advance westward, with axis approximately along the line Polotsk—Libau (Liepaja). The right of the Russians was north of the Dvina River. On 10 July the left made substantial gains and reached Svencionys Junction, thereby turning the German lake positions in this zone. The Russians pushed this attack forward, notwithstanding that their right near the Dvina River failed to keep up. Utena was reached next day.

The Germans in this area brought in new divisions. These slowed the Russians who were temporarily stopped on 15 July near Onikshty. The main effort was then shifted to north of the Dvina River, to an area of lakes, small streams, forests, and swamps, very difficult for coordinating movements of large units. After the capture of Polotsk the Russian line north of the Dvina had, by steady attacks, by 14 July reached a line from Drissa to the northeast. This was a 30-mile advance in 10 days. Strong attacks during the next three days advanced the line about 10 more miles to Lake Osveya—Rositsa. No further change occurred by the 18th.

North of the 1st Baltic Army Group was the 2nd Baltic. Between 23 and 27 June this force had daily attacked the area around Opochnka and south thereof. No gains had been made. At this time it is not known whether these attacks were serious and were repulsed or whether they were feints to divert attention from the other attacks further south. In any case, the situation on this front thereafter stabilized until 11 July.

On that day the Russians attacked on a 50-mile front, from opposite Opochnka to opposite Idritsa, both inclusive. As on previous occasion, an exceptionally strong air and artillery preparation opened the way by punching holes at selected places in the defending lines. On the first day only slight gains were made, but on the 12th penetrations were made near Opochnka and Idritsa. Idritsa fell to Russian armor that same day, but the attack on Opochnka broke down.

On 13 July the Russians by-passed Opochnka, advanced westward to the north of it, then circled around and threatened it from the rear. During the night 13/14 July the Germans evacuated Opochnka. In the morning the town passed into Russian hands. The Germans had had time to destroy all bridges in the vicinity and plant road mines so as to delay a pursuit.

The left of this Army Group pushed west from Idritsa and reached Sebez on 17 July, where the line still was when this account closes.

NOTE: There were no operations during the period north of Lake Peipus nor south of the zone of action of the 1st Ukraine Army Group.

At the end of the period the line was

Narova River (with Russian bridgehead southwest of Narva)—Lake Peipus—Velikaya River (with German bridgehead at Ostrov)—Sunyaya River—Lake Osveya—Rositsa (R)—Druya (R)—Braslaw (R)—Zarasai (?)—Onikshty (R)—Koshedary (R)—Niemen River (with several Russian bridgeheads, including Grodno)—Hajnowka (R)—Brest Litovsk (G)—Luboml (G)—Wlodzimierz (Vladimir Volynski on Russian maps) (R)—Sokal (G)—Kamionka (G)—Busk (R)—Zloczaw (R)—Strypa River—Buczacz (G)—Tlumacz (?)—Ottynia (G)—Zabie (R)—Radauti (G)—Suceava (G)—Harlau (R)—Targu Frumos (G)—line 8 miles north from Iasi—Koroneshty (G)—Ornei (R)—Reut River—Dnestr River.

COMMENTS

1. Activity of modern warfare, where maneuvering space is available, has been well exemplified in the campaign of June and July. It was found impracticable to defend a 1,300-mile front so as to prevent gaps' being caused by a sudden attack. In all cases the gap has been initially brought about by a powerful artillery and air preparation. In some cases the two preparations succeeded one another, in either order; in other cases they coincided.

The rolling barrage of artillery is now regularly supplemented by a rolling barrage of bombs. This has not always given commensurate results. If large bombs are used—500 lbs. or over—they have to be to far in front of their own troops that the enemy has time to come out of his shelters after the bomb wave has passed over. Small bombs can not be placed with the accuracy of artillery fire.

2. Armored troops seldom push forward ahead of supporting troops. Present AT defenses are so good that tanks alone are rather readily overcome. Whereas the British are sending their tanks forward with infantry, which keeps their advance down to a very low rate, the Russians use them with cavalry. This permits the tanks, when no opposition is found, to advance at about 6 miles per hour. When opposition is met the Russian cavalry dismounts to fight on foot, and their tanks are right there to aid them.

Russian cavalry and tanks are followed up as closely as possible by infantry and artillery. It is not intended that the cavalry and tank combat group undertake individual battles: they take the place of the old advance guard. They seize places ahead before the enemy can arrange to defend them, and then hold them until their own supporting troops arrive.

Tank and cavalry combat groups seek to get in rear of retreating troops and cut them off. Rear guards similarly composed seek to quickly destroy advancing spearheads by cutting them off from their supports. These opposing missions lead to a vast amount of maneuvering, where quick decisions and energetic action give maximum results.

Cavalry is used with tanks not because it is a better comrade than infantry mounted on motor transportation—either trucks or motorcycles. In the forests and swamps of that part of Russia where the campaign was fought, cavalry could get across the country better than motor equipment. In many situations, the reverse would be the case.

Russian cavalry uses the horse for transportation only. Perhaps it might be better to designate this type of unit as mounted infantry—the British have used this term. Although not officially adopted in the American service, we have used mounted infantry in our Indian campaigns and in the Philippines.

3. Night operations, involving major attacks, are increasing. Most of the defended cities appear to have been attacked by the Russians shortly after dusk. The attack was continued all night with a view to piercing the defenses before daylight. This suggests the necessity for the defense to be able to satisfactorily illuminate the foreground, otherwise there is no satisfactory way to direct artillery fire.

4. Both sides used the Air Force mainly against transportation. In part, night attacks were made against railheads and critical points of railroads. Day attacks were mainly against motor transportation, including tanks.

In the sector south of the Pinsk Marshes, where there is much open country, the Germans claim that in three days some 1,400 Russian armored vehicles were put out of action mainly by air attack. North of the Pinsk Marshes, where forests abound, it was rare for either side to claim as many as 50 tanks put out in one day by air attacks.

This points to the necessity of armored troops' having overhead cover when operating in open country.

THE WAR IN FRANCE (19 June to 18 July 44)

The American First Army (Lt. Gen. Omar N. Bradley) and the British Second Army (Lt.-Gen. Miles C. Dempsey), forming together the 21st Army Group (Gen. Sir Bernard L. Montgomery), had landed in Normandy on 6 June. By 19 June they had an established beachhead. The Americans on the right had the VII Corps (Maj. Gen. J. Lawton Collins), with the 4th, 9th, and 79th Divs astride the Cotentin peninsula, facing north along the line Carteret—Quettot (excl)—Montebourg (excl)—Quinéville (incl). It was engaged in reducing the fortress of Cherbourg containing all or parts of the German 77th, 91st, 709th, and 243d Divs, under Lt. Gen. Wilhelm Dietrich von Schlieben. There was also a German naval force under Rear Admiral Hennecke.

Our II Corps, with the 30th, 90th, and 82nd (airborne) Divs, was back-to-back with the VII Corps, facing south along the line La Haye du Puits (excl)—Carentan (incl). This line was continued on eastward by the V Corps (Maj. Gen. Leonard C. Gerow) with the 1st, 2nd, and 29th Divs, which reached the Bayeux road at a point 7 miles northeast from St. Lo.

Connection was here made with the right of the British. Three corps (2 British and 1 Canadian) were in this army also, but their designations and order in line had not been released at date of writing. The Army held the line Caumont (incl)—Tilly-sur-Seulles (excl)—Caen (excl)—Troarn (excl)—mouth of the Orne River.

All troops were in close contact with the enemy.

In addition to the troops listed above the American 101st (airborne) Division was present. British forces included 3 English infantry divisions (3d, 50th, and 51st), 2 English armored divisions (7th and 9th), 2 English airborne divisions (1st and 6th), and 2 Canadian divisions (2nd and 3d). In all these add up to 19 divisions, which are those only whose designations have been officially released.

When our invasion landed the enemy had had the 709th Div at Cherbourg. The 77th Div was in the Carentan area. The 243d and 91st were further south, but moved up and entered the battle. This group of 4 divisions constituted the final Cherbourg garrison. It appears that a part

of these divisions, including trains, were sent south before the Americans closed the Cotentin peninsula.

In the sector of the British Army and the American V Corps which landed east from the Vire River, the Germans initially had the 352nd Div just east of the Vire. This was the unit which was having maneuvers and happened to be in the zone of action of the V Corps. For 20 miles on its right, where the British landed, the 716th Div was observing the coast. Due to this thin line, the British occupied Bayeux within 24 hours. On the east side of the Orne River was the German 711th Div, which was able to concentrate on its left in time to hold Caen. It received support from a Panzer division late the same day.

The 21st Army Group operates under a single commander. Nevertheless the American and British Armies have had separate missions.

AMERICAN FIRST ARMY

The Reduction of Cherbourg

On 19 June the 9th Division attacked toward Quettot, taking Bricquebec, slightly over a mile to the south and only 11½ miles from Cherbourg. As an attack against Montebourg failed, the town was bypassed. In general the fighting of this day was largely of a reconnaissance nature.

Next day a general advance was made. Contrary to expectation, the enemy made no serious resistance. A terrific artillery shelling was placed on Valognes, a small town nearly in the center of the line of advance, after which it was bombed. By evening the line had reached Vasteville (4 miles southwest of Cherbourg)—Valognes—St. Martin—Eglise de Grenneville (2 miles north of Quinéville), bringing the troops within sight of Cherbourg, which now was within easy artillery range.

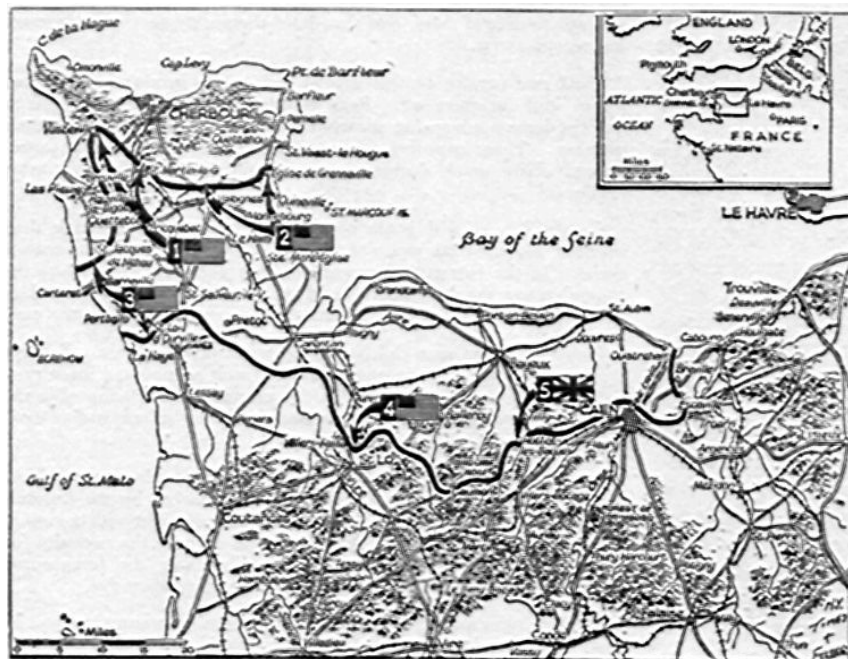
A radio appeal was addressed to the besieged within Cherbourg, explaining the hopelessness of their situation and suggesting surrender. No reply was received. Next day a further appeal was made, asking that dock and railroad men at Cherbourg and directors of industrial establishments refrain from taking part in demolitions, but that on the contrary they make an effort to save as much as possible for the future use of the Allies.

On 21 June further advances were made, particularly on the left. German positions were heavily shelled all day. On account of low clouds there was very little bombing. Ground attacks were limited to minor advances on the left, which advanced the line to include Acqueville, 5½ miles from Cherbourg harbor. Now the Americans were in front of what appeared to be the line which the Germans would hold. It was fairly wooded, and located on a series of hills. There were numerous pill boxes and a fair number of strong points.

On 22 June the first serious attack against the German lines started at 1240 hours* with an 80-minute air preparation. Waves of fighter bombers attacked enemy positions. At 1400 hours a 30-minute artillery preparation was fired. Then the infantry attacked. The terrain was not suitable for tanks, so not many were used. A rolling barrage preceded the infantry. Opposition came after the edge of woods had been passed. Fighter bombers returned as demanded, guided by ground OPs. One detachment dropped 23 tons of bombs within 5 minutes. The minimum distance between bombing lines and own infantry was 500 yards, the maximum 3,000. Main success of the day was on the right, where St. Pierre Eglise was captured.

Heavy fighting developed throughout the 23d. Comparatively minor resistance was

*Hours shown are British war summer time, which is 2 hours ahead of Greenwich mean time.



At the start of this period American columns moved close to Cherbourg by taking Vasteville and by sweeping through Rauville-la-Bigot and Breuville to St. Martin-le-Grand (1). From the southeast other American forces surged through Montebourg and Valognes and, on the coast, advanced to Eglise de Grenneville (2). Near the west coast our troops pushed north of Barneville and south toward La Haye (3). U.S. patrols were reported within 2 miles of the important junction of St. Lo (4). Farther east the British finally took Tilly-sur-Seulles and went on 2 miles to Hottot-les-Baques (5); they thus reduced one of the most stubborn resistance points.

met on the right; the line was advanced from St. Vast de la Hougue to Cape Levi (Levy on some maps). Closer to Cherbourg an enemy strong point was taken near Tourlaville, a village only 2 miles from the center of the city. South of the city La Mare à Canards was reached, while on the west the high ground northeast of Flottemanville (also only 2 miles from the center of Cherbourg) was taken. Much fighting was in woods, where the lines were so close that artillery fire could not be used. Tanks could rarely be employed. The fighting was infantry fighting, aided by special heavy weapons. It involved numerous separate actions against pill boxes, machine gun nests, and obstacles. This was the first day that the town of Cherbourg had been seriously under fire.

On the 24th the attack continued without intermission. Strong resistance was met north of La Mare à Canards, where the Germans had strong fortifications. The Air Force bombed these with 500-lb. bombs. This had no noticeable effect, so they were bombed again using 1,000-lb. bombs. This gave results. Medium bombers in waves, and at intervals of but a few minutes, dive-bombed targets as called for from the ground. Although the advance was general, the Germans made a few counterattacks and occasionally recaptured a bit of ground.

On the afternoon of 25 June the German-held Fort du Roule, just south of the center of the city, was taken. Thereafter, troops reached the outskirts of the city on all three land sides, and street fighting commenced by 1730 hrs. Starting at 1210 hrs. Allied warships shelled the harbor fortifications on the sea front. German coast artillery replied, and claimed having sunk 2 cruisers and damaged 4 others. Allied reports are limited to statements that the German coast artillery was good.

During the night 25/26 Germans succeeded in reoccupying Fort du Roule, which was retaken next day. Serious resistance was met at a few other points, but in general this was overcome by early afternoon. By this time most of Cherbourg (less the navy yard at northwest corner) had been taken. A flag was sent demanding surrender. This was accepted by Lt. Gen. Schlieben for himself and staff, but he declined to sign for the surrender of other parts of his command.

On 27 June, a loud speaker mounted on a truck was parked near the navy yard. In German, announcement was made that the rest of Cherbourg was now completely in American hands and that the German commander had surrendered the evening before. The naval detachment was invited to do the same. They did, at 0945 hours. Mopping operations began against German isolated detachments still to the east and west of Cherbourg.

The coast artillery forts of Cherbourg, which were on islands or on breakwaters, did not surrender until 29 June, and then only after they had been heavily shelled by the Allied navies. By 1 July the isolated enemy detachments outside of Cherbourg had been reduced.

Capture of Cherbourg has been the outstanding success of the Norman campaign to date. About 35,000 prisoners were taken, which includes labor battalions. Two complete German divisions (77th and 709th) were taken, and a large part of two others. After his capture the German commander was asked why he had not defended the outer line of works of Cherbourg instead of making his first stand practically on the edge of the city. He declined to answer. On 19 June a German radio announcement stated that the mission of the German army in Normandy was to prevent the Allies from debouching from the Cotentin peninsula. Assuming that this was the case it is not clear why it was necessary to detach 4 divisions to defend Cherbourg. Their resistance lasted hardly a week. The Germans did demolish the port of Cherbourg; it will take some time to recondition it.

Other Operations

During the operations against Cherbourg, the main front facing south was devoid of major fighting. At the expense of losing his 4 divisions in Cherbourg, the enemy had gained 10 days to reinforce and organize the line facing the American Army.



From the Cherbourg area comes this magnificent shot of a 155-mm howitzer in full recoil. It was shelling the city's defenses at the time.

On 29 June a minor attack was delivered opposite St. Lo. After an air preparation by dive-bombing planes and an artillery preparation, infantry attacked with a view of straightening the line. By infiltration the infantry made gains, but reports now available indicate they were unable to withstand the German reaction and withdrew. A renewal of the attack the next day after a new artillery preparation failed to gain.

On 3 July the entire First Army attacked at 0530 hrs. on a 30-mile front extending across the Cotentin peninsula. A driving rain and low clouds interfered with air support. In preparation for this attack, the American artillery had fired heavy programs during the preceding two days against enemy batteries and critical points. There appeared to be 5 German divisions in line, but these included 3 which had already been captured at Cherbourg. Elements of these divisions probably were withdrawn from Cherbourg before the siege, and it is possible that the enemy may have filled them out with replacements. German divisions consist essentially of a headquarters and such other troops as may from time to time be assigned by proper authority. It is easy to gather any available troops from a division. In order from west to east the Germans were the 77th, 91st, and 243d Inf Divs, the 17th SS Panzer Div, and the 3d Parachute Div. The last two were first class. SS Divisions were overstrength, and might have 15,000 men or more; other divisions were usually understrength. It was estimated that SS divisions were all German, line divisions 40% foreigners (including strong contingents of Russians and Poles); parachute divisions were mostly German, but ordinarily did not have over 10,000 men.

On the west end the terrain available for an advance was limited to a 1½-mile front between the sea and a swamp. On account of the rain the ground was very soft and the going difficult. No much progress was made. North from La Haye du Puits the advance secured two wooded hills about 3 miles northeast and northwest of that village, for an advance of 1 mile. Five miles east of that town the village of St. Jores was captured, 1½ miles from the line of departure. Further east no substantial gains were made.

The battle was renewed in better weather on the 4th of July, with main effort between La Haye du Puits and St. Jores. Only a slight advance was secured. The attack was extended to the vicinity of St. Lo, but without material change.

On 5 July the battle continued, with main American effort on the west. Strong artillery support was provided and tanks were freely used. This brought the line down to La Haye du Puits (excl), the Americans holding the RR station at the north end. A gain of over 2 miles was made down the road from Carentan to Périers.

Twice on the 6th the Americans entered La Haye du Puits, but were each time thrown out by counterattacks. Southeast of La Haye troops entered the high ground which is covered by the Mt. Castré Forest. Within this forest are excellent OPs with a wide range of

view. On the road from Carentan an advance of about a mile was made against strong resistance from the German 17th SS Panzer Div. Much of the terrain in this area was cut up by small streams and marshes.

On 7 July a new operation was started, to capture St. Jean de Daye. At 0430 hrs. began an artillery preparation which preceded two attacks launched an hour later. One was westward from the vicinity of Ariel and directed against the east face of the objective, the other was astride the road from Carentan against the north face. The artillery preparation was so good that the east force reached the Vire River within 2 hours and found a bridge intact. The engineers built two more. By evening both attacks were closing in on St. Jean. Fighting to the west was severe but inconclusive.

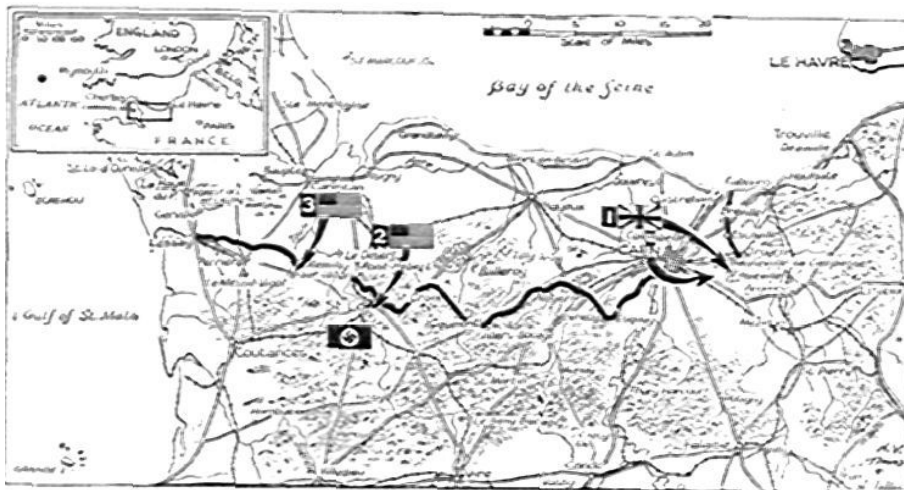
On the 8th St. Jean de Daye was taken and the line pushed over 2 miles beyond. No material gains were made elsewhere.

On the 9th La Haye du Puits was finally secured, although the enemy held on just outside. American troops (90th Div) were in Mt. Caste Forest, engaged in a mixed-up fight in the tangled undergrowth. Outside the forest to the east the advance was slow. This part of Normandy contains numerous small apple orchards which are usually separated from one another by hedges. These have an earth foundation which may be as much as 6 feet high and as thick. On top of this wall trees grow. This kind of hedge, a specialty of the region, is a very good tank obstacle. It affords good cover to defenders and limits the view from OPs. Every hedge affords the possibility of creating a delaying action. The Reich SS Panzer Div arrived in line in the sector east from La Haye du Puits.

Next day two gains were made. Sainteny on the road from Carentan to Périers was taken. The other advance was south from St. Jean de Daye to Pont Hébert.

On the 11th the advance was pushed to 2 miles south of La Haye du Puits, through thickets and swamps. In the vicinity of Pont Hébert, prior to dawn, 35 German tanks attacked; 15 of them reached rear areas. Seven of these were destroyed, the remaining 8 were able to return to their own lines. There is no information as to what damage, if any, these tanks accomplished. After this episode the Americans were able to make short advances between Pont Hébert and St. Lo.

On 12 July all of Mt. Caste Forest was cleared, thereby assuring the artillery good OPs. Elsewhere the line was pushed forward, but nowhere for any considerable amount. North of St. Lo an attack was made on La Meauffe, after a 45-minute artillery preparation. This little village is in rear of Pont Hébert (which had previously fallen) but a garrison had remained therein as a road block. After the preparation the town was taken without difficulty; found: 20 dead Germans, 2 Germans wounded in the legs, 1 German soldier who was a Pole. What happened to the remainder of the garrison is unknown.



As the period closed, preceded by a stunning 7,000-ton aerial bombardment a breakthrough was achieved by British and Canadian troops east of Caen (1). The troops went through Colombelles and through a suburb just south of Caen and, according to German sources, the battlefield was around Banneville la Campagne and Emiéville. Meanwhile the Americans conquered St. Lo (2). The Germans fell back two miles to the south bank of the Vire River. West of St. Lo the Americans were within 200 yds. of the road to Périers at a point below Remilly-sur-Lozon (3); the road was practically useless to the enemy as it was under fire of our guns.

The American artillery was daily firing very heavy programs. All German-held towns were being systematically destroyed. Every road, trail, or path over which it seemed that the enemy might bring up reinforcements or supplies was continuously interdicted. The Germans countered this by extemporizing devious routes across country.

On the 14th the Americans in continuous fighting reached the line **Ay River—2 miles north of Lessay—Pissot (US)—Raids (US)—Tribehou (G)—Les Champs de Losque (US)—Pont Hébert (US)—2 miles north and east of St. Lo.**

By blocking the causeway at Lessay the enemy created a lake about 6 feet deep extending for several miles to the east. West of Lessay the Ay was fordable with difficulty at places. Tides are high (up to 15 feet) and the river was not fordable anywhere except for brief periods at only limited places. These inundations were reached by the First Army on 15 July.

On the 16th there was no appreciable progress. On the 17th a German tank attack in the vicinity of Périers was repulsed with a loss of 17 tanks to the enemy. Our lines closed in around St. Lo, to within a mile of the city.

After strong artillery fire American armor next day entered St. Lo and held on. The Germans retained high ground just south of the town and immediately commenced to shell it.

As this account closes the American line was **Ay River—Periers (G)—Remilly (US)—St. Lo (US).** This was almost a straight line. Since the start of the offensive on 3 July, the advance had averaged a net gain of 6 miles in 14 days.

BRITISH SECOND ARMY

What mission was assigned to this army is not yet known. It may have been a detaining of enemy forces, or an overthrow of the enemy with a view to an advance into the interior of France. It seems probable that until Cherbourg had been captured and a base independent of the weather had been secured, the mission was to protect the American First Army. Afterward its mission depended upon orders from higher authority which have not yet been released.

During the entire period the heaviest fighting has centered around Caen, only 9 miles from the sea. Through it run the double-track railroad and main road from Cherbourg to Paris. It was therefore necessary to clear this place if an advance toward Paris was contemplated.

On 19 June the Germans held Caen and Troarn, with the British just outside. To the west Tilly-sur-Seulles was in No-Mans-Land, and Caumont was just inside the British lines. There was considerable artillery activity all along the front and much local action.

A very extensive air program was under way daily and nightly, its mission to cut every road and railroad in a wide belt around the invasion area as far south as the Loire River and around Paris on the south, to east of Amiens. Our own reports indicate that this attack has been very successful. Some enemy reinforcements certainly did reach the front, however.

Another auxiliary campaign was the dropping of parachutists in enemy rear areas, where they united with French sympathizers to sabotage German lines of communication and interfere with industrial production of value to the enemy. The only available reports of these activities are Allied reports recounting success, with too little information to form an accurate idea of what was accomplished, and German reports which give the number of parachutists and French killed; this last has been averaging about 200 a day, indicating widespread activity.

At the beginning of the period British activity centered around the vicinity of Tilly-sur-Seulles. The Germans were sensitive to every movement: every attack was promptly followed by an enemy counterattack. These were usually made by small forces not exceeding a battalion of infantry plus 20 to 30 tanks. Tanks and infantry

in this area have generally stuck together as a single combat team. By 27 June these minor attacks had gradually extended the British front to Mouen, 4 miles southwest of Caen.

On 28 June the British pushed their attack. Cherbourg had now fallen, so the American Army would soon be ready to attack southward. Advancing southwest of Caen, the British armor met the 12th SS Panzer Div, whose personnel are youths of the German equivalent for our Boy Scouts. It nevertheless fought well and gave the British a hard fight. The country contains many woods and orchards which limit observation. It is therefore terrain where sudden attacks from unexpected directions are practicable. Troops advancing proceed cautiously. The British obtained a foothold across the Odon River (which is really a creek about 30 yards wide).

This battle continued on through the 30th. Both sides brought up additional troops: the British identified 4 German Panzer divisions as in line in this sector. The British widened their bridgehead over the Odon slightly, and lost a bit to German attacks from the Tilly direction.

Then the British extended their attacks to opposite the west edge of Carpiquet. By daily small attacks they reached the town by 5 July. Each of these attacks, having limited objectives, was met by corresponding German attacks. This made a very active sector, for very minor gains. The British were, however, steadily gaining toward Caen. On 8 July they still further extended their attacks to around the north side of Caen. This led to a new series of small fights. Every farm was an enemy strong point, and every village had been prepared for all-around defense. In spite of intense artillery and air support it was impracticable to drive the enemy out of these places. Each one had to be separately attacked and overcome.

On 9 July the British staged a major attack against the north and west sides of Caen, respectively with British and Canadian troops. It was preceded by a powerful air and artillery preparation which lasted all during the preceding night. The first British troops entered Caen about 0900 hrs. By 1400 hrs. that part of the city north of the Orne River, and which included the business center, had been occupied. In this battle Allied warships aided in the artillery support, their fire being directed by planes.

This success led the British to extend the battle next day to the old ground northwest of Caen. A strong artillery preparation was followed by an attack of infantry and tanks. On a front of 3 miles a 2½-mile advance included the villages of Eterville and Maltot, and Hill 112. Small German counterattacks by a battalion plus some 20 tanks won back Maltot next day; they also retook part of Hill 112.

On 13 July the British retook Maltot. This area remained very active with continued offensives and counteroffensives which kept the front fluctuating without material change.

On the 15th it was estimated that the enemy had between 20 and 25 divisions on the Norman front, as against 7 scattered along the coast and 1 in reserve on 6 June. It was clear that in spite of bombing programs the enemy had succeeded in reinforcing his front by 12 to 17 divisions. If allowance is made for 4 divisions lost at Cherbourg, the enemy had evidently brought forward 16 to 21 divisions within 40 days; this would average a division every 2 days, but there was no information that the increase in enemy forces had been uniform. Of the German divisions in line 8 were Panzers, 1 was a Panzer Grenadier (motorized infantry), 6 were overstrength SS divisions, and the balance were regular infantry divisions at normal strength. Total enemy strength within France and the Low Countries was estimated as 65 divisions, as against 60 estimated a month earlier; this would indicate that in spite of troubles on other fronts, the enemy had found it possible to send some 5 divisions to France. It would seem that the enemy had 40 divisions in reserve, which included those scattered watching coasts.

As against this, the German radio estimated that the Allies had some 40 divisions in Normandy, including at least 15 in the vicinity of Caen. The enemy believed that about 40 to 48 divisions remained available in the British Isles either to reinforce the Norman invasion or for new landings elsewhere.

During the night 14/15 July the British captured Esquay after a short but extremely concentrated artillery preparation. In 2 hours an advance of 4,000 yards was secured.

On 16 and 17 July, possibly as a diversion for what was to come, the British delivered strong attacks in the sector southwest from Caen. These were met by the usual fierce German reaction, but nevertheless made gains. The front of these attacks was extended to about halfway to the Villers Bocage area.

Next day the British made their greatest attack yet. The main effort was directed southeast, using the road from Caen to Troarn as a line of

departure. The secondary attack was directed eastward and was launched just southwest of Caen.

The air preparation started at 0500 hrs., using the 8th and 9th US Air Forces and the British Bomber and 2nd Tactical Air Forces, all based upon fields in England. Among them some 12,000 sorties were made. The first wave was before dawn. The targets were every village and building, and every enemy target located. A few minutes after the first waves the smoke and dust haze was so great that it was difficult to see. A gentle breeze from the northeast dispersed this cloud in a fairly uniform manner. There was no enemy reaction.

At 1000 hrs. the air preparation ended and the artillery preparation commenced. Temporarily all planes disappeared from the sky, then came fighters and fighter bombers based on Normandy fields. The depth of both the air and artillery preparations was approximately a circle 6 to 7 miles around Caen's south and east sides. The combination of the two about wiped out every human structure. It destroyed all the orchards. It left the roads so full of craters that it was impracticable to use them except for foot traffic.

Around noon the infantry and tanks attacked, covered by the artillery barrage. Tanks were attached to the infantry and thereby were kept down to a slow rate of advance. On account of the torn nature of the terrain, advance was not easy.

The Canadian division reached the Orne south of Caen. By swimming, using rubber boats, and other means they got across the river against light opposition and entered the south suburb of Caen, Faubourg de Vaucelles. The main attack east of Caen gained 4 miles. As this account closes, the battle was still in progress.

On 18 July the British line was.

Caumont (Br)—Noyers (Br)—Evrecy (G)—Esquay (?)—Caen (Br, less a German center of resistance in south part)—Emieville (G)—Troarn (G).

The maximum advance during a month had been nearly 8 miles, from Tilly-sur-Seulles toward Esquay.

COMMENTS

1. The American Army has attacked almost every day. The British Army has made major attacks only when strong air support was obtainable. As this had to come from English fields, it was only possible on days when it was not raining nor too cloudy. There has been an unusual number of cloudy and rainy days this year.

2. The German army has been fighting stubbornly. It has staged no major attacks. It has defended its positions, and its counter-thrusts have been on a limited objective order.

3. Although little mention has been made of it, there is at times considerable enemy air activity, but nothing to compare with what the Allies can do. German planes bomb Cherbourg almost nightly, presumably to interfere with the reconditioning of the port; no great damage has been caused.

4. German defense positions are in three zones. The advance zone, held for observation and delaying action, is anywhere up to 2,000 yds. deep. The intermediate zone covers a depth of 3,000 to 4,000 yds.; here are located the local reserves, including the tanks and small infantry units to counterattack promptly enemy penetrations other than major assaults. The main zone of resistance has a depth of 5,000 yds. or more. As the German zones of resistance cover at least 10,000 yards in depth, an artillery and air preparation which does not go deeper than this may miss the most important elements of the enemy's forces.

5. The German commander in France (Marshal von Rundstedt) was relieved on 6 July by Marshal von Kluge. This general, who is 61 years old, has a reputation of being very conservative.

6. The German policy has been not to commit the mass of their forces until after all, or nearly all, of the Allied divisions in Britain have been landed on the continent. Until this occurs the policy calls for employing a minimum of divisions against the Normandy and any other invasion which may come, while retaining a mass of maneuver for a strategic blow when the Allies have no similar reserve left. This is a rather hard game to play.

THE WAR IN ITALY (19 June to 18 July 44)

The Allied Central Mediterranean Force under Gen. Sir Harold R. L. G. Alexander, consisting of the American Fifth Army and the British Eighth Army, held at the beginning of the period the line

Bruna River—Paganico (Allies)—Orcia River—Citta della Pieve (A) — Perugia (German)—Assisi (A)—Foligno (A)—Mt. Aspro (?)—Tronto River (G).

Its mission was to destroy the opposing German Army Group of Field Marshal von Kesselring, estimated as having about 25 divisions.

On the left was the American Army, with a French corps on the right. The British Army had South African, British, Indian, and Italian troops, in the order named from left to right. Boundary between armies was

Sarteno — Montepulciano — Sinalunga — Asciano — Radda (all to 8th).

As this account opens a detached force of French troops was attacking Elba. That island was completely taken on 19 June, when 1,800 Germans surrendered. It was estimated that the Germans lost 500 others killed and wounded. A small number escaped to the mainland.

The main campaign started off with the Allied capture of Perugia on 19 June by British troops, and of Chiusi by a South African division. Rains at this time had created much mud, which delayed operations. On 21 June a general advance was started, with main effort on both sides of Lake Trasimeno.

The heat was tropical. The Germans had the advantage of mountain positions and of cover from trees, hedges, stone villages, stone walls, and ditches. They used mines liberally. Due to mountain slopes, attackers could use armored vehicles only on narrow fronts, which the enemy could foresee and where he could post his AT defenses. Bridges and culverts were systematically demolished. The Allies had about as hard a job as possible in attacking, as the country was almost ideal from a defensive point of view. In general much reliance was placed on the artillery, in which the Allies had considerable superiority, to shell the enemy out of lines of resistance. In the air the Allies held absolute command.

The Americans found it easier to advance through the mountains than along the few roads: there were few of the mine fields which greatly delayed advances in valleys. Notwithstanding the rough country, American artillery kept up in the cross-mountain movements. On 27 June the Americans reached the line Sassetta—Chiusdino. On their right the French Corps reached San Quirico d'Orcia.

On 28 June the Allies attacked determinedly. The Americans extended their right from Chiusdino to Monteciano. The French extended this to a line through Montalcino and Pienza. West of Lake Trasimeno the British, notwithstanding repeated attacks, were still short of Castiglione del Lago. East of the Lake, where the enemy held Magione, no advance was made

either. Not north of Perugia. Further east the British were still near Assisi, but beyond there had been an advance, made gradually during the preceding days. The line now was Nocera (G)—Camerino (G)—Chienti River.

On 29 June the American left was pushed forward along the coast to Cecina. In an all-day non-stop attack the British advanced west of Lake Trasimeno to the line Montepulciano—Castiglione del Lago, this difficult enemy center of resistance finally falling to a combined air, artillery, armored, and infantry assault.

The heavy battle of the American Army continued on through July 4th and 5th. It was evident that the enemy had received strong artillery reinforcements, particularly in large calibers: his artillery fire was constant and heavy. By now his main line of resistance was back through Rosignano—Montecatini—Volterra—Colle.

On 7 July the French Corps advanced toward Poggibonsi, a road center in a valley which afforded possibilities of turning the enemy's strong positions which confronted the left and center of the 5th Army. South of Arezzo the British were repelling enemy attacks, but the India division passed Umbertide and reached Montone. The Poles were also able to make some gain toward Ancona.

On 8 July it appeared that the enemy's strong hill line north of the Cecina River was about to become untenable.

Next day it was clear that the enemy was falling back. Americans pushed 4 miles beyond Volterra.

On 14 July the Americans on the left in hard and continuous fighting arrived at the line Rosignano (Allies)—Fauglia (German) — Lari (G)—Peccioli (A). The French Corps extended this to include Poggibonsi, which they took by assault. East of the Tevere (Tiber) valley, slight advances brought the Allies to near Fabriano.

On 16 July the Americans were heavily attacked. The Germans were repulsed and a counterattack brought the line forward slightly. The French Corps was also strongly attacked around Poggibonsi, but held its lines. The British, with the observation advantage given them by the capture of Monte Lignano, entered Arezzo in the morning. This town was badly demolished, but the enemy made a stiff resistance among the ruins. In the afternoon the enemy withdrew and the British followed on for several miles.

On 18 July the Americans had a hard fight. The fiercest part appears to have been the taking of Monte della Poggia, only 3 miles east of Livorno. The British found that the enemy had retired to the high ground north of the Arno in central Italy; they pushed westward to Montevarchi, 15 miles from Arezzo. The prize of the day fell to the Poles, who in a brisk assault entered Ancona. At the end of the day the line was

Livorno (G)*—Fauglia (A)—Pontedera (A)—Peccioli (A)—Certaldo (G)—Barberino (G)—Montevarchi (A)—Arezzo (A)—Citta di Castello (G)—Sassoferrato (G)—Esino River.

COMMENTS

1. During a month the Allied advance was 65 miles on the west coast, 30 miles in the center, and 70 miles on the east coast. Length of the front in an air line from Livorno to Ancona is 165 miles, or to the mouth of the Esino River 156 miles; measured along the line the distance is 168 miles.

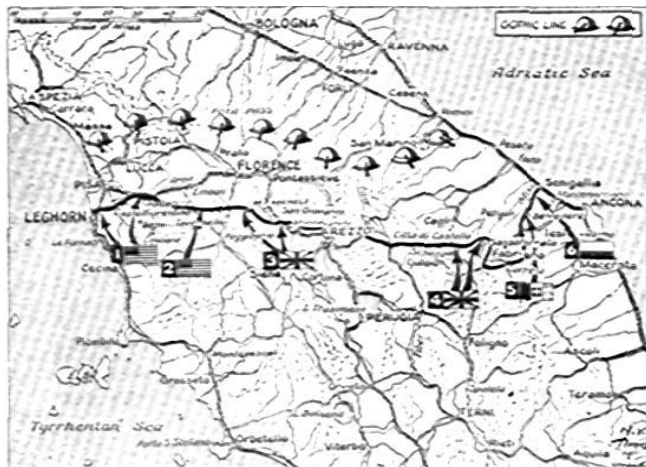
2. During June the enemy's resistance in Italy following the loss of Rome was not so serious. Commencing around 1 July he offered a serious and stubborn defense. After this date the rate of advance of the Allies was cut to approximately half of what it had previously been.

3. It is believed that the enemy's main line of resistance will be along the Etruscan Apennines. This range is about 50 miles deep, densely wooded in parts, and very suitable for defense. It starts on the west near La Spezia, passes north of the Arno valley, traverses Italy to the small independent state of San Marino, and then becomes the Adriatic coast mountain range. This has recently been referred to as the Gothic Line but it is not known what name, if any, the enemy has applied to it.

4. Air photographs indicate that only a part of the line has been prepared for defense. The existing fortifications cover all passes, of which there are a considerable number.

5. At mid-July it was officially announced that the various nationalities composing the Allied armies in Italy had been joined by one more—a Brazilian contingent. This is the first appearance in an active sector of troops from Latin America.

*Livorno was occupied by the Allies on 19 June.



Just after this period American forces (1 and 2) pressed forward on the left within four miles of Pisa and took Castelfiorentino and Tavernelle. British forces (3) moving toward Florence farther east captured Mount San Michele and drove on San Giovanni, in the Arno Valley. Other British forces (4) took Scheggia and Sassoferrato. Still closer to the Adriatic, Italian troops (5) captured Belvedere and Polish troops (6) pressed on to engage enemy forces in the Misa Valley.

THE WAR AGAINST JAPAN (19 June to 18 July 44)

SOUTHEAST ASIA

With the exception of the shelling of Port Blair in the Andaman Islands by Allied naval forces on 21 June, operations have been limited to frontiers between Burma and India and between Burma and China. In general the period has been characterized by Japanese withdrawal.

The frontier between Burma and India is about 600 miles long. The Allies are across the frontier in Arakan on the south and in north Burma on the north. In the center the Japanese have been across the frontier in Manipur.

Between Burma and China the frontier is another 600 miles long but has had only one active sector, nearly in the center.

All frontiers are bordered by high and rough mountains parallel to the boundary and generally extending north-south. Operations which traverse the frontier have a succession of mountain ridges and stream lines to cross. Most of this territory is jungle covered. This makes it possible to move troops without their being observed from the air. There is limitless opportunity for tactical movements, involving flank marches, surprise attacks, etc.

As roads are few and generally are in deep and narrow valleys, it frequently happens that one side or the other is able to establish road blocks in rear of enemy fronts.

The Allies have decided air superiority. If necessary they can supply forward areas by air. During the period the Japanese for the first time have begun to similarly supply some of their forward troops, but on a reduced and limited scale.

Arakan

The line has remained nearly unchanged between Maungdaw (British)—Buthedaung (Jap)—Kaladan (?)—Paletwa (J.).

Manipur

At the beginning of the period the British 14th Army (Lt.-Gen. Slim) had the III Corps, with two divisions, operating in the vicinity of Kohima. The IV Corps with two divisions was holding the area between Imphal and Bishenpur, and was completely surrounded by hostile forces. It was being supplied satisfactorily by air.

In view of their failure to reach the B & A RR in the beginning of June the Japanese abandoned the campaign and commenced to withdraw from Manipur. In lieu thereof a new campaign was started in China to attack the forward American air bases in that country. By the end of June the Imphal-Kohima road was again available after being closed for three months.

On 18 July the line was 17 miles south of Ukhrul, where the remains of the Japanese 15th and 31st Divs were withdrawing over the mountains to the Chindwin River. The next point of contact was 8 miles east of Palel, where strong Japanese resistance was encountered; as Palel is 22 miles from Imphal, the Japanese in this direction were 30 miles away. On the Tiddim road the Japanese were 9 miles south of Bishenpur (16 miles from Imphal), retiring slowly and in apparent good order. The Silchar trail extending westward from Bishenpur was clear of the enemy except for minor patrols. A detached enemy post, which was by-passed by the British, remained at Maokot (9 miles south of Ukhrul). The Naga Hills north of Kohima are reported as practically cleared of hostile forces.

North Burma

Lt. Gen. Joseph W. Stilwell on 19 June had the following troops in the field:

The Chinese 22nd Div was 5 miles south of Kamaing, advancing down the Mogaung valley toward Mogaung, protecting the advance of the Ledo Road.

The Chinese 38th Div was besieging Mogaung, with no ground connection with supporting troops.

A mixed force of Chinese and Americans under Brig. Gen. Frank Merrill was besieging Myitkyina; it was being supplied and supported by air.

A British force of Gurkha troops and native Kachin Levies based upon Fort Hertz was besieging Tiangzup, north of Myitkyina.

A mixed force of Americans, Indians, and British, known as Chindits* (Maj.-Gen. W. D. A. Lentaigne) and entirely supported by air, was in enemy rear areas, with important detachments aiding in the sieges of

*The original commander of the Chindits was Maj.-Gen. Orde C. Wingate, who was killed in an air accident on 24 March. He had designated his command as *Chinthays*. A Chinthay is an heraldic animal resembling a lion, supposed to be assigned to protecting Pagodas, and was the emblem of the command. Through error the original orders read *Chindit*. That name stuck.

Mogaung and Myitkyina.

The mission of the entire command was to complete the building of the road from Ledo to Bhamo, where it was to connect with the Burma road to Chungking, China.

On the opening day of this account Tiangzup was captured after a 6-week siege. Thereafter the British advance southward during the following month appears to have been about 5 miles.

The 38th Div assaulted Mogaung on 25 June and took this town on the following day, but road communication into Mogaung was not opened until 11 July. By the end of the period the Chindits had reached Mingon, 18 miles from Mogaung.

At Myitkyina American troops are on the north side. Chinese are on the west and south, but have no direct communication with the Americans. The Chindits are across the Irrawaddy River, with precarious communications with the Americans on their right and the Chinese on their left. During the entire month the Allies have made gains of but a few hundred yards.

The net gain for the month has been to advance the vanguard of the Ledo road some 25 miles, which covers the possibilities of construction gangs at this monsoon season of the year.

The Salween Front

To help the supply situation of Chinese forces here, American engineers are opening the Burma road beyond the Salween. The necessary bridge only needs a 300-foot span, but the material takes time to transport. Our 14th Air Force is dropping commissary stores, ammunition, and medical supplies.

At the end of the period all Japanese garrisons were holding. The north Chinese column had closed in 20 miles on Tengyuch, and the south column had to its credit a 10-mile gain toward Mangshih. No part of the Burma road had been recovered.

COMMENTS

During the entire period the Allied Air Forces (American, British, and Indian) have been constantly raiding enemy lines of communication within Burma. This has interfered with enemy supplies' being forwarded to the districts where fighting is occurring. The Chindits in north central Burma have aided materially in this task, by detached operations against important bridges. The effect of this campaign has been cumulative: prisoners taken in Manipur show actual evidence of starvation.

SOUTHWEST PACIFIC

New Guinea

On 19 June the Jap 18th Army of 3 divisions, estimated as 60,000 men, was on the north coast between Aitape and Wewak. Both these places were occupied by Allied troops; between them, the sea on the north, and the Torricelli Mountains on the south, the enemy was surrounded. Outside this area enemy held only a few small posts toward the west end of New Guinea.

Active operations were in progress only at Biak Island, which was being mopped up. This operation was completed by 2 July. The enemy's losses, believed to be his entire garrison, are reported as 3,055.

A new operation began on 2 July when Allied troops, following a naval and air preparation, were debarked on Numfor Island. This island, about 15 miles by 12, is in the northwest part of Geelvink Bay and had Japanese air fields. The air field was quickly secured; minor fighting followed only until 6 July.

On 12 July the Jap 18th Army, estimated to have been reduced to about 45,000 men, was reported assembling, apparently with an intent to attack westward. Thereupon the Allies established a battle line along the Dinumor River. The Japanese (identified as the 20th and 41st Divs in line and the 51st Div in support) made minor thrusts. These were probably exploratory. Finding the river line solidly held, the enemy did not try to force it. Instead, by 18 July he was reported to be attempting to by-pass the Allied position by following trails through the Torricelli Mountains to the south. Naval forces have intercepted a number of barges. The fact that this barge traffic continues is an indication that some have gotten to their destinations, otherwise the enemy would not continue to send them on. They may have evacuated part of the Jap forces.

Bougainville

There has been no material change in the situation. The enemy

holds both ends of the island and the east coast. The Allies hold part of the west coast, with main force grouped about Empress Augusta Bay.

Information from Bougainville indicates that the account given in these *Perimeters* in the May number of this JOURNAL regarding the actions of 8 to 10 March was incomplete. It is now known that the Japanese 6th Div of their 17th Army attacked two regiments of the American 37th Div, with a view of seizing Hill 700. After the battle was over about 4,500 enemy dead were buried. It is estimated that their total casualties were around 10,000. The meager accounts available indicate that the American troops fought bravely against superior numbers. That they succeeded is attributed largely to the artillery support which was constantly given by the division and corps.

CENTRAL PACIFIC

Caroline Islands

Many islands have been bombed in an extensive and persistent program. Principal target has been Yap, which was bombed 15 times for a total of 488 tons; 44 enemy planes were reported downed near Yap, the only island where enemy air resistance was encountered. Truk was bombed 11 times. 418 tons of bombs were dropped on 6 trips.

Other islands bombed were Palau (14 times), Woleai (12), Sorol (10), Ponape (3), Nauru (3), Ngudu (1), and Nomoi (1). Most of these attacks were incidental to reconnaissances.

Marshall Islands

Islands still Jap-held are Jaluit, Maloelap, Mili, Taroa, and Wotje. They were bombed 17 times. There are no reports as to results.

Marianas Islands

At the beginning of the period Admiral R. A. Spruance, commanding in the area, had despatched to Saipan an amphibious expedition under Vice Admiral Richard K. Turner. On the night 14/15 June the 2nd and 4th Marine Divs under Lt. Gen. Holland McT. Smith had landed respectively north and south of Charan-Konoa. They had then wheeled to the left, and when this account opens held the line across the island Garapan (excl)—point 1 mile east of Lake Susupe—Magicienne Bay. The 27th Div landed later in rear of the Marines, and wheeling to the right was engaged in capturing Aslito and its airfield. The enemy held north Saipan with about 2 divisions and Aslito with about a regiment. He held the adjacent island of Tinian to the south, which was within easy artillery range of south Saipan.

On 19 June Jap planes attacked the ships off Saipan. They came from a fleet to the west. The ships delivered an extremely heavy AA fire, while American planes opposed the enemy in the air. According to our reports one own battleship and two aircraft carriers received slight damage, and 27 own planes were lost. Against this, 402 enemy planes were downed.

Next day our planes located the Jap fleet of battleships and carriers about halfway between the Marianas and the Philippines. The fleets were never at any time in contact with each other or near contact, but each fleet was attacked by the other's air force. On the 20th, it was the turn of the American planes to attack Jap ships. This took place late in the afternoon. Our planes came from a task force under command of Vice Admiral Mark A. Mitscher. At dark the enemy was fleeing westward. The Japs have admitted losing in this battle 1 carrier and 2 tankers sunk, plus 50 planes; they did not report ships damaged. According to American reports our planes sank 1 destroyer and 2 tankers and downed 26 enemy planes. This was what was observed, but the following ships were reported as having been bomb hit and damaged: 3 aircraft carriers (of which 1 received 3 1,000-lb. bomb hits and is probably the one reported lost by the Japanese), 1 light carrier, 1 battleship, 3 cruisers, 3 destroyers, and 3 tankers. Since this battle the enemy's naval forces have not materially interfered with the Saipan campaign.

Meantime, the 27th Div captured Aslito airfield without great difficulty on 19 June; on the same day the Seabees commenced work to reopen the field.

A general attack was now made straight north across the island. The terrain was difficult, enemy resistance strong. Down the center of the island is a mountain range whose highest summit is Mt. Tapotchau (1,554 ft.) 2 miles southeast of Garapan. The enemy's main line of

resistance was through these two places and on the north shore of Magicienne Bay. The mountains contained numerous caves, in which the enemy posted machine guns and mortars. These positions were repeatedly shelled by both the navy and artillery. It required a direct hit at a favorable angle to destroy a cave post, as the defenders were often some distance inside.

On 23 June the naval task force planes attacked Pagan Island in the northern Marianas. Two small ships were sunk there and 2 others damaged. Proceeding northward, the planes on the 24th attacked Iwo in the Bonins.

By 25 June the 27th Div, having completed the task of capturing Aslito less a small Japanese force at Nafutan Point, had joined the two Marine divisions. Very hard fighting developed. Garapan was entered, while Mt. Kagman on the east coast was seized. The small Jap force at Nafutan, in accordance with custom, delivered a suicide attack on the 27th; next day Nafutan fell.

Severity of the fighting can be judged by the casualty report: up to and including 28 June in 14 days the American losses had amounted to

	<i>Marines</i>	<i>Army</i>	<i>Total</i>
Killed	1,289	185	1,474
Wounded	6,377	1,023	7,400
Missing	827	51	878
Total	8,493	1,259	9,752

By daily battles the American line had advanced by the 6th to within 4 miles of the north tip of the island. On the following day the Japs made their usual suicide attack. The leading Japs were well armed, but those in rear belonged in part to non-combat units and had no arms; they took those of the men killed before them. This attack was made with great bravery, although it lacked skill—it was a straight frontal attack. The enemy entered Tanapag and pierced the artillery line; a few along the mountains got still further south.

This attack was led by the commanding generals. It was now ascertained that these were Vice Admiral Chuichi Nagumo (C-in-C Central Pacific Area), Rear Admiral Takehisa Tsujimura (Commander of Naval Forces), and Lt. Gen. Yoshitsuga Saito (Commander of the Army Forces). Admiral Nagumo had commanded the Japanese Task Force which attacked Pearl Harbor on 7 December, 1941. All were killed.

Next day the conquest of the island was completed. In the entire campaign over 1,000 Japanese prisoners were taken, exclusive of 9,000 civilians who were interned. Enemy killed buried numbered 19,793. Total American casualties have been announced as 2,359 killed, 11,481 wounded, and 1,213 missing, for a total of 15,053.

Immediately after the cessation of fighting on Saipan, Admiral Spruance's force prepared to attack Guam and Rota. These two islands were heavily bombed and shelled by battleships, cruisers, and destroyers at close range daily from 8 to 18 July (when this account closes), with the exception of one day.

CHINA

After June the Japanese operations in Honan were of a limited character. According to Jap accounts, in the course of the entire campaign (which began in mid-April) the Chinese armies had lost over 60,000 killed and nearly 20,000 prisoners. Over 400 pieces of artillery and 24,000 rifles were listed as captured. Jap losses are represented as having been 2,008 killed. The Japanese hold the northeast section of Honan, including the important city of Chengchow, at or near which the main roads, railroads, and river lines meet; this gives them economic control of a large unoccupied area.

According to reports from Chungking, the Communist Army in Shensi received orders in May from Generalissimo Chiang Kai-shek to initiate immediately an offensive against the enemy in Honan. Two months after this order was issued the Communist Army is still at its usual garrisons.

South of Hankow the Japs hold a corridor astride the Hankow and Canton RR. In previous years the Japs annually raided in May and June through south Hupeh into Hunan as far as Changsha, then withdrew to their Hankow center. This year they are staying. The corridor is guarded by a series of posts, which are mostly walled Chinese towns about 40 miles on each side of the railroad. The Chinese are attacking these posts but have not been able to reach the railroad.

According to Jap communiqués the mission of the current campaigns

in China is to interfere with the activities of the US 14th Air Force by seizing its forward bases. Some of these have been taken or made unuseable, as for example one near Hengyang. It has only been necessary for the Americans to establish new bases outside the 80-mile wide Jap corridor. This may be classified as a nuisance, but it has not materially affected the 14th Air Force. The Jap plan is the sequel of the failure of their attempt to hamper the American planes by capture of their bases in rear of Manipur.

The 14th Air Force has been most active. It is vigorously aiding the Chinese troops in the defense of Hengyang, and is regularly attacking enemy lines of supply. It finds time to make raids as far as the China Sea and into Indo China. Special attention is given to destroying Japanese shipping.

COMMENTS

1. Present indications are that Japan realizes that she has lost command of the sea and can not regain it. She sees the hopelessness of holding on to the vast number of islands; our fleet can reach any of

them any time, the Japs can reach none except to a limited extent and then only when the main American naval forces are away.

2. Jap barges continue to circulate through the island area. Many are sunk, but some undoubtedly get by. Submarine cargo ships are also reported.

3. Japan is expanding her air service.

4. Transfer of Jap industries to the China mainland has been partially accomplished. The idea seems to be to force the Allies to wage a land war in China, where the Japanese army, very large in numbers, could meet their invaders on fair terms. For this purpose strenuous efforts are being made to build up a large army, partly Chinese, within China.

5. The Chungking China government has failed to establish satisfactory liaison with Communist China. These two large groups are not cooperating, but the Communists are anti-Japanese: they are not fighting them, but neither are they aiding them.

VISIONS OF A PRE-WAR WORLD

A retired artilleryman's legendary ambition is said to call for a hilltop home, a comfortable lawn chair complete with non-emptyable tumbler, a field piece complete with an everlasting supply of ammunition, and a man to shoot it into the valley below whenever the spirit might move the elderly gentleman to command *Fire*.

Part of this wish was fulfilled in his youth by Lt. Col. G. B. Jarrett, Ord., who has prepared many outstanding articles for this JOURNAL. Long a weapons enthusiast, his personal collection of firearms from many lands includes not only rifles and pistols but also field pieces, complete with accessories. Ammunition was home-prepared, even to some of the projectiles; a New Jersey farm was an excellent site for using it.

The accompanying photo was snapped in 1937. Col. Jarrett writes, "The piece is a British 75-mm Vickers mountain howitzer. The charge was about a good handful of 3FFF black powder; the projectile a beer can, concrete-loaded—about 4 lbs., as I recall; target area, our distant corn field some 700 yards away. At this range our 50% zone was approximately the whole 10-acre field—or all over the place. Isn't it rare for a small Brownie camera to catch this projectile as it went by—honestly not retouched a bit."

Through the smoke you can clearly see the streak of the projectile, the sun glinting on the bright can. Col. Jarrett is in his shirt sleeves, crouching at right center. Some of his other pieces are also visible.



Activities like this call for good knowledge of what you're doing, for the sake of your neighbors as well as yourself. This is not a sport for the tyro to engage in. It does, though, open up vistas for the war-horse sadly separated from his beloved Arm, and suggests that not-too-elaborate arrangements are necessary.

WHEN EQUIPMENT IS UNSATISFACTORY

Headquarters officers in the Technical Services, responsible for the improvement of all equipment, say that officers in the field are not taking fullest advantage of the *Unsatisfactory Equipment Report*. They wonder how many of the men in position to observe the daily performance of material simply never heard of the form, and how many are just lax about using it. The form in question is W.D., A.G.O. Form 468, reference TM 38-250 and Circular No. 4, W.D., 1944.

The *Unsatisfactory Equipment Report* form provides a convenient and easy way to report on any unsatisfactory equipment to the Chief of the proper Technical Service. There is space for complete identification of the equipment, its length of service, description of the trouble, its probable cause, description of any remedial action taken, and recommendations for eliminating the difficulty.

As stated in the instructions on the form, it is to be used for "reporting manufacturing, design, or operational defects, and for use in recommending

modifications of materiel." It is not used "for reporting failures, isolated materiel defects, or malfunctions of materiel resulting from fair wear-and-tear or accidental damage."

Unsatisfactory Equipment Reports provide the most important and reliable means of finding out the real worth and performance of Army equipment. They convey vital information from the field. Sometimes they lead to only minor changes, but these improvements in the aggregate are of enormous importance. Army equipment is subjected to accelerated tests before it goes into service. But these tests cannot provide the information that may be derived from extended experience under field conditions.

"You have good equipment," say the men at headquarters to the men in the field. "But if we do not have your reports and recommendations, we cannot make the modifications and improvements that should be constantly in progress."

Don't forget, the Preventive Maintenance services you perform are for your own good. For instance, TM 31-200 calls attention to the fact that "It is the driver's duty to do everything possible to prevent tire failure. This not only helps to conserve valuable rubber, but is also for the driver's own convenience, benefit, and safety."

Cooperation in the Red Army

As Viewed by the Soviet Press

Cooperation is perhaps the foremost lesson to be derived from a study of the Red Army's successes. This has so many aspects that only some of the outstanding ones are considered here. These all have direct application to the artillery and to its first cousin, the armored forces, which combine fire-power with mobility.

This article reflects the views of the Soviet press in 1943, as digested by a distinguished officer of one of our allies. The principles outlined here deserve the closest study, as their soundness has been proved beyond doubt in combat. Their application requires still more, however: training and practice. Only by intensive training of all arms with all others can we develop that team which is essential to victory at any time, and especially under the conditions of mobile warfare.—Ed.

MORTARS AND ARTILLERY IN OFFENSIVE ACTION

In moving warfare mortars, due to their mobility, constitute an important weapon. When put in an infantry formation or used as an accompanying weapon, the battalion or company mortar is the faithful companion of the rifle unit. By supplementing the fire of artillery, and sometimes even replacing it, the mortar reinforces the breakthrough power of infantry on the offensive and increases its resistance in defense.

The special importance of battalion and company mortars lies in the fact that they can successfully destroy enemy fire points in the immediate neighborhood of the forward rifle detachment. By means of them, the infantry can move up very close to the objective of attack. For this purpose the fire of mortars is particularly important: the artillery which accompanies the infantry can strike an objective only if the infantry is not nearer than 200-300 meters, whereas mortars can fire at a target that is only 50-75 meters from the rifle detachment. Hence mortar fire is particularly important before the beginning of the assault and during the time of close combat.

Of course, the depth of action of mortar and artillery fire is not constant. It depends on many conditions, above all on the disposition of enemy forces. At the beginning of the advance, and before our rifle detachments have reached the tactical depth of the defense, the artillery fires on targets that are at least 200-300 m. from our front infantry formations. Artillery lifts its fire into the depths of the defense organization in proportion as our infantry penetrates the forward zone. The distance between the front rifle groups and the artillery targets is increased. There is a certain interval of time between the moment that the artillery ceases to strike a certain fire point and the moment that the infantry has approached close to it. But, even if it is only a few minutes, the enemy may during this time be able to act with machine guns, and by organized fire strike the attacking infantry. Hence, fire support must be continuous. Fire protection must be provided in front of the infantry until the troops can use hand grenades in the assault. Thus the basic mission of the battalion and company mortars is to keep under fire the closest targets, not giving the enemy any breathing spell and not allowing him to recover after the artillery fire.

In using mortars in offensive operations we must avoid as much as possible any useless expenditure of ammunition. If we waste shells, for example, during the time of preparation for the

attack, we shall not have these shells to use during the combat, when liaison with the artillery may be broken and when certain fire means have been left behind. In joint action of artillery and mortars the fire is of course dense and heavy and the moral effect upon the enemy is great, but this is not of practical significance: the enemy personnel will then seek cover and its fire means will be sheltered by armor.

In planning the artillery preparation and in distributing targets among the cannon and mortars, we should limit the number of missions for the latter. They should attack only those targets which they can really destroy. The most intensive battalion and company mortar fire begins from the moment when the artillery transfers its fire into the depths of the enemy defensive. This is a rule which has been confirmed by experience and should always be kept in mind.

On the occasion of the advance of one Russian battalion across a river, the mortars opened fire against some heavy machine guns of the enemy and after a few minutes silenced them. But the enemy then used the same means against the Russian mortars, and our artillery began to fire at the German mortars and silenced them. During this time the Russian mortars continued their action—they supported the battalion, destroying chiefly the enemy fire points. The commander of the mortar batteries acted properly. He availed himself of artillery support, maintaining close contact with it. Thus the fire support of the battalion was not interrupted and the enemy mortars were silenced by effective artillery fire.

A skillful use of company and battalion mortars will not only aid us in carrying out our specific missions, but it will also enable us to cooperate successfully with artillery by reinforcing the fire power of the artillery attack.

TANK-BORNE TROOPS

After the penetration of enemy defenses the success of further offensive action depends chiefly on the mobility of the troops, on their ability to develop their gains in depth, before the enemy has time to transport reserves along the lateral road. We must move into the depth of enemy defense quickly, seize important terrain points, and make it impossible for the enemy to maneuver. It is only in this way that the attacking troops can gain access to the wide spaces beyond.

This mission can best be executed by tanks with motorized infantry, but it may happen that due to the absence of roads or for some other reason the infantry can not accompany the tanks and if they tried to move on foot they would be left behind. In this case we use tank transport. The infantry climbs upon the tanks and goes into battle by caterpillar traction. These tactics have proven their worth. In this way we enable the tank to remain away from its infantry unit for a longer time. The tank detachment, by means of tank-borne infantry, can reinforce captured terrain and hold it until the arrival of the main infantry forces.

On one sector of the southern front, after a penetration of the defenses it was necessary to capture at once an elevation considerably to the front. This mission was given to a tank detachment, to which was assigned a company of riflemen with automatic weapons on the tanks.

Until contact with the Germans was made, the riflemen moved on tanks. Upon approaching the elevation they saw

that it had been converted into a strong point, but the enemy had just occupied the position and had not yet had time to organize his fires. Hence our men decided to carry out the attack from the march.

After several minutes the tanks moved into range of artillery and mortar fire, but since the shells had not been aimed the infantry remained on the tanks. Not until the enemy began to use antitank guns and machine guns did the infantry dismount and march behind the tanks. With slight losses it penetrated the battle positions of the Germans, and in close-range fighting demonstrated the importance of skillful cooperation between infantry and tank crews. The Red Army men overwhelmed the positions with fire from machine guns and automatic rifles, and in this way protected the tanks from direct attack. Then they discovered an antitank ambush; they destroyed the enemy sappers and fortified for themselves the positions which the tank men had captured. Concealed behind the large bodies of the tanks and under the protection of their fire, they approached the enemy and destroyed him with automatic weapons and hand grenades.

In praising the valor of the troops and the deadliness of their fire the tank commander said that the infantrymen showed themselves to be tank fighters at all times. Thus the commander, Slobodyanik, with the riflemen's assistance, destroyed by fire and by crushing with treads 7 enemy guns, 2 camouflaged tanks, 3 machine guns, and in due time made a detour of the mine fields. On the fifth day the enemy was cleared from the elevation, and in this way the development of the whole operation was aided.

Tanks sent into the depths of the enemy defenses should always be accompanied by tank-borne infantry with automatic weapons. The presence of riflemen with the tank enables the latter to maneuver more freely and facilitates night action and action under conditions of limited visibility.

The crews of the machines and the troops transported constitute a single unit. The infantry—armed with automatic weapons, grenades, and sometimes with machine guns—are well acquainted with their machine and its crew, and at the least sign guess the intention of the tank commander. Help in due time from the riflemen reinforces the shock and the fire power of the tanks.

The company transported, however well it may be trained, is not always able to accompany the tank for a long time in battle, and sometimes its strength is not sufficient. Hence it is necessary at some time or other to train all infantrymen for transport by tanks, so that every company can perform this mission if the occasion requires.

TANK DETACHMENTS IN FIGHTS FOR TOWNS

During offensive action Red Army tanks play an important part. In cooperation with infantry they attack fortified enemy positions; in other cases they act independently, developing successes or pursuing the enemy. In their drive from Stalingrad to Rostov, Soviet tanks encountered serious obstacles and had to fight some hard battles. In a particularly stubborn manner the Germans defended towns and villages having operational importance. Tanks sometimes attacked these points when by chance they were separated from the infantry divisions which were following them.

Many judges of tank tactics do not regard towns and villages as favorable battlegrounds for tanks, and are of the opinion that on city streets tanks lose three-fourths of their combat power. This is only partly true. It all depends on the character of the particular town or village: its size, location, and strength of

defenses. If it is a large and well-defended place, tanks of course can not play a decisive part in long street battles; under such circumstances they can not compete with infantry which has heavy cannon at its disposal.

Of course, this does not mean that tanks do not have anything to do on the streets of large cities. In the formation of German assault detachments they are generally used in smaller groups or as individual tanks. The main mass of tanks is generally used at the entrances to towns, for crushing enemy groups and for encircling them.

The Germans do not abandon any town or village without a battle. When it happens that they begin to withdraw quickly from some place, this means that at the approaches to the place in question they have suffered heavy losses or that they fear complete encirclement.

In the case of a populated center the depth of the encircling movement always depends on concrete conditions. In any case we must try to surround the city with its fortified belt. After sensing the possibility of encirclement and failing to beat off attacks, the Germans try to withdraw their main forces from the city in order to avoid a decisive defeat. Hence, in attacks against certain towns and when encircling operations are undertaken, it is important that we occupy simultaneously all the roads leading away from them. In these cases we can very well make use of tanks with motorized infantry and artillery. In no cases should tanks be left on the streets: it is much more important that the enemy be deprived of the possibility of either entering the town or leaving it. Large tank detachments, reinforced with a suitable number of infantrymen, execute a deep encirclement of the town, preventing the approach of enemy reserves and destroying all operational liaison between the town's garrison and the troops which are operating outside.

When it is a question of surrounding and capturing some town or village, and the tanks penetrate into the rear of the enemy, they must immediately try to enter the place. If they do not succeed, they must then occupy all the approaches and roads and hold them until the main forces come up.

Under favorable circumstances—that is, when a successful advance is being made over the whole front—tanks may occupy a town independently. In such cases one should try to have the infantry brought up as soon as possible and relieve the tanks for further maneuvers. As we know, the mission of tanks consists least of all in the guarding of captured positions. They carry out such a mission only in case of necessity and until the arrival of the infantry.

EXPLOITING THE MOBILITY OF TANKS

Even in this war we have battles without great mobility, but they are on a small scale. War of movement has now become the prevailing kind. At the beginning of this war line tactics were used, but they soon gave way almost entirely to tactics of maneuver. Tanks, with their speed and power, can convert a tactical success into an operational one, while this is impossible in the tactics of line fighting—and this is the chief defect of the latter.

In studying the various failures or incomplete offensive operation, we always find the same picture. Up to a certain point the advance goes along well. The front part of the enemy defenses is broken, the advancing infantry breaks through for several kilometers—but the offensive weakens, the advance slows up and later stops entirely. Finally comes the retreat under pressure of enemy reserves or, under the most
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favorable circumstances, the attackers maintain themselves on a newly fortified line. These are the characteristics of line tactics. For them we have a complete explanation, but shall discuss only that which is connected with the question of exploiting tank mobility.

According to line tactics the forces and means are disposed over the whole front. The advance is frontal, and we maintain a strict arrangement of the units along the front. If one unit pushes ahead it stops and waits until the adjacent units get even with it. In this way we of course lessen the rate of advance and give the enemy time to maneuver his reserves. Then too, in case the linear advance makes a breakthrough into the enemy defenses to tactical depth, the commander does not have at his disposal enough mobile means to develop the tactical success into an operational one, because he has already used them at the beginning over the whole front in an effort to achieve a tactical success.

In advance there is one moment when we must pass from a methodical advance to a fast maneuver. Experience has shown that during this transition only fast, mobile units are suitable, and among these the tank units occupy first place. For this reason tank maneuver into the depths of the defense is of prime importance.

What do we need for this purpose? Above all, we need large groups of tank forces to send out in the decisive directions. The time of fighting with small tank groups is past. Concentrations of these forces are being used more and more, and efforts are being made to increase their size. Tanks have become the decisive means for achieving operational successes.

The depth of a tank maneuver will depend directly upon the strength of the group. It has been found that a small group of tanks exhausts itself before it can seize important points in the operational depths of the enemy defenses; and if the group is able to capture such points it is not able to fight a decisive battle with enemy reserves. Thus, the operation may be condemned to failure before it is completed. A tank group which makes a deep thrust must be sufficiently strong to fight its way for several hundred kilometers and, after all losses sustained, be strong enough to complete the operation.

Under present day conditions of warfare, tank maneuver along the front has become important. The center of battle is quickly transferred from one sector to another, attack at one point is shifted to another, and a sudden attack of small groups is converted into an attack of large groups. One of the chief

missions of tank maneuver is to feel out weak places in the enemy disposition.

The fact is that one can not be strong everywhere, but if we exploit to the fullest extent the great mobility of tanks and motorized infantry and are able to move along the front quickly, then we shall be able to strengthen any place quickly.

Today the fronts having a length of 1,000 km. are held chiefly by means of mechanized forces and aviation. For deep tank maneuver it is very important that the forces and means be properly distributed at the time of penetration of enemy defenses and during the development of this penetration. In practice we have the following cases:

1. The chief mass of tanks is used with the infantry in order to break through the defenses, and for the development of the breakthrough nothing is left. Result: the breakthrough is effected but remains undeveloped, and as a result of this the offensive is not carried to the end.

2. All the mobile means for reinforcement are kept in reserve. The infantry penetrates the enemy defenses with its own means. Result: the action on the line of penetration slows up; the mobile means are used only in part, but when the breakthrough finally comes there are still not enough tanks to exploit it.

We must exercise great care in the grouping of tanks. One group provides direct support for the infantry and another group exploits the gains. The first group must be sufficiently strong, with the other means of reinforcement, to protect the advance of the infantry over all the tactical depth of the enemy defenses. But this must not be to the prejudice of the other group, whose mission it is to exploit the gains, but it must be at the expense of other smaller and less important sectors.

If the front is passive—that is, if no other arm is in the action with the tanks, the operation is reduced to what is called a raid, and the tanks return. The losses which the tanks can inflict upon the enemy on such occasions are not sufficient. For such raids to be successful the tanks must be accompanied by units of other arms.

In this manner the Red Army distinguished itself by actions in the area of Stalingrad, on the Don, and in the south. Here there was complete harmony of action between the tank detachments which penetrated into the rear of the enemy and the units which advanced along the front. In this way the offensive operations were carried out at a rapid pace, and it was impossible for the enemy to isolate the separate tank groups.

WHO'S TOUGH NOW?

In recent months the infantry has staked out great claims to ruggedness. No one disputes their ability to take it and to dish it out—but the fact remains that it is a *field artilleryman* who holds the record for hiking 25 miles in minimum time! Dressed for combat and carrying a full field pack with carbine and steel helmet, PFC Ruben Meyer (of Serv Btry, 3d Armd FA Bn, 9th Armd Div) covered that distance in 4 hours, 34 minutes, 24 seconds—walking only on unpaved roads, trails, and shoulders of roads.

Starting at 4 AM on 3 Jun 44, Meyer covered the first 7 miles in the remarkable time of one hour flat. Although he seemed to weaken as the long grind progressed, he was able to run the last 2 miles to set the new record. At the finish line Meyer was greeted in front of 9th Armd Div Hq by a band, as well as by a large and enthusiastic crowd of all ranks.

He was accompanied on his jaunt by his battalion commander, Lt. Col. George Ruhlen, who paced him in a jeep. Capt. Charles E. Plath, Camp Polk Special Service Officer, was the official timer; he certified that Meyer's equipment was standard and complete, to include K ration.

FIELD ARTILLERY INTELLIGENCE

By Col. Charles A. Pyle, FA

Field artillery, in order to accomplish effectively its mission of support, must have definite targets at which to shoot. The primary role of artillery intelligence is to locate those specific targets whose destruction or neutralization will best help the supported unit. Good artillery targets—like gold, heaven, or education—are not obtained without effort: they require sweat, search, and struggle. *Artillery intelligence personnel are the target getters for our cannon. The effectiveness of the ammunition expended is in direct proportion to the number and accuracy of the location of targets.*

ORGANIZATION OF ARTILLERY INTELLIGENCE

Every artilleryman is concerned with artillery intelligence—getting dividend paying targets; and with counterintelligence—concealing our own dispositions and maneuver. Tables of Organization of battalion and higher headquarters provide for an S-2 and one or more assistants whose primary function is to assist their commanders in artillery intelligence. Separate intelligence sections or platoons are not provided, but certain individuals in operations platoons are designated for intelligence duties. *Many individuals not so designated in T/Os, such as liaison personnel, forward observers, observers at battery and battalion OPs, air observers, sound and flash units, etc., occupy key positions in the far-flung scheme of target-getting artillery intelligence.*

INTELLIGENCE FOR CLOSE SUPPORT MISSIONS

Close and continuous support of infantry (cavalry, tanks) can be accomplished effectively only by neutralizing or destroying those targets which directly interfere with the advance of the supported unit. This requires that artillery fire be directed at those specific spots from which resistance is coming or is likely to come; there are never enough firing batteries, ammunition, and time to "sweep the prairie"; artillery fire delivered where the enemy "ain't" is largely wasted. Artillery intelligence must use every means—ground observers, air observers, exhaustive study of maps and photographs, information from higher, supported, and adjacent units, etc.—to spot those hostile installations or suspected locations which, if destroyed or neutralized, will help our supported comrades to accomplish their mission.

The cornerstone of close support is the artillery direct support battalion. Commanders of direct support battalions by close contact with the supported unit keep informed as to what the infantry is doing and what they are going to do. Artillery fire plans are made jointly and in conjunction with infantry fire and maneuver plans; there is in effect but one fire plan—a joint infantry-artillery fire plan. Sometimes artillery fires are kept coordinated with infantry effort by means of a time

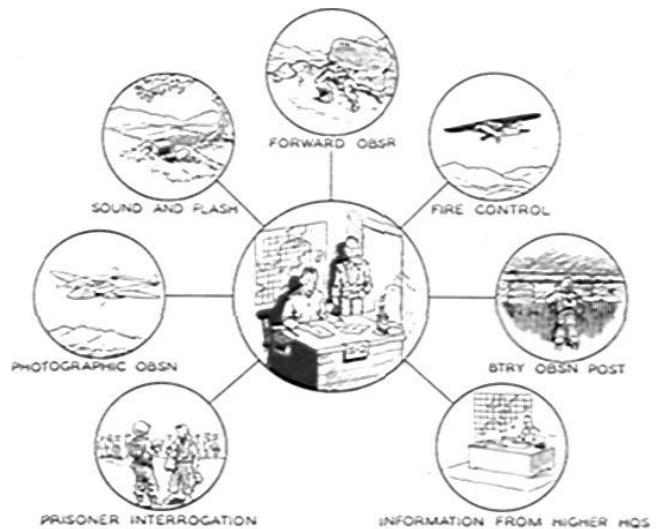


Figure 2.—S-2, the Artillery Target-Getter, and his sources of target location and target verification.



Figure 1.—How many possible artillery targets can you identify on this air photo of a combat area? Test your ability as an S-2, then turn to page 660 for marked photo showing targets.

schedule, for example, during the preparation or during the early stages of an attack; usually, however, artillery fires are delivered on call from the supported unit. In either case, artillery intelligence agencies furnish artillery commanders with the dope regarding location and suspected location of targets on which to base recommendations as to how artillery fire should be used to support infantry maneuver.

Although artillery direct support battalions are the principal link with the supported unit, they do not carry the load unaided: all artillery assists in this all-important job. General support battalions reinforce the fires of direct support battalions on call. Those with reinforcing missions answer calls for fire directly from those units whose fires they have the mission of reinforcing, others receive such missions through division or corps artillery fire-direction centers. Division artillery commanders augment direct support battalions by attaching additional forward observer parties from general support battalions; *they maneuver observation to insure that all the battlefield is kept under close surveillance*; they fight for map and photograph coverage; they keep artillery intelligence

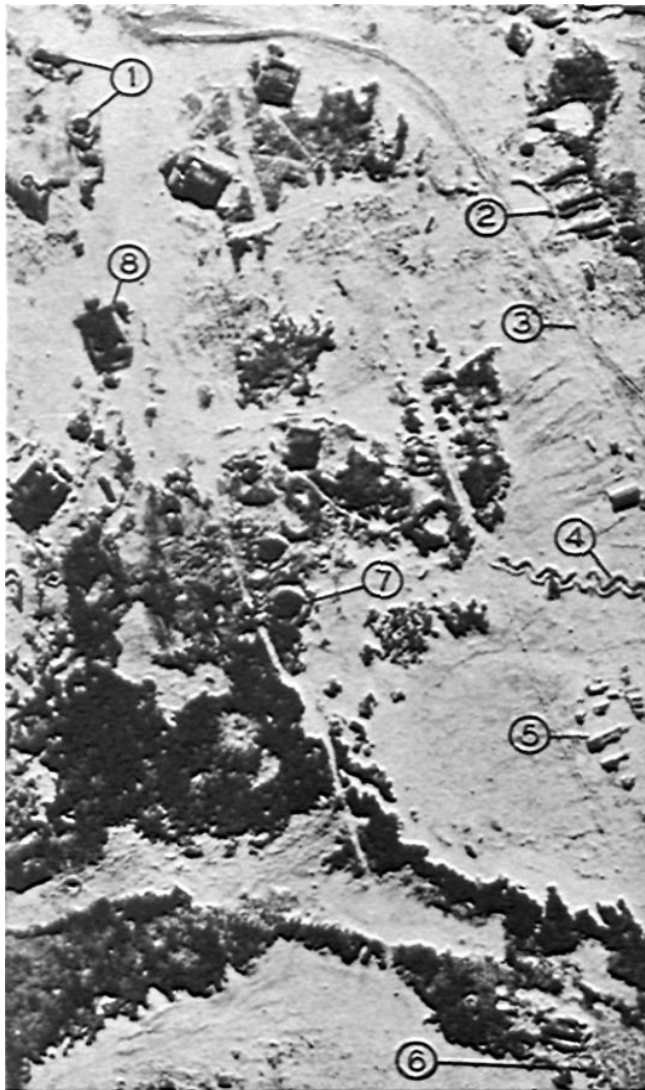


Figure 3.—Scale: approximately 1/3100. Key: (1) occupied heavy AA gun emplacement; (2) caves (possibly supply storage); (3) prominent road; (4) trench; (5) supplies piled on the ground; (6) large foxholes; (7) new, unoccupied gun positions; (8) prominent building.

flowing up, down, and laterally. Thus all artillery, both division and corps, may be placed on those specific spots where it will do the most good—where it will help the infantry forward.

COUNTERBATTERY INTELLIGENCE

Hostile artillery may interfere with our success either by fire on our supported troops or by reducing the effectiveness of our own artillery fire. It must be destroyed or neutralized. Neutralizing *located* hostile artillery within range is relatively easy; locating it is difficult. Counterbattery, therefore, is primarily an intelligence (a target-getting) problem. Sound and flash ranging, aerial photographs, shell reports, ground and air observers—all are important aids in counterbattery intelligence.

Since hostile artillery can fire over a wide front, intelligence concerning any one hostile battery may be obtained from several divisions. Our observation battalions (sound and flash) may operate over several division fronts. Counterbattery intelligence is therefore usually reported to and evaluated at the corps artillery FDC and from there disseminated to all interested units; the corps artillery FDC is thus the nerve center of counterbattery intelligence. This does not mean, however, that the corps artillery alone is responsible for counterbattery intelligence: all units, supporting as well as supported, must assist by prompt reports of enemy shelling, located hostile batteries, suspected locations, etc.

INTELLIGENCE FOR LONG RANGE TARGETS

In addition to close support and counterbattery, artillery destroys hostile installations and executes harassing and interdiction fires deep in hostile territory. These missions also must be kept in conformity with the plans of the supported unit. Targets are attacked that will play the greatest havoc to enemy maneuver. Intelligence concerning such missions are based largely on study of aerial photographs and maps and reports by air observers. Artillery intelligence personnel, working closely with division and corps G-2 sections, must submit recommendations as to where and when such artillery missions should be executed.

DISSEMINATION OF INTELLIGENCE

Intelligence stored in files is useless. It must be published to be of value. Battles in this war have been lost for lack of information that was available in nearby units. *Pass on your dope—up, down, laterally.*

Timely information scribbled on toilet paper helps win the war; out of date information, even though polished and typewritten, merely clutters up communication channels. *Do not hold information until you can write a literary masterpiece; get it out to "them what can use it"!* Feeding information to good artillery intelligence officers is like feeding milk to a sick baby—it only stays in a little while before it is disgorged again in still recognizable but digested form.

Intelligence gathered by artillery agencies is not used solely by the artillery: it is used by all arms and all commanders. There can never be enough information. Artillery observation covers the entire battlefield. Artillery communication systems provide a means of getting information back. Whenever they are not required for fire commands these channels must be kept "hot" passing back information of both the enemy and our own troops.

TANK DESTROYER COORDINATION

By Lt.-Col. G. D. W. Court, M. C., R. A.

Everybody has heard of this subject but many do not know just what it means when it is boiled down to its essential qualities, nor do they know how to attain it. To shed light on those points is the purpose of these remarks.

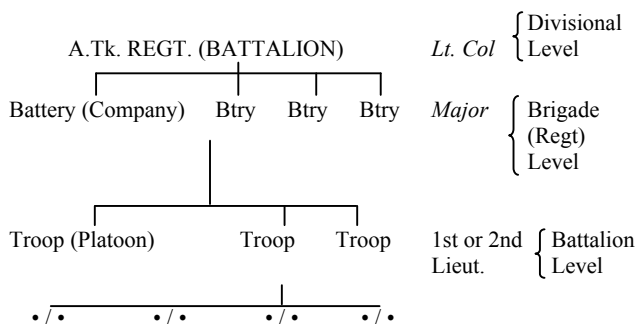
Information about the other arms in the area in which the unit is operating must be included in the tactical orders, by whomever is giving them. The initial responsibility for this rests, of course, on the battalion commander. If any commander in the chain of authority does not receive this information, then he must do everything within his power to find out; this applies principally to the dispositions of the unit supported, and as far as TDs are concerned, especially to the infantry antitank. A subordinate commander of whatever rank who is placed in this position must remember to disseminate his information back to his senior commander, as well as pass it forward to his own officers.

The Division Artillery Officer is usually responsible for all antitank defense in the division sector. The Tank Destroyer Commander may assist him as the coordinator of all antitank means within his area. This means that the coordination of the following is his responsibility:

- a. minefield dispositions
- b. obstacles
- c. infantry antitank
- d. tank destroyers

The result of all this must be *no gaps*, and *no unnecessary duplication of effort*.

It might be of interest to see how this problem is tackled in the British Army, where each division has one organic antitank regiment (TD Bn). The following diagram illustrates the antitank battalion organization and the level at which the various sub-unit commanders normally work.



The principle is that the local antitank commander is the supreme antitank authority within his own area, whether he be lieutenant colonel, major, or lieutenant.

The divisional antitank battalion commander is responsible to the division commander for coordination of antitank in all its forms—guns, mines, obstacles both natural and artificial. The divisional engineers' commander (also a lieutenant colonel) is *inter alia* the minefield *technical* expert, but it is the antitank commander who "ties up" the minefield and antitank gun layout.

The same thing applies on a lower level. The battery (company) commander generally works with the brigade (regiment). If it is an independent brigade, he is virtually in the

same position as his colonel is within the division. If the BC is working under command of a brigade as part of a division, he refers to his own colonel any points which he cannot settle himself with the brigade staff and with the senior engineer officer within the brigade—generally the engineer major commanding a company.

This is how it works out in practice:

(a) The antitank troop (platoon) commander reconnoiters his platoon area and sites his guns. He establishes close liaison with the local infantry in his area and probably shares his reconnaissance with their commander. Normally he then attends his battery (company) commander's coordinating conference, at which he reports on the situation in his own area and brings up the subject of obstacles in general and minefields in particular. He may not be able to add to the battery commander's existing knowledge of the area, but generally he can—as of course he sees his area in more detail. If there is no coordinating conference he must contact his battery commander.

(b) The antitank battery commander is thus fully acquainted with his area in detail. He can now report on the situation at his brigadier's conference, where he will also meet the senior engineer officer in the brigade. Here they all "get together" and the BC will report results to his own colonel.

(c) Meanwhile the antitank regimental (battalion) commander "ties up" loose ends and ensures coordination of everything antitank between the brigades (regiments) of the division. He should also ensure that the division is coordinated with its neighbors (if any). He gets his information from

- (1) Personal reconnaissance (he generally accompanies the DivComdr)
- (2) The divisional staff, with whom he maintains a very close liaison, siting his HQ close to Div HQ.
- (3) His own battery commanders, whom he visits very frequently and who keep him fully "in the picture."

It is emphasized that this is all done on a divisional basis. The antitank battalion is an integral part of the division and has trained together with the other troops in the division—played together and fought together, too. They all know each other and understand each other's personalities and opinions. This results in all commanders' knowing their opposite numbers, and within a brigade even the enlisted men know each other.

(d) Finally the principle again: The local antitank commander is the supreme coordinator in his own area.

What does coordination mean? Reduced to its essential terms, it means

- Mutual support* for all guns;
- Interlocking fire* for all guns;
- The blocking* of every avenue of approach for tanks; also
- Adequate infantry protection* for the guns, with coordination between them and the TDs' security;
- Information* as to the plan of the armored forces working in or near that area; and
- Mine fields* located to deny to tanks avenues of approach which cannot be effectively covered by guns.

bottom concurrently with commanders higher up the scale of seniority.

a. When the platoon commander assigns gun positions to his platoon he is particular to designate with detailed accuracy the right and left boundaries and range of the primary field of fire. He is also careful to indicate to the gun commander the positions of the other guns in the platoon, and not only which guns are covering him but also which guns he must cover in his turn.

b. Having done this the platoon commander checks that there are no gaps between his platoon and its neighbors.

c. Meanwhile, if any gun commander has not got the information set out in *a* above, he will go out and find out—and in any case, all gun commanders should check for themselves.

d. When the platoon commander is satisfied as to *b* above,

he will go 'round his platoon area and ensure that the gun commanders have done their jobs thoroughly.

e. In the same way the company commander gives each platoon commander information about the other platoons affecting his area, and then goes off to ensure that there are no gaps between his company and the other companies. Platoon commanders find out for themselves if they are not told—and in any case they check on their company commanders.

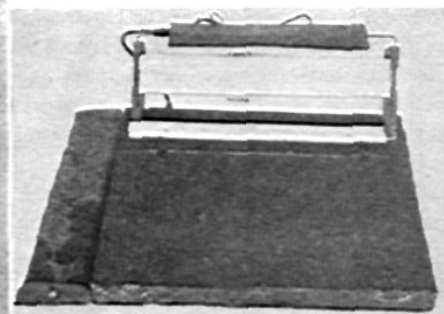
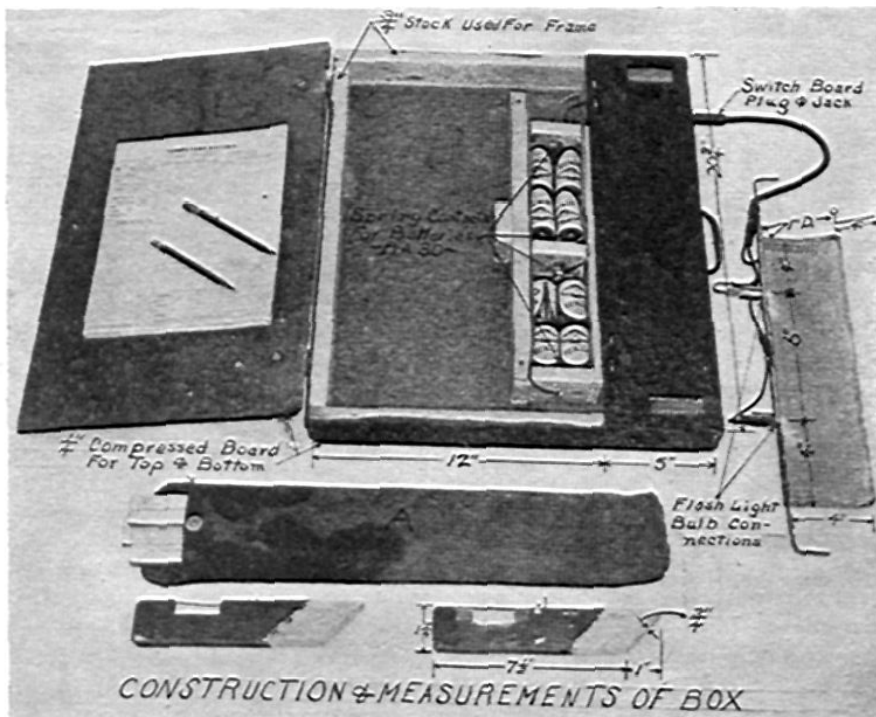
f. And so it goes on; check and countercheck.

Without the most meticulous attention to detail as outlined above it is not possible to guarantee a good job, and commanders should never be satisfied, checking dispositions and arrangements daily and seeing that the latest information as to enemy and friendly troops (both the larger and the local situations) is passed on to their troops. This is important before, during, and after any battle.

AN ALL-AROUND AID FOR THE COMPUTER

By T/4 A. Stanczyk

The amount of equipment the computer has to carry is quite a load, so why not make it as easy as possible to carry all the smaller articles, such as computer pads, pencils and clips, and graphical firing tables? He needs a table or desk of some sort, which our "Computer's Box" furnishes as well. For night firing, when the computers have to be dispersed in foxholes, the night light with the battery pack is very convenient. During months of maneuvers under all types of conditions and terrain, a few changes were made; combat polished the outfit. Here it is, for other units to adopt if they wish. Several organizations have already done so, and they agreed that it is "the thing" for the best advantage of the computer.



Not in the BOOK

SIMPLIFIED USE OF MAP TEMPLATE, M-1

One battalion and more recently all battalions of our Division Artillery discovered that the "secret hole" method of using the map template M1 is simpler than that method described in TB 21-25-1.

The code group for the origin or secret hole is changed at least daily. This code group consists of a letter followed by numbers up to 100, such as M-1, B-24, P-38, M-7, A-20, V-8, etc. A base line is not used. The template is oriented on the map or photo by paralleling the X-line of the template with that of the photo or map.

Let us assume that the code group for the secret hole has been disseminated to the command as B-24. A forward observer desires to send his location using his template. He lays his template on Special Map A so that the secret hole B-24 falls on the intersection of Y-line 1165 and X-line 924. He then orients the template on the grid line. The forward observer's map location, let us say, falls under hole X-98 of the template. The following message will designate his position to anyone familiar with the "secret hole" code group: "My location, reference Special Map A, 1/20,000, 65.0—24.0, X-98." The S-2 at the CP places B-24 on the grid intersection 65.0—24.0, orients the template, sticks a pin through hole X-98, and has the location of the observer on his map.

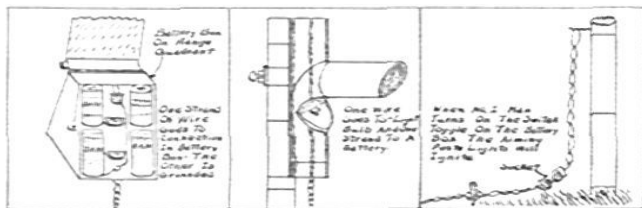
MAJ. D. S. HULL, FA

A FIELD NECESSITY

Imagine yourself a battery executive who, some dark night, is called on to fire defensive concentration B-25-K. You alert your sections but something seems to be holding up the operations. Your chiefs of section report, "We are lighting our aiming post lights."

To the average artilleryman this delay is short, but to the infantry, which needs the help, it is interminable. In the positions in which we have found ourselves no delay could be tolerated as at times it might be disastrous.

We immediately set out to remedy this situation. The problem went to the Chiefs of Section and each responded with a system. We chose the most feasible plan and adopted it for permanent use—or at least till



a better one is devised. This is the diagram of our set-up. This simple system enables us to turn on our aiming post lights without leaving the gun pit. Thereby we are able to give speedier support to our infantry.

Our plan was devised during a defensive position but it will also work in offensive positions merely by using a socket (as shown in diagram) at the base of the aiming post so that the wire can readily be rolled up and fastened on the range quadrant.

LT. PETER J. BOYLE, FA

ESTIMATING RANGE

For amusement I have used this for many years—but it has practical value too. It might be called "estimating range in a wink!"

Hold up one finger at arm's length and look past it to the target with one eye closed. Open the other eye and close the first eye, noting the new point near the target as seen past the finger. Multiply the estimated distance, at the target, by 10. This will give the range. Try it and see.

You can make this method very accurate by certain refinements. For example, take your interpupillary distance (as measured by the medico or your field glasses) and multiply it by 10. Take a string or stick that length and practice holding your finger at that distance from your eye.

EDITOR'S NOTE: This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.

That fixes the small triangle. Now practice yourself in studying the terrain so as to make a good estimation of the subtended distance at the target. When you master the latter you have a good way to get the range "in a wink!"

As a corollary to this—if a forward observer knows his OT range, he has a method of laying a scale on the terrain. The subtended distance is 1/10 of the range.

COL. H. CRAMPTON JONES, FA

A JUNGLE ORIENTATION PROBLEM

SITUATION: Late in the afternoon an artillery battalion receives hurry-up orders to displace to an advanced position to support an infantry attack early the next morning. The position in question is an old one and coordinates of the emplacements are known, but there is no data available on orientation. During the displacement, "A" Btry arrives promptly and registers on the base point in twilight, but "B" and "C" are delayed by a traffic jam and arrive after dark. Batteries are separated from each other in deep draws and there is no point from which the Survey Officer can see more than one battery at a time. There has been no time for daylight survey and night survey through jungle is unpromising. "B" and "C" Btrys cannot register because of darkness.

REQUIRED: The plan of the Battalion Survey Officer to establish direction for "B" and "C" Btrys.

SOLUTION: All three firing batteries were set up on a conference telephone call. A bright star to the front was identified by all hands. The gunner of "A" Btry's base piece (which had registered) was instructed to leave his tube laid on the base line and to track the star with his sight only. The gunners of "B" and "C" Btrys were told to zero their sights and track the star by traversing their pieces. Over the conference telephone set-up the Survey Officer gave the command *Commence tracking*, and after having allowed sufficient time to get on the star, he commanded *Stand by* and *Mark!* All stopped on the last command and reported that they had good "shots."

The gunner of the registering piece (whose sight only had followed the star) read the deflection where he ceased tracking. The howitzers of "B" and "C" Btrys were now all parallel with the registering howitzer's line of sight. It remained only to shift them by the amount of the deflection read on the sight of the registering piece, and all howitzers in the battalion were parallel. Since the coordinates of all base pieces were known, the rest was "duck soup."

P.S.: This was the problem which faced a Marine artillery battalion on Guadalcanal, and the solution adopted. The battalion commander crossed his fingers, and it worked!

LT. COL. M. L. CURRY, USMC

COMP SITE—FAST

To facilitate the proper inclusion of "comp site" by the VCO in the FDC without waste of time, the following method works fine.

For the charge being used, and at the ranges being fired, the "comp site" factor is obtained from the firing tables for each 500 yds. These factors are then divided into 1. The resulting figure (taken to the nearest whole number) indicates the number of mils of site which will require one full mil of "comp site;" it is referred to as "1 on [so many]."

For example, the comp site factor for the 105-how, charge 5, range 5500, is .12. Dividing this into 1 yields 8. This figure is put on the VCO's fan opposite the appropriate range, just as the deflection correction is placed on the HCO's fan. Now the VCO knows *at a glance* that at that range he must "throw in" 1^m of comp site for every 8^m of site.

In using an off-scale chart the "one-on" figure can be entered opposite the equivalent chart range.

VCO can prepare in advance his "one-on" figures for appropriate ranges, keeping them in his notebook for quick transferral to his fan.

LT. THOMAS B. MAIER, FA

Diary of War Events

(As Reported in the American Press: Edited by M. K. W.)

JULY, 1944

- 1st 15,000 Danish patriots man barricades, demonstrate against German garrison.
- 2nd More than 500 Fortresses and Liberators drop 1,500 tons of bombs on flying-bomb emplacements in France; Allied planes from Italy strike oil refineries, rail yards, and industrial targets near Budapest, in Hungary, and in Yugoslavia. 21 enemy planes shot down.
- Allied planes pour 230 tons of bombs on Numfor Island off northeast coast of New Guinea.
- 3rd 5th Army captures Sienna.
- Some 750 Liberators and Fortresses from Italy smash Balkan oil facilities.
- Kamiri airfield on Numfor Island seized.
- 4th Canadians capture Carpiquet, 1½ miles from Caen.
- Americans capture Garapan and Tanapag on Saipan.
- Carrier planes attack Iwo in Volcano Group, destroying or damaging 79 Jap planes.
- British capture Ukhrul in India.
- 5th U.S. troops capture railroad station at La Haye du Puits.
- Americans capture Kornasoren airfield on Numfor Island.
- Chinese in Yunnan capture Chanhsi.
- 6th 8th Air Force bombers and fighters attack flying-bomb sites in Pas-de-Calais.
- 7th Japan's huge steel center (Yawata) and naval base (Sasebo) bombed again by Superfortresses.
- In air battle near Leipzig Germans lose 114 planes. We lose 36 bombers and 6 pursuit planes.
- British storm into Caen, U.S. troops seize St. Jean de Daye.
- 8th Chinese seize Liling, rail junction at Hengyang.
- 9th Caen and La Haye du Puits in France, Lida in Poland, and island of Saipan under Allied control.
- 10th British and Canadians capture Eterville and Maltot. U.S. troops liberate Sainteny.
- 11th 1,100 escorted Fortresses and Liberators attack Munich. We lose 20 bombers and 2 fighters.
- Chinese recapture Yungfeng in Hunan Province.
- 13th Brig. Gen. Theodore Roosevelt dies in France of a heart attack. 5th Army in Italy captures Laiatico.
- 14th In Italy U.S. troops capture San Luce, French capture Poggibonsi.
- U.S. carrier planes again bomb Guam and Rota Islands.
- 15th 750 heavy bombers blast Ploesti refineries.
- 16th 1,000 Fortresses and Liberators pound Munich and Saarbruecken. Escorting fighters shoot up rail lines around Luneville, France.
- 8th Army captures Arezzo.
- Chinese capture Sumkrung in Burma.
- 19th Allied troops capture Ancona and Leghorn.
- Entire Tojo Cabinet resigns.
- 20th Americans land on Guam.
- An almost successful attempt on Hitler's life is reported.
- 21st Canadians seize St. Andre-sur-Orne and St. Martin-de-Fontenay, near Caen.
- 22nd British-Canadian troops capture Maltot and Etavaux.
- 500 American planes from Italy blast Ploesti.
- 23rd British drive Germans out of Emieville, 6 miles southeast of Caen.
- A British-Greek Commando force lands on Dodecanese island of Symi, scales 500-foot cliffs in the darkness, and kills or captures entire German garrison.
- Americans on Guam capture Cabras Island, town of Piti, virtually isolate Orate Peninsula.
- 1st fighter shuttle flight from Italy to Russia ends with arrival of Lightnings and Mustangs of the 15th Air Force at a Soviet base.
- 24th R.A.F. strikes Kiel naval base with 3,000 tons of bombs.
- 8th Army captures Terranuova.
- 25th Lt. Gen. Lesley J. McNair killed at Normandy front.
- 26th Americans push Germans back at St. Gilles and Marginy.
- Germans recapture Everecy, Esquay, and several hill positions.
- R.A.F. heavy bombers drop fire bombs and block-busters on Stuttgart, hit Berlin and Bremen, smash a synthetic oil plant in the Ruhr.
- 27th Armored and infantry forces blast Germans from their positions in Lessay area.
- Allied Eastern Fleet successfully raids Jap naval base at Sabang, Sumatra.
- 28th Many Germans trapped in Normandy as U.S. armored columns from Periers and Marginy poin near Countances.
- 29th Americans on Guam capture former Marine barracks on Orote Peninsula.
- 30th German Elite Guard troops in Caumont area surrender to Americans.
- Allied planes draw closer to Philippines, strafe and bomb Halmahera.
- 31st Entire Normandy peninsula in our hands, with capture of Avranches.



For Heroism and Service



SOLDIER'S MEDAL

T/5 ROBERT E. AVEY: At West Fork Creek, Camp Campbell, Ky., on 27 Mar 44, a weapons carrier, attempting to ford the creek, overturned and submerged in deep water, throwing twelve enlisted men into the stream where they were in danger of drowning. At the risk of his life he entered the cold, deep, and swift-running water, seized and pulled to safety a struggling soldier. Diving back into the stream he swam to the aid of another man, towed him to shore, and although virtually exhausted by his efforts, clung to an overhanging tree limb until he and his unconscious companion were assisted to the top of the bank by his battery mates. Address, 14, 907 Forrer St., Detroit, Mich.

T/5 FRANK B. FORD: At West Fork Creek, Camp Campbell, Ky., on 27 Mar 44, a weapons carrier, attempting to ford the stream, overturned and submerged, throwing twelve enlisted men into the water where they were in danger of drowning. He swam toward the farthest of three men well out from shore but before he could reach him the soldier sank. He dived beneath the surface in an unsuccessful effort to locate him. The other two men by this time were swept beyond his reach. In the swift, deep water, hampered by his clothing, he risked his life in attempting to rescue his comrades from drowning. Address, 1244 Columbine St., Denver, Colo.

CPL. CLARENCE I. KUNTZ: On 27 Mar 44, at West Fork Creek, Camp Campbell, Ky., a weapons carrier, attempting to ford the creek, overturned and submerged in deep water, throwing twelve enlisted men into the stream where they were in danger of drowning. At the risk of his life he dived into the deep, cold, and swift running water and brought one soldier to safety after locating him beneath the surface. He then dived again and again in an unsuccessful effort to reach the submerged truck to attempt the rescue of other men. Address, 2133 Abington Rd., Cleveland, Ohio.

PFC. NICK E. LANGLEY: On 27 Mar 44, at West Fork Creek, Camp Campbell, Ky., a weapons carrier, attempting to ford the creek, overturned and submerged, throwing twelve enlisted men into the stream where they were in danger of drowning. At the risk of his life he dived into the deep, cold, and swift running water, swam to where he had seen a man sink, and diving again from the surface, found the soldier, towed him to shore, and with the aid of another soldier administered effective resuscitation. Address, 905 David St., Henderson, N. C.

BRONZE STAR (Posthumously)

T/3 JOHN A. BUSHEMI, for heroic achievement in connection with military operations against the enemy as a photographer for *Yank* Magazine. He accompanied task forces during the campaigns in the northern Solomon Islands, the Gilbert Islands, and the Marshall Islands, operating alone and without supervision. By his personal bravery, initiative and professional ability he produced photographs of such technical excellence and high quality that they attracted wide praise and admiration. The armed services have gained materially by these candid portrayals of the fighting foot soldier. In order to accomplish his task he voluntarily chose the most dangerous phases of attacks. He thus obtained superior combat photographs. During his continuous and rigorous service, with front-line units, he sacrificed his own safety to preserve the soldiers' great deeds for historical record. Reported killed in action 19 Feb 44, at Eniwetok Atoll, Marshall Islands. Next of kin: Peter Bushemi, 3500 Conn. St., Gary, Ind.

BRONZE STAR

CAPT. RAY C. HARRIS, for meritorious achievement from 2 Sep to 18 Dec 43, in the Central Pacific Area. Address, Glendale, Calif.

M/SGT. MANUEL S. MALDONADO, for achievement as Operations Sergeant for Headquarters, 7th Infantry Division Artillery from 15 Sep 42 to 1 Mar 44. During the attack on Kwajalein Island he displayed marked initiative in supervising the operation of the division artillery command post. His work in preparing overlays and coordinates for scheduled fires on Kwajalein Island was exceptionally well executed and greatly aided the five field artillery battalions to deliver their prepared fire with a minimum of difficulty. Under his careful direction a complete file of situation maps was kept and a superior unit journal was compiled. Address, 1945 E. Adams St., Phoenix, Ariz.

* * *

For service in Sicily with the Seventh Army and in Italy with the Fifth Army:

Air Medal with 2 Oak Leaf Clusters

LT. OLIVER P. BOARD, 609 E. Leland Ave., Chevy Chase, Md.

Air Medal (Posthumously)

LT. JOEL PADAWER. Next of kin: Mrs. Shelia P. Goldman, sister, 290 Brooklyn Ave., Brooklyn, New York.

Air Medal

LT. DIKRAN BARRONIAN, 308 Orchard St., Belmont, Mass.
S/SGT. LEONARD R. BENNIS, 611 S. Wewoka Ave., Wewoka, Okla.
LT. HUBERT A. BOONE, 139 1st St., Coaldale, Penna.
S/SGT. JAMES BROWN, Montpelier, Idaho.
LT. ANTHONY CARARIE, Cloe, Penna.
LT. DONALD L. CLANCEY, 976 Berendo St., Los Angeles, Calif.
LT. EARLE I. COLEMAN, 1511 Alton Rd., Miami, Fla.
S/SGT. JAMES G. FRY, 407 N. 14th St., Frederick, Okla.
LT. WILLIAM H. HORTON, R.F.D. 5, Raleigh, N. C.
S/SGT. WILLIAM A. McCALLUM, 628 S. Marengo St., Pasadena, Calif.
S/SGT. ERNEST V. McCLELLAND, Lake Placid, Fla.
S/SGT. JAMES C. MOYER, 2140 N. Kate St., Waco, Tex.
S/SGT. WARREN T. RIES, 257 Harrison St., Elyria, Ohio.
LT. ALFRED W. SCHULTZ, 276 Prospect Blvd. Waterloo, Iowa.
LT. DAVID R. SHEPHERD, 22 Dorsey St., Greenville, S. C.
S/SGT. BYRON E. SHEPPARD, 2180 Cambridge St., Los Angeles, Calif.
LT. EDWARD R. SMARTT, R.F.D. 2, Lamar, Colo.
LT. JOSEPH B. STONE, 1221 Washington St., Denver, Colo.
LT. JOHN J. SUSKI, 20 Van Reypen St., Jersey City, N. Y.
LT. HAROLD V. TERRILL, 1605 Anthony St., Columbia, Mo.
LT. JAMES L. WEBER, 2219 E. Harrison St., Tacoma, Wash.
LT. MARVIN J. WEINBERG, 5424 Paseo St., Kansas City, Mo.

* * *

U.S.S.R. AWARDS

The following have been decorated by the President of the Union of Soviet Socialist Republics for their outstanding work as members of the Persian Gulf Command. The awards were made "for the successful performance of the mission of the Persian Gulf Command in the movement of arms, equipment, and food supplies for the Soviet Union, thus affording great assistance to the Red Army in its struggle with the Nazi German invaders."

LT. COL. DANIEL P. CAULKINS: Order of the Fatherland's War, First Class.

LT. COL. WILLIAM O. DARBY: Order of Kutozov, Third Degree.

LT. EDWIN F. GOLD: Order of the Red Star.

BOOK REVIEWS



LOOK AT THE WORLD: The "Fortune" Atlas for World Strategy. By Richard Edes Harrison; text by the Editors of Fortune. 67 pp. Alfred A. Knopf. \$3.50.

Unusually large page size allows Mr. Harrison's magnificent maps to have the treatment they need and deserve. In them the world's important sections are viewed from new and striking perspectives. These are described by the publisher as being "from the point of view of the air age"—but such a description is largely a catch-phrase to strike the public's fancy. The air approach is not unimportant, to be sure, but the significance of the Harrison technique goes far beyond such a relatively low-priority meaning: these maps emphasize the problems of world communication as a whole, international relations, military and naval strategy. Japan viewed from Alaska, for example, is a quite different appearing group of islands; new problems of reaching it appear, and some of the difficulties disappear. And a perspective of China drawn from a point high above Japan gives a new and enlightening conception.

In all, here are 33 pages of maps in full color and 11 pages of black-and-white maps. Most of the maps are perspective drawings, but some are orthographic or gnomonic projections. For each is some well-written text pointing up the particular purposes of the drawing. A 12-page index contains about 3,600 entries.

Such a portfolio is an excellent supplement to conventional maps. In no way, however, is it a substitute, as there is too much distortion of scale and, since the picture must be painted in rather broad strokes, not too many points can be shown. Some people may well feel that the pendulum is swinging too far from conventional cartography. That isn't quite true, especially if the purposes (strategic clarity) and limitations of this technique are kept in mind. As a graphic supplement to maps of standard type, to repeat, an atlas of this sort is invaluable.

PRELUDE TO SILENCE. By Arnold Brecht. 146 pages; index. Oxford University Press. \$2.00.

In this rather brief book Dr. Brecht gives a painstaking account of the incredible processes by which Germany was brought under the totalitarian rule of the Nazis. The author knows his subject from the inside. From the vantage point of his post in the German Civil Service he saw the new National Socialistic party develop insidiously into a formidable and irresponsible power threatening all civilization.

Hitler's rise to power within the framework of the legally constituted Weimar Republic has in it the quality of a curious political accident. It is the story of a country too beset with postwar problems fully to perceive the grave danger in the new party. By the time the seriousness of the threat was realized Hitler, through the most remarkable feats of cunning, had managed to insinuate himself, with technical legality, into a position of advantage. This, combined with Reich President Hindenburg's increasing senility and political ineptitude, led to involuntary collaboration with the despised fanatic. He soon rose in

power to a point in which he could enforce a demand for further authority under the Enabling Act.

Dr. Brecht's review of the successive steps leading to the usurper's incredible rise to power is at once an enlightening account and a pointed commentary, with internal application, on the axiom, "Eternal vigilance is the price of liberty."
F. E. J.

THE VIKING PORTABLE LIBRARY: DOROTHY PARKER. With an introduction by W. Somerset Maugham. 534 pp.; indexes. The Viking Press. \$2.00.

This is a honey of a book, any way you take it. Maybe I'm prejudiced, for I've always thought pretty well of Dorothy Parker's verse. But in this handy, pocket-sized anthology you have the cream of her short stories sandwiched in with the best of her poems. These latter have a penetrating wit all their own; those of Ogden Nash sometimes approach them, but Mrs. Parker's have a terse patness that hasn't yet been touched.

As for the stories—they are rounded, complete, and every one cuts right through to the nub of the thing. Usually they are full of humor; sometimes they are satiric; always they are readable.

This package is put out in a size and shape to fit pocket or musette bag. It is light enough to be no burden to carry around. The type is clear. In short, in every way this is a fine book for relaxation and enjoyment.

RUSSIA AND THE PEACE. By Bernard Pares. Index. The Macmillan Co. \$2.50.

Bernard Pares has been one of that small group of Englishmen who throughout history have been able to cut the ties which bind the majority, and make another country their home and their second love.

The author, since his early youth, has been studying, living with, and learning the Russian. Not the Russia of the tabloids nor the Russia that is depicted as a bloody beast ready to spread Communism throughout the world, but Russia as she lives and breathes in the hearts of the simple people who are Russia. Such has been the author's sincerity and fairness that he has been enabled to meet with the highest officials of the Soviet Republics. Sir Bernard has made in this book one of the most realistic appraisals of Russia that this reviewer has seen in a long time.

Bernard Pares's emphasis has been that the Russian people are Russia, and that as they are so shall they mold their leaders—in the long run. This is not meant to say that the officials governing Russia are not in complete control of the country. The thought is that the deep-rooted feelings and emotions of the people are being brought to light and acknowledged, even by the most ardent of the early followers of Lenin and Trotsky. The soul of Russia is re-emerging and its imprint is daily becoming more and more plain.

The author discusses Russia in its relations with the other countries of Europe, Germany, Poland, the Balkans, eastern Europe and England; Russia in its relations with the Far East, China, and Japan;

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and finally, Russia in its relations with the United States. Sir Bernard's conclusions relative to Russia and the peace are that peace or war can be nurtured and developed via Russia, the outcome depending upon her acceptance into the council of nations and the treatment she receives from the other Great Powers of the world.

The question of Russia will loom large in American foreign and domestic policy in the not too distant future. Obviously, Pares's inclination is to study Russia in terms of relation to England. The American problem is study Russia, not from English eyes, but from American eyes. The author's treatment of United States-Russian relations is not so full as could be wished, but he does present a fair and adequate case.

A. E. G.

EXPLOSIONS, THEIR ANATOMY AND DESTRUCTIVENESS. By Clark Shove Robinson. 85 pp.; index; illustrated. McGraw-Hill Book Co. \$1.50.

We're accustomed to finding out what makes things tick, but a good many artillerymen are not aware of the complex nature of the explosions their projectiles produce. In simple and understandable language Lt. Col. Robinson, late of the Department of Chemical Engineering, Massachusetts Institute of Technology, gives a good idea of them in a brief space.

His study of explosions is based on lectures given to the auditors of the Safety and Security Branch, Office of the Chief of Ordnance. Those have been somewhat expanded, to form a notable addition to the scanty literature on the subject. After discussing what an explosion is and how it starts, Col. Robinson traces the progress and results of detonation; goes into the missiles, earthwaves, and craters that result; describes the effect on structures of blast, missiles, and seismic disturbances; studies some notable accidental explosions; and draws some conclusions. Although he keeps his discussion in the layman's language, basic mathematical formulae are included for the benefit of those desiring to delve more deeply into specific problems of their own. A bibliography will help all types of readers.

UNFINISHED BUSINESS. By Stephen Bonsal. 291 pages; appendices; glossary; index. Doubleday, Doran & Co. \$3.00.

These extracts from Colonel Bonsal's notes and diary give us the inside story of the Peace Conference, 1918-1919. Col. Bonsal acted as President Wilson's interpreter. His notes were taken in secret sessions where no secretaries were allowed; he also made a point of talking with key men at the conference.

Col. Bonsal has been reluctant to release these notes, but he is now convinced that the unvarnished story of the failures last time may help us now. He is probably right. M. K. W.

THE OFFICER'S GUIDE. 533 pages; index; illustrated. Military Service Publishing Co. \$2.50.

INFANTRY DRILL REGULATIONS. 424 pages. Military Service Publishing Co. In paper, 50c; cloth-bound, 75c.

Two excellent perennials have again been freshened up with new editions.

The Officer's Guide needs no introduction. It actually has been revised much more often than the term "10th edition" indicates. An important addition to this latest revision is a chapter on "Going Home," which deals with army rights and obligations, benefits, social security, and administrative matters that the disabled veteran should know. Also, of course, the body of the book has been kept up to date, new matter superseding the old.

Infantry Drill Regulations, in pocket format, is now in its 11th edition. It covers Rifle Marksmanship (with Springfield and M1 rifles and the M1 carbine), Military Courtesy and Discipline, Interior Guard Duty, and the Infantry Pack and Equipment. Consequently it is a mighty handy reference to have around.

20TH CENTURY ENGINEERING. By C. H. S. Tupholme. 201 pp.; index. Philosophical Library. \$3.00.

This book offers to the average layman an interesting and useful look into the science of modern engineering. While the book covers many aspects of engineering, it is not a scientific text book. It is both stimulating and instructive to all would-be engineers who care to read it with a thought of improving their knowledge on many technicalities of engineering.

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THE WAR: FOURTH YEAR. By Edgar McInnis; introduction by Viscount Wavell. 375 pages; chronology; index; maps. Oxford University Press. \$2.50.

From Alamein to Salerno was a long, long way—but the Axis backtracked over that route in the space of a year. From the Volga to the Dnieper was even farther, when measured in blood, but the Russians covered that ground in the same period. At the beginning of that year Mussolini visited Africa, preparatory to a triumphal entry into Cairo; at its end the dictator had fallen, and the historic Quebec conference was just over. In the Solomons we had progressed from a precarious toe-hold on Guadalcanal to clear-cut victory on New Georgia. Instead of Port Moresby's being threatened, the Lae-Salamaua area had fallen.

Such was the broad sweep of this war's fourth year. At the time, many of its events were shrouded in secrecy. The rest were blown at us both hot and cold by stiff communiques and by conflicting despatches of reporters. From day to day the emphasis shifted from area to area, but the bombardment of news never ceased. Little wonder, then, that even quite intelligent people had trouble straightening events out in their minds. As for perspective—only the wisest and best informed could gain that!

Edgar McInnis, however, promptly began winnowing the wheat from the chaff, and organizing an account of events in logical sequence and proper balance. His series of annual summations are the clearest and most accurate statements of events that have yet appeared, and without doubt will remain as classics long after this war is ended.

CARDINAL OF SPAIN. By Simon Harcourt-Smith, 275 pages; bibliography; index; illustrated. Alfred A. Knopf. \$3.50.

This is the amazing story of an Italian who was born the son of an Italian gardener; joined the Church for a career; became confidante and secretary to the Duke of Vendome (one of Louis XIV's most renowned generals), queen maker, Prime Minister of Spain and War minister of Spain when it opposed a military coalition of nearly every state in Europe; and ended his days in the diplomatic service of the Vatican.

Alberoni's early years were not spectacular, but he did seem to have a knack of meeting certain personages at a time when these chance meetings could advance his career. The first most important of these meetings took place when he and a Bishop Roncoviere were sent by the Duchy of Parma as an unofficial delegation to the camp of the Duke of Vendome, then ready to invade certain sections of Italy. The delegation remained in the French camp for some time, and when the Duke of Vendome moved on with his armies, Alberoni went with him as secretary and confidante.

The career of the Abbe Alberoni is traced throughout the years he remained with Vendome, while the latter was both in favor and in disgrace with the court of Louis XIV. During one of the periods of Vendome's disfavor, Alberoni had another of those fatal meetings. This time it was with the Duke of Alba, the Spanish Ambassador to Louis XIV's court.

King of Spain during this time was Philip V, a grandson of Louis XIV. His reign over the turbulent Spaniards was marked by one misfortune after another, most of them due to the mis-rule of Spain by means of cumbersome Commissions, all staffed with Grandees and nobles of Spain, whose main concern was their privilege and prestige.

Alberoni, ever alive to opportunities, suggested to the Duke of Alba that Philip V would be best served were Vendome to come to Spain as Commander-in-Chief of the Spanish armies, and Alberoni to become the Prime Minister. The Spanish Ambassador was amenable to the idea and broached it to his Royal Master. Philip immediately began overtures to effect the suggestion. As Vendome at the time was in disfavor at the French court, the suggestion was not received favorably. The idea having been planted in Philip V's mind, however, he was not disposed to let the matter drop. Request after request was made to Louis XIV, and finally the latter relented. In Spain the French general's brilliant strategy and abilities soon restored the Spanish armies to a state of efficiency.

During this time Philip V's first wife died. Hardly was the funeral underway before Philip was importuning his ministers to find him another wife. This was the moment that Alberoni began to plan to have one Elisabeth Farnese, a Lombard girl, and one whom

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he could direct and guide, chosen as Philip's second wife. The Abbe was successful, and from then on, his star was in the ascendancy. He began to effect those many reforms he felt were necessary for Spain's welfare. The position of Prime Minister of Spain soon paved the way for the Abbe to become a Cardinal.

Harcourt-Smith presents a sympathetic study of Alberoni. The previous historians who have mentioned him have done so with either distrust or contempt. Much of this adverse treatment is due to the Duke of Saint-Simon, a nondescript member of the French nobility whose one outstanding trait was a venomous hatred for the Duke of Vendome and all those associated with him. The author goes a long way to dispel the mystery and onus that have surrounded Alberoni's name. The masterful style of the book makes reading it interesting as well as informative. The author has been successful in presenting the European courts as they were, virile, sensuous, and masters of the arts of real politik.

A. E. G.

AMERICA UNLIMITED. By Eric Johnston. 245 pp.; index. Doubleday, Doran & Co. \$2.50.

Eric Johnston gained prominence when he was elected president of the U. S. Chamber of Commerce. As such he is the representative of some 600,000 businessmen.

Since being elected Mr. Johnston has amazed both radicals and conservatives with his many and unusual ideas on labor, big business, and capitalism. *America Unlimited* is the summation of these ideas, and they offer not only interesting reading but food for thought to all clear and free thinking Americans. Mr. Johnston does not profess to be an authority on all the subjects discussed. He only tries to convey his own feeling that we Americans live not by bread alone, but by food of the spirit, freedom, self respect, and democratic justice.

An extremely interesting book.

B. H. W.

INVASION DIARY. By Richard Tregaskis. Random House. \$2.75.

Richard Tregaskis is one correspondent who doesn't just bounce into a theater for a moment and then write a potboiler. On Guadalcanal he lived through the thick of things with the Marines, accompanied them on their raids, shared all their difficulties and hardships. From that experience he emerged with tropical fevers, but also wrote his magnificent *Guadalcanal Diary*.

Last year he was in the E.T.O. He witnessed the first bombing of Rome. In Sicily he was with our 1st Div in its drive toward Nicosia, then with the British Eighth Army when it captured Catania and entered Messina. He landed on the Salerno beachhead via an LCI, and was at the very forefront of the fighting above Altavilla and around Albanella. Next he moved to the north flank, with the Rangers near Maiori; moved up the Naples plain; and was in the first vehicle to enter that city.

From then until the Voltorno crossing Tregaskis doubled in brass as political as well as war correspondent—then was truly glad to be able once again to devote all his time and attention to his main interest, the fighting front. That phase was very brief, unfortunately. On November 22nd he climbed craggy Mount Corno to visit a Ranger outpost. Returning down the trail he suffered a tremendous brain wound from a shell fragment, which hospitalized him for months—first overseas, later in this country.

Tregaskis's combat accounts are vivid and accurate descriptions. They concentrate on what actually happens, and would well serve as texts of small unit operations. Of great interest are his reactions after being wounded, and the care and treatment given him—not to mention the shift in his reactions toward the enemy and toward our war aims, after seeing at close range the results of enemy action.

THE TIME FOR DECISION. By Sumner Welles, 414 pages; appendix; index. Harper & Bros. \$3.00.

Democracy is not an easy, natural, self-sustaining principle of government. It is, in fact, a constant challenge to the wisdom and political genius of any country that accepts its theories. If it is to survive in a world of increasing complexities it must be preserved by a growing popular awareness of its character and an intelligent application of such awareness.

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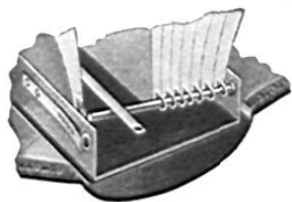
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Despite the weight and scope of its subject this book is remarkably easy to read. Its intimate popular appeal supports the democratic dictum that government is everybody's business. F. E. J.

THE WOLVES OF NORTH AMERICA. By Stanley P. Young and Edward A. Goldman. 632 pages; index; profusely illustrated. *The American Wildlife Institute.* \$6.00.

The Wolves of North America is unique in its combination of interesting readability, comprehensive treatment, and complete and magnificent illustration. Its appeal is universal, extending at least to the hunter, farmer or rancher, historian, scientist, artist, and dog-lover. I'll admit that sounds like a large order, but this book fills it.

Wolves, members of the genus *canis* and hence definitely related to the dog, are or have been found in nearly every part of the world. Their history is as ancient as their characteristics are definite. They have influenced literature, language, and folk-lore: strong Anglo-Saxons were partly named for them (Beowulf, for example), and long before that period arose the legend of the nursing of Remus and Romulus. A scourge to man's food, they have for ages been the special quarry of the chase and the hunt. The scientist will be interested in the authoritative classification worked out by Maj. Goldman. And the artist will revel in the splendid photographs and superb paintings reproduced in this volume.

If ever a book earned the terms "authoritative" and "definitive," this one has. Its authors have spent their lives studying and actively working against these predators. Mr. Young joined the U. S. Biological Survey in 1917 as a government hunter, and is now a Senior Biologist of the Fish and Wildlife Service. Maj. Goldman's 52 years as a professional biologist in the government service have made him a leading authority on native North American mammals.

Their joint efforts have covered the complete story of wolves in North America. Part I describes the wolves' history, habits, economic status, and control. Habits and characteristics, and the animal's place in our economic scheme, are especially full of authentic, fascinating oddments, all carefully arranged in logical fashion. The chapter on measures of capture and control is both historical and practical, and of definite value to present-day victims of depredation. In Part II is Maj. Goldman's exhaustive and clear scientific classification.

Especially outstanding are the illustrations. The table of contents fails to do them justice, as it merely lists 131 plates, 15 text figures, and 7 tables. Actually, most of the plates consist of at least a pair of splendid photographs, splendidly reproduced, showing wolves and their near-relatives, their dens and habitat, and the like. Best of all, however, are a number of full-page and full-color reproductions of intensely lifelike paintings of the major sub-species of wolves found in North America.

This is truly a book for interesting reading, as well as one with a definite place on a reference shelf.

THE SECOND NAVY READER. Edited by Lt. William H. Fetridge, USNR. 368 pages; index; illustrated. *The Bobbs-Merrill Co.* \$3.75.

So many splendid accounts of our navy's rebirth, growth, and operations have appeared, that it seemed a pity to let them remain scattered, soon to drift into comparative oblivion. It is well that Lt. Fetridge has again gathered into book form the cream of the

crop. These tales—mostly factual—will not only help give the navy man the "feel" of his service, but will stimulate in other branches and in civilians both interest and respect.

WORLD MAPS AND GLOBES. By Irving Fisher and O. M. Miller. 163 pages; index; illustrated. Essential Books. \$2.50.

DOWN TO EARTH: Mapping for Everybody. By David Greenhood. 255 pages; index; illustrated. Holiday House. \$4.00.

Two interesting and important additions to the literature of maps and mapping have just been published. Like the maps they describe, each was prepared for a specific purpose.

World Maps and Globes pays greatest attention to the purposes, advantages, and distortions of the various projections. It is an eminently readable discussion of the different types of maps and how to judge them. This book goes a long way in helping correct misconceptions about size, direction, and shape. It is especially useful for those who already have some working acquaintance with maps but who are a bit weak on the whys and wherefores of the many projections in current use. A new method of spotting and evaluating distortion at a glance is incorporated into many of the illustrations.

Another advantage is that it is small and compact enough to go into your "travelling library"—and its contents are valuable enough for it to have a definite place there.

Down to Earth, a larger and more comprehensive work, has an excellent chapter covering substantially the same ground as *World Maps and Globes*. As the title suggests, however, it is primarily a layman's guide to mapping. Its simple and logical steps furnish ideal instruction to either the embryo soldier or the gentleman farmer. Its approach is wholly practical, with a wealth of material on practical mapping as well as on map reading and understanding. Comprehensive, it contains many splendid illustrations, many of which were especially drawn for it by Ralph Graeter, art director for *Life* magazine. A section on map collecting gives many excellent suggestions, ranging from the care and indexing of your maps to suggestions as to where various maps can be obtained.

Both volumes contain splendid bibliographies. Each gives as good a discussion of map types as this reviewer has seen; each differs just enough from the other in this respect, however, that something is gained from referring to both—but that is not essential, however, in view of the superiority of both these books in this regard.

To summarize: if you want to learn about maps, or feel the need of some refreshing on their broader aspects, *Down to Earth* will certainly fill the bill. If on the other hand it is of the types of maps (projections) that you want to know more, *World Maps and Globes* will surely give you what you want. Neither volume, be it noted, is in any sense an atlas; that is an entirely separate field, well covered by other books recently reviewed in these columns.

A.A.F.: The Official Guide to the Army Air Forces. 357 pages; appendix; index; illustrated. Simon & Schuster. \$2.50.

Our AAF has had great popular appeal. Its work is colorful, it has expanded far more than has any other branch of the service, its achievements have been great. Up to now, however, there has been no rounded, complete, coherent account of its make-up and operations. This official book, published for the benefit of the AAF Aid Society, fills that large gap. It is well sub-titled "a directory, almanac, and chronicle of achievement."

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This book will fascinate the younger generation. It will also be useful in the dayroom and elsewhere, for gaining a comprehensive picture of the operation of one of the army's three major Forces.

CONTEMPORARY ITALY. By Count Carlo Sforza. 394 pages; appendix; index; endpaper map. E. P. Dutton & Co. \$3.50.

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famed abroad as one of his country's ablest diplomats. He is a traditionalist and as such writes with a conservatively biased opinion.

Contemporary Italy attempts to link the past with the present—shows that the Reformation was as necessary as the Counter-Reformation; the smiling Settescento as the French Revolution and its Italian forerunners. Thoughtful portraits are sketched of the men who most powerfully influenced Italian thought from Machiavelli, who dared discard the phantom of the Roman Empire for the concept of a unified state; through Mazzini and Cavour, whose deeds are indelibly carved on the framework of Italian diplomacy; to D'Annunzio, who alone can explain the birth of Fascism, since he was its inventor (Mussolini being no more than its skillful plagiarist).

Sforza bears no love for Mussolini. Many instances of the former Duce's pettiness of character are recounted, and Sforza believes it is this trait that is the key to a moral fact never understood abroad. When Mussolini realized his mental incompetence to head a great nation, he understood that he could only remain in power by resorting to bluffing, publicity and violence.

In discussing the causes of the present global war Sforza wrathfully incriminates all who chose blindness rather than moral courage. "The sad truth is that everyone in Europe was guilty of slackness; and of lack of moral courage to face reality . . . the Right as well as the Left—the Tories, the Socialists, and the Communists. But the main guilt in this situation . . . is the guilt of the French Conservatives and the British Tories . . . It was the duty of the members of the traditional aristocracies in England, Italy and France—who have always boasted their patriotism while enjoying so many privileges—to serve their countries even more faithfully and loyally than the workmen and little people who enjoy so few privileges."

As for the war on Czechoslovakia—it was a war of hate rather than a desire of international convulsions. The main reason for the hatred of the despotic Hitler and Mussolini was that the country of Mazaryk and Benes had become the soundest and healthiest democracy in the world—thus a country to be feared.

What is to be the plan of postwar Italy? Sforza believes her main problem will be to convince the peasants that the State is not a "Camorra" managed by the white-collar-and-necktie gentry. Economically she is an agrarian country and it is of prime importance to convince the peasants that their agricultural problem is complex, that it has to do with gigantic transformation of the Italian soil—and a real transformation, not a comedy like the Pontine swamps that Mussolini subsidized to impress American tourists.

On the whole Sforza's book is rambling and uncohesive. As the author states in his foreword, he is writing his impressions and not an encyclopedia. It is neither a history nor a biography of a statesman's career, but a melange, flavored with poetic and literary allusions.

C. P.

THEY PLAYED THE GAME. By Harry Grayson. 139 pp. A. S. Barnes & Co. \$2.00.

Here is a brief description of some 135 great men of baseball fame.

Contrary to what one would suspect, this book is not crammed with figures, tables, and tabulations of statistics. Instead, it has approximately a page and a half of interesting and humorous reading for each of the great players of the game, telling of the highlights of their careers and the personal characteristics of each player. Photos of the players are included, which adds to the enjoyment of the reader.

B. H. W.

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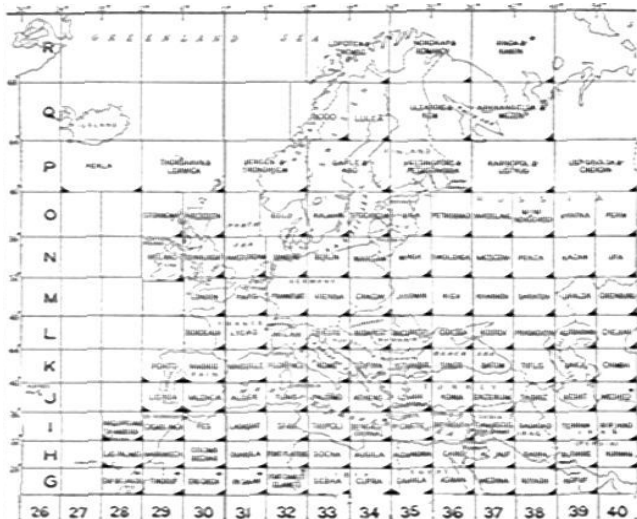
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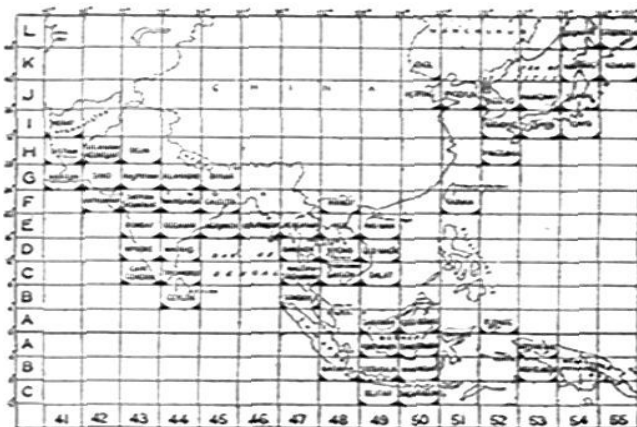
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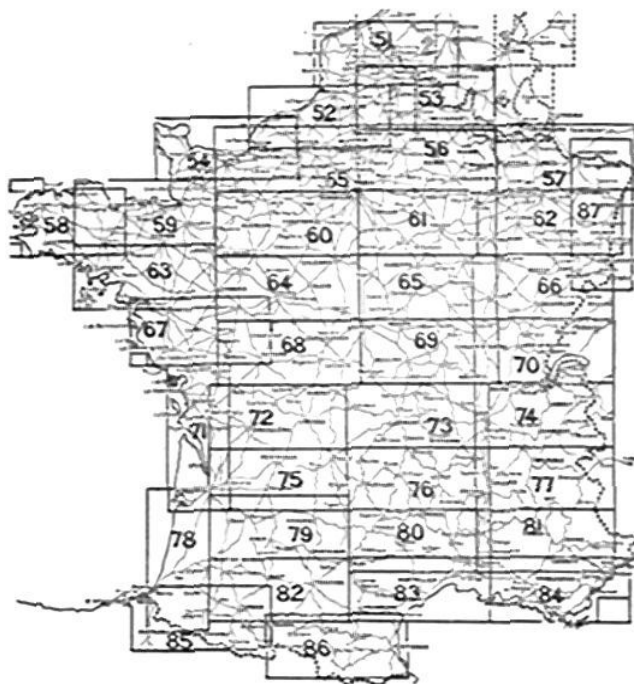
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