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FIELD ARTILLERY
Journal



OCTOBER, 1944

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The Field Artillery Journal

OCTOBER, 1944—Vol. 34, No. 10

PAGE

ON OUR COVER appears the latest use of the 105-mm howitzer. Mounted in the M-4 ("Sherman") tank, it combines the mobility of an M-7 motor carriage with full armor protection. It gives this medium tank its heaviest firepower to date.

LINED UP for next month is one of your *Journal's* most important articles of the year: Maj. L. O. Rostenberg's detailed description of how to locate and identify enemy artillery from analysis of shell craters. Also scheduled is a group of articles on observation and fire direction for the "heavies" — of special value to those units, but of use and interest to every artilleryman.

Artillery is now being reinforced by tank destroyers, 4.2" chemical mortars, and even by tank guns. This topic will be covered by several officers who are well versed on what is being done, and how.

And Capt. Pike (see p. 702 herein) will have another article, this one on use of oddments for practical field fortification.

FOR THE FUTURE we are arranging for detailed combat accounts, complete with names and numbers, places, movements, accomplishments — the "What and how," so to speak. Battle lessons can readily be drawn from such narratives, but those stories will make good reading in themselves just as soon as circumstances permit them to be published. In some instances that will not be until after the war. In the meantime, however, we want YOUR tale of YOUR operations.

MORAL OF ALL THIS is that your Association is a continuing organization. It has been for over a third of a century, and will carry on long after this war is past.

It is also a mutual association. You members own it and run it. Your interest is its strength. Your cooperation through the years has built it up. Your contribution of articles has been outstanding.

This too will continue long after this war is past. And remember, even when many of you return to civilian life you still remain eligible for Association membership, for your *Journal*, and for the other benefits of your Association.

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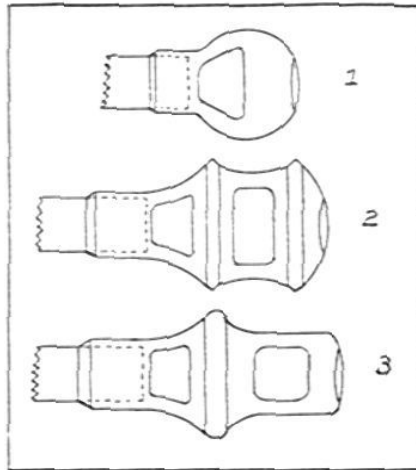
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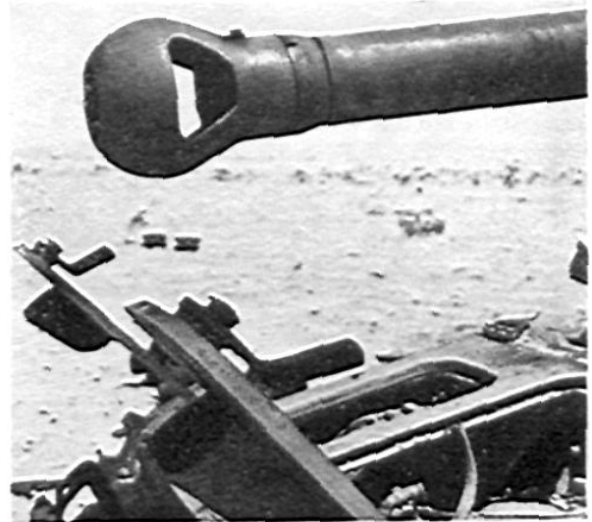
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MUZZLE BRAKE VARIANTS

*Know
Your
Enemies'
Weapons*



German muzzle brakes' evolution has passed through the three stages shown here. Regardless of minor variations that might be found, all Nazi brakes fall into one of these classes. This gives a clue not only to the relative age of the brake, but sometimes to the approximate date of adoption of the weapon or this particular use of it.



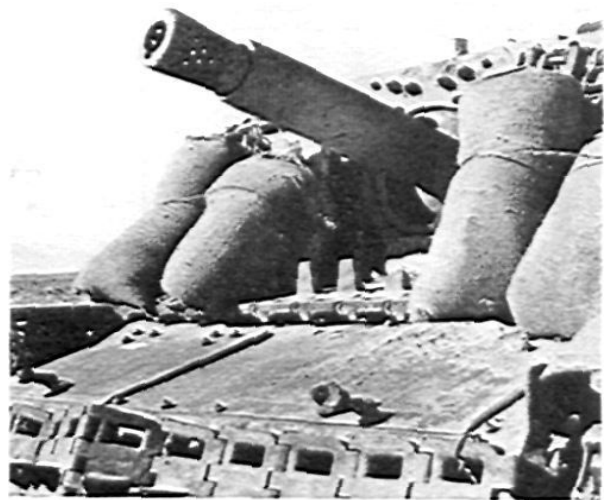
Typical of the earliest German muzzle brake is this bulbous one on a 7.5-cm KWK, here shown on a PzKw IV in the Libyan desert.



PAK 40s (75-mm AT guns) use the latest version of the muzzle brake. Notice (above and right) that on her AT guns Germany uses a "right-handed" sliding wedge breech block, instead of the "left-handed" type found on standard field pieces.



Germany's ingenious adaptation of captured materiel is well illustrated here: a Czech muzzle brake on a French 75 on the carriage of the German PAK 38 (5-cm AT gun), in the combination known as the PAK 97/38.



On the Italian M3 medium tank is mounted a 75/18 field gun. Its barrel has an extra jacket (armored), and being only 18 calibers long yields a very low velocity. Its muzzle brake is peculiar to Italian designs, and probably isn't really much more than a hopeful flash-hider.

NEW TIME FIRE TECHNIQUES

By Lt. C. A. Chapin, USMC, and Lt. H. W. Oliver, USMCR

EDITOR'S NOTE

As a result of research by Lieutenants Chapin and Oliver, the Marine Corps has adopted the methods here described. Due to the close association between Army and Marine artillery, field artillerymen should be familiar with this system. It is well to bear in mind that "complementary site" is misnamed: it is really "complementary elevation," realization of which makes this treatment of fuze setting appear most logical.

If time fire is to be most effective, it must be used in massed fire of battalions or larger units. With methods now in use corrections are determined and applied so that such massed fires can be executed with devastating effect. Much of our artillery, however, both Army and Marine Corps, is confronted with mountainous terrain in the several theaters of operation; and it must be noted that these massed time fires are accurately adjusted for height of burst only where the point of registration was at about the same altitude as the target. When considerable changes in angle of site are introduced an adjustment has to be made for each target unless a change is made in the methods of determination and application of time corrections.

Recent experimentation at the Field Artillery School, Marine Corps Schools, has shown that these transfers do not work with large changes in site, and has pointed the way to new methods by use of which time transfers will work at any angle of site within transfer limits for range and deflection. It has also resulted in a procedure for obtaining quick and accurate vertical control by time fire. This should prove very useful, as much of the terrain where vertical control is of prime importance makes connection survey operations difficult and slow.

BALLISTICS

Firing tables list the time of flight to a target at the same altitude as the gun. If the target is at a different altitude from the gun the time of flight differs, being greater for targets at a greater altitude and less for targets at a lesser altitude. In such cases, when complementary angle of site is included in the quadrant elevation the trajectory passes through the target but a time setting appropriate for a target at the level point will cause the projectile to burst too soon (high and short) for the higher target or too late (graze) for the lower target. In other words, a correction to the time setting must be applied to correspond to varying angles of site.

Consider the case of a plus angle of site. The complementary angle of site is the increase in the angle of elevation necessary to make the projectile travel to a target at the range for elevation and at a greater altitude than the guns. The time of flight corresponding to combined elevation and CAS is almost the time of flight to a target at a plus angle of site. This larger time of flight reading is not so large as the true time of flight. With the M54 fuze (a powder train fuze), however, the rate of burning is decreased because of lower average air density as the trajectory is raised. This decrease in rate of burning produces a slightly larger time of flight to point of burst. This increase in time of flight has been found to be the difference between the time of flight reading for elevation and CAS (combined) and the true time of flight. As a result, the correct fuze setting may be read

opposite the elevation and CAS (combined). See diagram and explanation below.

The case of a plus angle of site was used for illustration; the same considerations govern the case of a minus angle of site, where the correction results in a decreased time of flight.

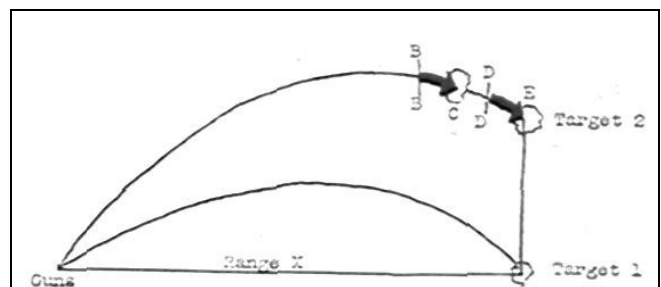
An important corollary of this phenomenon (and in a measure a proof of it) is the fact that for any given time setting, the angle of site to the point of burst varies in exactly the amount that the quadrant is varied. That is, for a single time setting, site subtracted from quadrant elevation yields the same figure, no matter what the quadrant elevation. The conclusion may be drawn that this figure, the combined elevation and CAS, is a constant for the given time setting. This has been found to be true by experimentation with both the 75-mm Pack Howitzer and the 105-mm Howitzer using the M54 fuze, testing up to 230 mils angle of site to point of burst.

The following data, taken from some of the test firing, illustrates this principle:

75-mm Pack Howitzer, 6 rounds at each quadrant elevation
Site measured with aiming circle at gun position
Time of flight measured by stop watch

Ch	Quad	Time	Site	El+CAS	Ti Corr.	Time of flight	Using present method	
							El	Ti Corr.
1	490	18.4	30.2	459.8	+ .75	19.0	450	+1.1
	550	18.4	95.5	454.5	.9	19.1	425.9	1.9
	610	18.4	155.5	454.5	.9	19.1	412.5	2.3
4	250	15.4	34.5	215.5	+1.3	15.57	214.5	+1.4
	310	15.4	94.4	215.6	1.3	15.68	212.8	1.55
	370	15.4	154.1	215.9	1.3	15.75	211.3	1.6
	450	15.4	232.6	217.4	1.2	16.22	210.4	1.7

With the time setting unchanged, the site varies by almost exactly the amount of the change in the quadrant elevation. The figure remaining when site is subtracted from quadrant



Target 1 is a target at zero angle of site and at horizontal range X.

Target 2 is a target at plus angle of site and at same range X.

A represents time of flight for elevation for range X and also the point where a projectile with FS corresponding to this time of flight will burst.

B represents the same time of flight as to A.

C represents the point where a projectile with FS corresponding to time of flight B will burst, because of decreased rate of burning of fuze.

D represents time of flight corresponding to elevation for range X plus CAS (for range X and site to Target 2).

E represents point where a projectile with FS corresponding to time of flight D will burst, because of decreased rate of burning.

elevation is the elevation and CAS combined. Although the elevation and the CAS are in different proportions at the different quadrant elevations, their sum appears to be a constant for the time setting used. The time correction listed is the correction to the rate of burning, and contains no false element caused by the angle of site used for the registration.

The times of flight listed were clocked without calibration of watches or timers. They should not be considered as exact times, but they do illustrate the variation in the rate of burning resulting from the variation in average density.

Corrections computed by present methods are included for comparison. Note that the corrections are different at each angle of site. Each one of these corrections will work, if the target is at about the same angle of site as the point of registration.

Similar data were obtained from firing the extreme and the mean charges for the 105-mm Howitzer, as well as other charges for the Pack Howitzer. Firings were done in different seasons and with different ammunition lots to insure that the results were not caused by some combination of circumstances not likely to occur again.

TIME CORRECTIONS

Let us assume that standard conditions prevail so there is no correction to the rate of burning in the fuze. Then the fire commands should be determined as follows: the site is computed for vertical interval guns to target (plus 20 yards for proper height of burst), and this is the site to be commanded. Elevation is taken for horizontal range and must have combined with it the CAS, which is computed by multiplying the tabular CAS factor listed for the elevation by the number of mils of site. The elevation and CAS (combined) is the elevation to be commanded, and is the figure opposite which to read the time setting either in the firing tables or on the GFT.

Since standard conditions seldom prevail, a correction must be made for the rate of burning. The methods previously used to determine this correction produce a correction applicable only to targets at approximately the same angle of site. A correction which can be applied to targets at any angle of site can be determined in the following manner:

Known factors are the adjusted quadrant elevation, the angle of site to point of burst, and the adjusted time setting, all of which may be determined by several types of registration to be discussed in *Time Registrations* below. The angle of site to the point of burst is subtracted from the adjusted quadrant elevation, leaving a net figure of elevation and CAS (combined). The hairline of the GFT indicator is placed over this figure (elevation and CAS) and a pencil gauge mark is made on the indicator above the adjusted time setting. To apply this correction for firing on a new target, the hairline must be placed over the elevation and CAS (combined) for the new target and the new time setting read under the pencil gauge mark.

It is to be noted that the setting of the GFT for range is still dependent on adjusted elevation in the usual sense—that is, the CAS must be stripped from the elevation and CAS (combined) so that elevation alone can be set opposite the range to the point of registration.

An example of the determination and application of corrections follows:

Registration with 105-mm Howitzer, Ch. 5.

Rn.: 6,000 yards.

Adj. QE: 398 $\frac{1}{2}$.

Adj. Ti: 20.4 sec.

Site guns to burst: +58 $\frac{1}{2}$.

Elevation and CAS (combined): 340.

CAS per mil: +.13.*

CAS for 58 $\frac{1}{2}$; +8 $\frac{1}{2}$.

Adj. Elevation = 398 — (58 + 8) = 332.

GFT setting = 6,000/332.

Time gauge mark: hairline over 340, pencil gauge mark over 20.4.¹

*Note that the CAS factor used corresponds to the resultant adjusted elevation. In making the computation, this factor must be selected by approximation; when the elevation is found, check opposite it to see if the original CAS factor was appropriate for this elevation. If the factor was not the correct one, recompute using the correct one. An example:

Registration with 105-mm Howitzer, Ch. 5, Adj. QE 468, Site +50 mils. Estimating total CAS to be +7 mils, the estimated adjusted elevation is 411 [468—50—7]. CAS per mil for elevation 411 is +.25. Therefore, the first computed adjusted elevation is 405 [468—50—(.25×50)]. CAS per mil for elevation 405 is +.24; therefore, recompute the adjusted elevation using +.24; the result is 406 [468—50—(.24×50)]. CAS per mil for elevation 406 is still +.24, so the computation is correct.

To fire on target at range 6,500, site +28, slide indicator until hairline is opposite 6,500, read elevation 371. CAS for this elevation is +.18; therefore total CAS is +5. Slide indicator hairline to 376 and read time 22.4. Pertinent commands are: Ti 22.4, Si 331 (328 + 3 $\frac{1}{2}$ for 20-yard height of burst at 6,500 yards), Elevation 376.

TIME REGISTRATIONS

There are two types of registration for adjusted quadrant, site, and time setting.

High Burst

Present methods using bilateral observation apply. Adjusted quadrant and time setting are as fired. Site guns to bursts is as computed in the normal manner. Since bilateral observation is used, the range to bursts is also found in order to make a GFT setting.

To determine the time setting correction alone, a high burst may be fired with observation only from the battery position. With the same quadrant elevation and time setting, 6 rounds are fired at a quadrant elevation sufficient to permit the executive to measure the angle of site to the bursts with his aiming circle. The site readings to the 6 bursts are averaged. The adjusted quadrant elevation and time setting are as fired, and the site is as averaged. No range correction may be found by this technique alone. It is often desirable, however, to find quickly the latest correction to rate of burning when the range correction may be known from meteorological data. This method is also necessary for shooting in the site as explained in *Vertical Control by Time Fire*, below.

Time Precision

The adjusted quadrant elevation is fired in on an identifiable check point by either OP or FO methods. The time precision registration is begun in the normal manner. When a .4-sec. time setting bracket is split, 6 rounds (instead of the usual 2) are fired and each is sensed as "air" or "graze." If equal "air" and "graze" sensings are obtained the adjusted time setting is as fired. If 4 "air" and 2 "graze" sensings (or 2 "air" and 4 "graze") are obtained, the adjusted time setting is .1 second greater (less) than the setting used. If 5 "air" and 1 "graze" sensings (1 "air" and 5 "graze") are obtained, the adjusted time setting is .2 seconds greater (less) than the setting used. If 6 "air" sensings (6 "graze") are obtained, the adjusted time setting is .3 seconds greater (less) than the setting used. (Computations at varying ranges and charges were

¹When using 12" GFT it is more convenient to put the elevation gauge mark (instead of the hairline) over 340, since thereafter all settings that do not involve complementary angle of site can be read with a single setting.—Ed.

made with a "12ths" rule and a computed time fork. Identical results were obtained with the arbitrary method explained above. The simpler method is therefore advocated.) The adjusted quadrant and time setting are as explained above, and the site is as taken from the chart or computed by survey.

A 6-round time precision registration is to be preferred to the present 2-round method as experimentation has proved that mixed sensings can be obtained at as many as five different time settings. The 6-round method gives the adjusted time setting with a maximum error of .1 second. The six rounds fired in the high burst method more frequently give exact results since the variation in height of burst can be exactly measured. Again the error will not be greater than .1 second.

VERTICAL CONTROL BY TIME FIRE

When survey operations are slowed up because of difficult terrain, the angle of site to a check point may be shot in using a combination of time precision registration and executive's high burst registration. The observer fires in the adjusted QE and the adjusted time setting to a check point, the site to which is desired. Using the adjusted time setting so obtained and a quadrant elevation sufficient to allow observation, the executive fires 6 rounds and measures the angle of site to each. The average site is subtracted from the quadrant elevation, leaving the elevation and CAS (combined) appropriate for the adjusted time setting. Since this figure is the same for this time setting at any quadrant elevation, the difference between it and the adjusted QE for the check point is the angle of site to the check point. This gives vertical control and also allows a more accurate back plot for the observed fire chart, if used. Once the time correction is known, the site to other points may be shot in using the 2 precision registrations alone. A sample problem:

Results of registration on check point using 75-mm Pack Howitzer, Ch. 4:

Adj. QE: 264.

Adj. Ti: 15.4.

Results of high burst registration by executive using Ti 15.4, QE 450 (this quadrant was necessary because of a high mask): Average site, +233.

By subtracting the executive's site from the quadrant elevation, the elevation and CAS (combined) is obtained: $450 - 233 = 217$.

By subtracting this figure from the check point Adj. QE, the site to check point is obtained: $264 - 217 = +47$.

The adjusted elevation to check point is $217 - 1$ (CAS) = 216. For back plotting on the observed fire chart, a range of 4,840 may be used, and the vertical interval guns to check point may be recorded as +227 yards. This back plot can be made more accurately if metro corrections are considered.

MECHANICAL TIME FUZES

The above techniques apply specifically to use with weapons using the M54 fuze. For use with the M67 fuze, these techniques are an improvement over the present ones, but may not be expected to give exact results. Since the M67 is a mechanical time fuze and does not have a variable rate of burning due to difference in density,² the use of the CAS factor to correct the time setting will only partially result in the necessary increase (decrease) of time of flight for a target at a greater (lesser) altitude. For exact results there should be available an additional column in the firing tables listing the increase (decrease) in fuze setting for each 10 mils increase (decrease) in site. Until this information is available, use of the above described techniques will produce more accurate results than firing with the present methods.

²Not entirely correct: rate of burning does vary with rotation and retardation of projectile, both of which are functions of air density. As the authors imply, however, present available information is not much-help to us.—Ed.

TIME PLOT OBSERVED-FIRE CHART

By Col. George D. Crosby FA

As this time plot method of constructing an observed-fire chart has proved most acceptable in local tests, information concerning it will doubtless be welcomed by artillerymen generally. It was developed to overcome the difficulties experienced in obtaining a proper height of burst in time fire when using the chart plotted with ranges corresponding to quadrant elevations, site being unknown. The latter plot (hereafter referred to as the "quadrant elevation plot") gave much trouble, particularly on rough terrain. Even when percussion fire was massed properly, time fire often failed because fuze settings did not correctly correspond to elevations: bursts appeared on graze, or too high in the air to be effective.

This limitation of the quadrant elevation chart can be eliminated, or at least minimized, by use of correct sites in plotting the chart—that is, plotting ranges corresponding to elevations rather than to quadrant elevations. Unfortunately, much delay often is experienced in establishing vertical control, especially in difficult country where it is most needed. Since the outstanding virtue of the observed-fire chart is (or should be) that it can be put into immediate operation, emphasis properly has been on the use of the chart without vertical control, to avoid the delays incident to determining altitudes.

Since site need not be known, the time plot chart avoids the bad effect of these delays. In most cases it not only will give

satisfactory results with time fire, but also improves the massing of percussion fire. It is, of course, subject to the range limitations inherent in the 25-second time fuze, and since the probable error of the time fuze is large at extreme ranges it may fail if registration at ranges much over 7,000 yards is necessary.

CONSTRUCTION

Register all batteries with the time fuze, to determine both adjusted quadrant elevation and adjusted time. Plot batteries in deflection as prescribed in FM 6-40, but plot the range corresponding to the adjusted time. Note the elevation corresponding to the adjusted time; the discrepancy between it and the adjusted quadrant elevation is considered to be site. Transform this site into altitude difference by the mil relation (using plotted ranges) and determine battery altitudes. Thereafter plot all targets, after adjustment, at a range corresponding to the adjusted time, determining their altitudes by the differences between adjusted quadrant elevation and the elevations corresponding to the plotted ranges. It is necessary, of course, to strip 20/R.

Use graphical firing table in the closed position. No time gage line is needed. Corresponding elevations, ranges, and time corrections all appear under the hair line, discrepancies

between them all having been lumped together into false site.

It should be clearly understood that the observed-fire chart set up with time shell will give good results with percussion shell, even though a change in ammunition lot is called for. Registration both with time and with percussion shell is not necessary. Only a small error results from ballistic differences of ammunition, provided all batteries change. For one battery to change lots when the others do not may cause failure to mass, of course.

ACCURACY

It is not possible to state just how accurate the time plot method is in comparison to the quadrant elevation method, as the reasons for inaccuracies of the two are different. The error of massing to be expected of the time plot method varies with the size of the time correction. In the quadrant elevation method, size of the error depends largely on how much site is present. It can be stated, however, that the quadrant elevation method is to be preferred only on very flat terrain where a very large time correction is present. With a time correction of not over one second, the time plot method is quite dependable.

In this connection, it must be remembered that the time correction is *not* the difference between adjusted time and tabular time corresponding to *range*; it is the difference between adjusted time and time corresponding to *adjusted elevation*. Anything that causes the projectile to arrive at a target abnormally early, thus necessitating a decrease in normal time of burning, will also result in a decreased adjusted elevation (minus K). Hence, time correction has a tendency to remain small. At Fort Sill, not once in 300 recorded problems did it exceed 0.8 seconds.

ADVANTAGES

A very practical advantage of the time plot chart is the following: After the chart is set up, true altitudes can be determined. If vertical control thus becomes available, altitudes on the time plot chart are changed to correct altitudes, the time correction is determined from the original registration data, and the time gage line is marked on the indicator of the GFT in the conventional manner. The chart continues in use. If, however, the quadrant elevation chart is established initially, subsequent determination of altitudes requires that all batteries and targets be replotted. In effect, the chart must be thrown away and a new one constructed.

The time plot chart is well adapted to determination of vertical control by measuring the vertical angle to a high burst center from a battery position. Any one of the three batteries can do this, thereby determining site and time correction for that battery. The time correction so determined is assumed to hold for the other batteries. Recomputed altitudes will be very nearly correct. The observed-fire chart should then approach the accuracy of a surveyed chart, although the lack of a known scale will of course prevent delivery of unobserved fires. The method of determining time correction from high bursts is described in detail in par. 402*d*, Change 3, FM 6-40.

WHYS AND WHEREFORES

It is interesting to consider why certain types of observed-fire chart do or do not work. A common misconception is that the presence of a large K is a source of error. It is true that K causes erroneous range plots, but as long as K is uniform among the batteries of a battalion it causes no distortion in *relative* locations on the chart. Hence the chart is accurate, but

of an unknown scale. The resulting chart K , however, is opposite in sign and equal to the actual K , and in theory the chart works perfectly.

The quadrant elevation plot does have relative positions warped by the inclusion of site in the range plot. This will cause deflection errors to appear under many conditions.

At targets near base point range batteries will mass for range, but on targets 1,000 yards or more from base point range the compensating effect usually is lost and ranges become erratic.

To illustrate this range error of the quadrant elevation chart, consider B Btry (105-mm H) at the same altitude as and 3,000 yards from the base point. It is the adjusting battery. If we assume (for simplicity) that K is zero, it plots 3,000 yards from the base point. If it now adjusts on a target at 4,000 yards, the target plots 4,000 yards away (if at base point altitude). Assume C Btry, also at 3,000 yards from the base point but with a site of +15. It plots (Charge 4) 3,180 yards from the base point and 4,180 yards from the target. Elevation to the target indicated by the observed-fire chart is 325. It should be 318, so the battery fails to mass by 70 yards.

What has happened is this. The 15 mils of site should have been decreased to $\frac{3}{4}$ of 15 mils, since range became 4,000 instead of 3,000. However, the 180 yards which took care of the 15-mil discrepancy at 3,000 (where yards per mil of elevation is 12) becomes 18 mils at 4,000, where yards/mil is 10. So instead of *decreasing* site to 11 mils, it was *increased* to 18 mils. 70 yards is not a prohibitive error, but in the general case this inverse effect—increasing site that should be decreased—rapidly grows worse at range changes greater than 1,000 yards.

Assume further that in the above case the true time correction is zero. B Btry will determine a zero time correction and will have no trouble adjusting on the target. C Btry, however, will carry a time correction at base point range of minus 0.7 seconds, since its quadrant elevation is 15 mils from its elevation. At range to the target this time correction becomes minus 1.0 seconds (on the GFT). The burst range is 3,950 yards, which is close to the target, but since the battery fired 70 yards over the bursts are 41 yards too high (slope of fall: 1/2.9).

The reason for this is the proportional increase of a time correction which actually did not exist. The use of a flat correction would have been better in this case. But the user of the observed-fire chart cannot know how close his time correction is to the real one, which gives better results when treated proportionally.

The time plot chart avoids much of the error considered above. Ranges at which batteries are plotted include both K and the time correction. But since tests have shown that the time correction, like K corrections, is roughly proportional to range, the plot is not warped so far as relative locations are concerned. Deflection errors will be smaller.

As far as percussion fire is concerned, the time plot chart introduces an error very similar to that of the quadrant elevation chart, in that while the latter treats site as a K , the former treats time correction as site. Time correction should be treated proportionally with range and site should be treated in inverse proportion, so we have the same effect that causes trouble with the quadrant elevation chart—an increment which should be increased actually is decreased, or vice versa. There is, however, this important difference: time correction presumably is the same for all batteries, whereas site is not. Each

battery, then, is given a false altitude, but unless there is considerable echelonment of batteries in depth the amount of false altitude for each is about the same. After the adjusting battery has adjusted on the target the correction made necessary by its false altitude is about the same as the corrections for the other batteries. The fire of the battalion will mass. It is quite true that the quadrant elevation method will give good results if batteries have little echelonment in depth *and if they are near the same altitude*, but the italicized condition need not be present to insure accuracy of the time plot chart.

The larger the time correction, the more false altitude goes into the time plot chart. The chart may fail if batteries are not so closely grouped as to all be affected nearly equally. If it is known, however, that the time correction is consistently large—say minus 2 seconds—this can be carried as the time correction, the range plot is that corresponding to the adjusted time plus 2 seconds, and only the difference between true and predicted time correction is converted into altitude. Again, massing should be successful.

The ability of the time plot chart to mass time fire successfully is apparent when it is understood that the *K* principle is applicable to the time correction. Actually, ranges taken from the chart are not ranges at all—they are corrected fuze settings, expressed in terms of yards. Since these are proportional to ranges, the plotted location of a target is as correct for one battery as for another. The plot is not warped any more than it is by inclusion of *K*. In theory the burst range will always be correct, even though an error appears in percussion fire. In fact, tests at Fort Sill indicate that the theory is not far wrong.

TEST RESULTS

A consideration of the figures that follow, taken from Fort Sill tests, will show why it is believed that the time plot method is superior to the quadrant elevation plot, actually as well as theoretically. Yet it must not be assumed that these figures are proofs. Some of the figures herein are based not on rounds actually fired, but on where rounds should have fallen had they been fired. In nearly all cases, however, the charts were constructed on the basis of actual registration. It must be remembered too that the time correction at Fort Sill is invariably small, a fact that is highly favorable to the success of the time plot method.

One test was fired in its entirety. Three howitzers (105-mm, M2) were set up to represent base pieces of batteries of a battalion. Conditions were severe. Echelonment of batteries in depth was 1,500 yards, in width, 800 yards. Altitudes ranged from 425 to 536 yards. Targets were from 3,000 yards over to 2,000 yards short of the base point. Mixed ammunition lots were used. Registration with Charge 4 was followed by firing with Charges 5 and 7. The test was repeated, registering with Charge 5 on a second base point and firing on targets with Charges 4 and 7. For each of two base points, three targets were fired on after adjustment by the center piece, by the two non-adjusting batteries. The following figures are the average errors (in yards) of the 12 resulting centers of impact.

Time fire:

	<i>Deflection</i>	<i>Range</i>	<i>Height of Burst</i>	<i>No. of Grazes</i>
Quadrant Elevation	61	178	40*	5
Time Plot	26	56	23	None

*Grazes were considered as zero height of burst. Had the distance which they would have gone into the ground been known, the average would have been lower.

Percussion fire was then used, without further registration. Errors were:

	<i>Deflection</i>	<i>Range</i>
Quadrant Elevation	61	121
Time Plot	27	56

Eleven other tests of a similar nature were conducted with various conditions and calibers. Actual fire was not, however, placed on all targets. Total results (averaged together) were:

<i>Time fire</i>				
	<i>Deflection</i>	<i>Range</i>	<i>Height of Burst</i>	<i>No. of Grazes</i>
Quadrant Elevation	38	94	77	21
Time Plot	16	26	41	15

<i>Percussion</i>		
	<i>Deflection</i>	<i>Range</i>
Quadrant Elevation	45	167
Time Plot	28	89

The errors above generally are larger than may be expected, since the tests were run under conditions unfavorable to successful massing, in order to bring out failure of the methods and to minimize effect of incidental errors.

You should note a fact implied by this article, but not sufficiently emphasized until this point: *the source of almost all troubles with observed-fire charts is false site*. Unless sites are known there is no sure way to avoid failure of any type of observed-fire chart, unless it be to group a battalion so closely as to have almost a 12-piece battery. There are many errors other than site, of course, but these seldom are large and usually are compensating. False site, on the contrary, introduces an error which may be so large as to make compensation by other errors impossible. Nor can this error be minimized by accurate work or by careful adherence to procedure. It is inherent in the method.

It is perfectly true that vertical control may not be available when the observed-fire chart is set up. As soon as it can be made available it should be used. If lack of time shell, or range limitations, require the use of the quadrant elevation plot, vertical control turns it into an elevation plot, which will work well either for time or for percussion fire. If the time plot method is used, introduction of correct altitudes and use of the time correction which known altitudes render determinable, will remove all error inherent in the method. To fail to take advantage of the opportunity to introduce vertical control is to accept an error which may be large enough to make the observed-fire chart worthless.

No altitude determination, nor any method yet devised, can overcome errors caused by dispersion, faulty registration, poor calibration, tricky ammunition, or a host of other reasons. Yet, time shell being available for use with the time plot method, the withdrawal of the restriction on site determination and the more generous grading scale for height of burst, should combine to take the curse out of AGF Battalion Test I. Barring errors which *should* be avoided, the observed-fire chart will give results.

If in combat the time plot chart is as satisfactory as it has proven itself to be on the ranges of Fort Sill, it is a valuable contribution to the job at hand.

SUPPLY DISCIPLINE

Lt. Gen. Ben Lear, Commanding General, Army Ground Forces, has just issued in pamphlet form a letter on the above subject. It is patterned after a similar one issued by name to all officers of the First United States Army under the signature of Lt. Gen. O. N. Bradley. In his foreword, Gen. Lear states that "the experience of our Armies overseas has impressed upon them indelibly the importance and necessity of *supply discipline*. These lessons, learned the hard way, must be impressed upon each officer and enlisted man and never forgotten. They are detailed here for easy reading." The letter itself opens with "I desire that you study and remember these *Notes on Supply Discipline* and use your influence and example to instill in every man the habit of

CONSERVING SAFEGUARDING
MAINTAINING SALVAGING
food, clothing, weapons, fuel, motor transportation, materiel, and supplies of all kinds."

GENERAL

1. No plan of operations, however good, will succeed unless administration has been emphasized from the start. *Supply discipline goes hand in hand with military discipline.*

2. The production of our equipment involves enormous efforts on the part of workers in our homes in the United States and it all has to be transported across seas at great risk to our seamen and ships.

3. In any operation, transportation—whether by sea, rail, motor vehicle or air—will never be adequate to meet all our requirements.

To request more than you need is inefficient.

To waste what you have is sabotage.

TRAINING

1. The training of the individual in *supply discipline* is as important as any other form of training. Your training program will set aside regular periods for this. Prepare what you have to say, your demonstrations, your practical work, as you would for any other training. The support of the men must be won. Ingenuity will be required. Emphasize the protection of property in guard duty. Remind each man that he is a taxpayer, quoting prices.

2. *a. Food:* It is a standing order of the AGF that no one should help himself to more food than he needs nor leave any on his plate. Greases and bones are used in manufacturing explosives; teach your men the various uses for which garbage is saved.

b. Clothing: Impress your men that a "stitch in time saves nine," and that laundering of socks, fatigues, etc., increases the life as well as the cleanliness of clothing. In battle it is more important to use transportation for ammunition than for clothing.

c. Weapons: Teach your men that "for want of a nail a horse can be lost," and that in combat a missing rifle part means not loss of pay or K.P. but immobilization of a weapon.

d. Fuel: Train all handlers of gasoline and oil to avoid spilling a drop when making transfers.

e. Motor vehicles: Have your drivers do 1st echelon maintenance at stops and periods of waiting instead of only at "motor stables." As long as 1st and 2nd echelon maintenance is kept up, our vehicles will keep rolling.

f. Hygiene and sanitation: Get your men to observe the principles instinctively. The best fighter is no good if he gets sick; unnecessary sickness must be avoided.

3. Administrative directives are not the sole concern of the supply services. Learn about their contents yourself.

It is not sufficient to have a good "S-4" or supply sergeant—every man must be something of an S-4 or supply sergeant himself.

IN COMBAT

1. *The boarding of supplies and equipment by individuals* results in overloading of vehicles and undue wear and eventual breakdown of transportation.

2. *Throwing away prescribed equipment by individuals to lighten personal loads* involves resupply at a later date and unnecessary demands on transportation. To prevent this, give thought to confining personal loads to what is necessary for the mission.

3. *The formation of unauthorized reserves and dumps* at battery and other positions will result in shortages of supplies where most needed.

4. *To abandon a supply of ammunition however small* may be equivalent to disarming yourself or your fellow soldiers at a later date.

5. *Vehicles, tools, and spare parts are always short of demand.* Units which retain more than they are entitled to, prevent the speedy re-equipment of other units.

6. *Cannibalization of tanks and vehicles* prevents these tanks and vehicles from becoming available quickly as replacements and disorganizes repair and replacement services.

7. *There must be no unnecessary use of transportation.*

8. *Gasoline and oil represent a very large percentage of tonnage to be moved.* Trucks and vehicles cannot advance a yard without it. Uneconomical use and spilling is sabotage.

9. *It is of the utmost importance that damaged valuable equipment such as radio sets, weapons, and spare parts be salvaged for repair and reissue.* New stocks cannot be provided in sufficient quantities without the assistance of efficient salvage.

10. *It is important that captured enemy materiel and supplies of all sorts be reported and brought under centralized control, intact, without pilfering or cannibalizing.* Such supplies may prove of the greatest value in assisting planning and speeding an advance.

11. *Administration must win the confidence of troops by its efficiency. Organization and units, on their side, must show confidence in their administrative service.* There can be no excuse for the forming of unauthorized reserves and dumps, holding of excess equipment and hoarding and overloading of vehicles.

No matter how hard the fighting, our battles will not be won without good supply discipline.

NORMANDY EFFECT

The following paragraph was extracted at a high headquarters from a report by a Motor Battalion Commander of a British Armoured Division on the fighting in Normandy:

"Although virtually cut off during the day, we were not out of reach of American artillery, in particular their SP 155s who had been supporting us throughout. We had an OP Officer called 'Chunk' Badcock, a bloody great monster of a man who certainly knew all the answers. As the firing died down it was known that there were quite a number of German infantry in a certain wood to our right front. The American OP then called for a special

concentration on it. For it, every gun within range had to engage; and it was a type that could only be ordered by an American General. However, it came down within about a minute and a half and it certainly was a real pandemonium. Afterwards 2 Germans who surrendered said that arms and legs were flying right and left in the wood and they must have had some 800 or 900 casualties. Although this is no doubt a gross exaggeration, it will, I think, give you some idea of the sort of shoot it was. It may have caused telegrams from Washington due to the colossal amount of ammunition expended, but it certainly put 'finis' to any further German attack that evening or that night, and must have done a lot of damage."

Normandy Armored RSOP and Survey

By Lt. David E. Olson, FA

Shortly after D-day the forward elements of our armored artillery battalion hit the beach in Normandy and were met by our glider-borne Liaison Officer who gave us first-hand information on the terrain into which were soon to disappear and the hazards that awaited us. "Just like the jungle," he said.

Map reconnaissance had indicated that the fields were small and the terrain flat (a hundred-foot hill was mountainous!). Foot reconnaissance showed tree lines bordering each field, narrow twisting lanes with steep banks on each side, deep ditches along the tree lines which proved to be obstacles for our M7s in some areas, and (most important of all) an utter lack of observation from the ground. It became apparent that we would have to change some of our SOPs, especially those concerned with RSOPs and Survey, in order to meet the problems confronting us.

First of all we changed the composition of the Bn Comdr's party. Now we use 3 ¼-ton: the BnC's, the RO-and-Survey O's, and the Com O's. When the area into which we must go into position is given to us by the DivArty Officer, these three vehicles with their officers plus 5 reconnaissance and survey men take off for the new area. The five enlisted men help perform the survey, but they also provide some protection against the machine pistol artists and snipers who will likely still be lurking in some Normandy hedges long after the Armistice is signed.

The Communications Officer immediately selects the CP and the Battalion Commander and the Reconnaissance and Survey Officer choose the GPs. Routes of entrance, availability of alternate positions, and the proximity of other installations are considered. A stake is driven in the center of each gun position.

The Battalion Commander and the Communication Officer return to a rendezvous point previously agreed upon, where they meet an officer and the wire crews from each battery. These representatives (they may be the BCs, Executives, or Assistant Executive Officers) are shown their positions and given suggestions by the Battalion Commander as to how the positions can be utilized most advantageously. Wire crews begin to lay wire to the CP, which had been indicated to them by the Communications Officer. In the meantime the Reconnaissance and Survey section have begun their survey, usually starting with the registering battery. Often, if the situation is moving rapidly, the representative of the registering battery will bring along one M7 which will begin registering immediately so that corrections will be available when the remainder of the battalion comes into position.

After the officer representative has analyzed the situation he returns to his battery, and it is displaced forward in the order specified by the Battalion Commander. The Communications Officer brings Headquarters Battery and the forward echelon of the FDC up so that fire missions will not be interrupted during the displacement.

An Armored Artillery Survey setup—

combining the survey and reconnaissance sections and streamlining both of them, plus the jungle-like countryside of Normandy—presents a discouraging picture from the survey point of view. There is one redeeming feature, however, and that is the map situation. The 1/25,000 battlemaps are excellent horizontally, although not too good vertically.

After the positions are selected by the Battalion Commander and Reconnaissance and Survey Officer, a position area survey is initiated. The poor observation makes it difficult to pick up points identifiable both on the map and on the ground and suitable for obtaining initial direction. As a result we use the compass needle (on what we call the Master Instrument) on the registering battery's orienting line, and from there carry direction to the remaining orienting lines. To catch large errors we check the computed azimuth against the azimuth obtained by measuring with the master instrument.

At each position the Survey Sergeant draws a base line from a grid intersection in the center of our sector (which serves as a Base Point) and the battery position. Thus a base angle can be placed on the executive's stake just as soon as the azimuth of the orienting lines is ascertained. The Executive sends this information (if the Survey Officer hasn't already) in his executive's report, along with the coordinates of his position and the grid intersection that he's tied in on. Just as soon as the Reconnaissance and Survey Officer is free he returns to the new CP and checks the plots, base angles, and the laying of the batteries by comparing the compasses with the azimuths of the base lines which have been measured or computed from the chart. Alternate position surveys are run by the battery teams. Coordinates of the new position and the azimuth of the orienting line, computed from the azimuth of the initial OL,



Berigny, south of the Forest of Cerisy, is surrounded by typical Norman terrain. Hedgerows on low banks make fine defensive positions and snipers' posts. Road intersections shown here are typical of this entire area; they make good sites for AT guns, for use against any type of traffic.

are sent to FDC. In the event that the alternate position must be occupied, a base angle is awaiting in the new position.

Distance is handled by inspection or by inspection and short traverse. Vertical control is usually carried, especially if the area is the least bit rugged or any doubt arises concerning vertical control on the portion of the map we are using.

Our rapid occupation, which we have yet to use here in Normandy, is the Fort Sill "shoot from the hip method." As far as tying the battalion together is concerned, the battery executive reports to FDC the coordinates of his

position, the azimuth of his OL, and the base angle on which he is laid. As soon as possible, the Reconnaissance and Survey section locates the battery positions accurately and carries direction to the OLs. Then any correction necessary can be made and the battalion can again be tied in on any point.

We think the Fort Sill methods are absolutely sound. So must some of the Nazis captured here in France, because they have a great deal of respect for what they *still* insist on calling "Automatic Artillery."

THE CORPS R.O. IN COMBAT

By Lt. Col. Joseph R. Couch, FA

Few duties performed by an artillery officer, in fact by any combat officer, are more important than those of the battery RO. In the final analysis it is *observed* fire that causes the greatest damage to the enemy, and the RO must direct a large part of such observed fire. The successful RO must possess physical stamina, skill, initiative, courage, and aggressiveness, all of the highest order. In our battalion of 155-mm M1 howitzers, Corps Artillery, we have attempted to train the ROs to perform their duties in line with the missions of the Corps Artillery. In many respects their duties will differ from those of an RO or forward observer with a direct-support battalion. By study, trial, and error during the North African, Sicilian, and Italian campaigns we have developed the principles outlined here. Each RO is thoroughly instructed and provided with a brief list of his duties. His activities are checked constantly by his battery commander and officers of the battalion staff. His general missions (listed in order of importance) are to (1) direct the fire of his battalion upon hostile batteries, (2) direct fire upon enemy tanks, vehicles, troop concentrations, and strong points in reinforcing the fires of the divisional artillery, (3) provide accurate and timely information of enemy and friendly troops, and (4) in a defensive role serve as a sentry, always alert to prevent damage or destruction to his battalion and to supported troops by enemy shellfire, enemy attacks, and counterattacks.

PREPARATION FOR HIS DUTIES

An RO must prepare himself carefully and completely before setting out to locate and establish his OP. He must be thoroughly instructed by the battalion commander and battalion staff officers before he departs. The successful accomplishment of his mission will depend largely upon his preliminary planning and preparation. His preparation should be conducted according to the following plan:

1. The RO reports to the battalion CP for instructions. If a displacement is underway and no battalion CP is set up he reports to the battalion commander or S-3 on reconnaissance.

2. His battalion commander or S-3 explains to him:



Russian 76-mm gun fitted with German muzzle brake and mounted on an ex-Czech chassis (known as Pzkw-38), destroyed on a mountainside near Esperia.

(a) Enemy and friendly situation. Location of front lines and support troops.

(b) Mission of the battalion.

(c) Our fire possibilities and capabilities, including maximum ranges, right and left limits, and ammunition status.

(d) The terrain as known to them. A map is generally used. Upon rare occasions part of the situation can be pointed out on the ground.

(e) Communications, including any variations from normal procedure.

3. Then the RO checks his equipment. He must have in his possession (a) maps, (b) instruments, (c) radio with extra batteries, (d) hand reel and wire, (e) prearranged codes, codex machine, radio call signs, and (f) food and bedding.

4. The RO must constantly bear in mind that an observer without communications is of no value. Before he leaves plans must be made for wire laying, relay stations, and necessary steps to insure constant and

reliable communications. This is the observer's responsibility and cannot be delegated not excused.

LOCATION AND ESTABLISHMENT OF THE OP

Only after he has completed his preparation does the RO set out to locate and establish his OP. He should bear the following points in mind at all times:

(1) He must always know his location. He should take speedometer readings, follow his maps carefully, take compass bearings—in short, he must be able to report his location at any instant.

(2) The RO always checks with friendly troops as he goes forward. This is highly important, as situations change rapidly and the battalion commander seldom possesses complete information when he sends the observer forward.

(3) The most obvious or most conspicuous OP should not be selected if a less obvious one can be employed. This may prevent spotting and neutralization by the enemy.

For Corps Artillery purposes height is a more important factor than proximity to the front lines, for the observer's primary mission is to see far back into enemy territory where hostile batteries will be located—but *both* height and proximity to the front should always be sought.

(4) Having located his OP, the RO proceeds to get it ready for operation. He should dig in, on a rear slope if possible, and make careful use of camouflage. Radio communications are established at once. Wire is laid as soon as it becomes evident that the OP is to remain in position for a sufficient length of time to warrant its use.

OP OPERATION

The observer's first report to his battalion should include his location (in code) and the fact that he is ready to observe. He begins immediately to study the terrain in his sector. Using his maps, he locates known points, roads, towns, and streams. Employment of his compass, measurement of angles from known points with the BC 'scope, and estimation of ranges will all help to build up his knowledge of the terrain.

All types of movement are reported. If worthwhile targets appear the observer requests fire on them, explaining to the battalion S-3 his ability or inability to adjust the fire.

He must not forget his primary mission of locating enemy batteries. He constantly studies the terrain for enemy gun flashes and smoke puffs. Listening to the sound of enemy gunfire will often help the RO to locate enemy artillery. He requests fire on any enemy guns that he locates, and adjusts, if possible, by the most accurate methods.

Enemy shelling reports are among the most valuable of his reports to the battalion CP. *All* enemy shellings observed will be reported, *without exception*. Even fragmentary reports from observers enable the Corps Counterbattery Officer to compile his enemy battery lists, and assist the Flash and Sound bases to make accurate locations. Shelling reports should include location of area shelled, azimuth to enemy guns (visual or sound), number of rounds fired, estimated number and caliber of guns, exact time of shelling, and damage (damage never sent in clear).

Even at night the observer furnishes any possible information of enemy artillery. Before dusk he should zero his instrument on a known point in order to give accurate azimuths. He should never fail to make reports because of the fact that his information is limited or fragmentary.

The artillery observer is one of the most important sources of S-2 information. He should make frequent reports in code of



88-mm multi-purpose gun destroyed near Pontecorvo

friendly actions. Activities such as small arms fire, enemy flares, demolitions, and patrols should be sent to his battalion S-2 accurately and regularly. Negative reports are highly important, and are frequently neglected. Information to the effect that there is *no* movement or action on a certain road or in a sector may be of great value to higher headquarters.

Each RO must constantly strive to improve his gunnery. Careful location of targets is of little value unless he can place accurate and rapid fire on them. A great many inexperienced officers have the "get-out-of-your-chair-talking" complex. It will seldom pay dividends in combat. Five or ten minutes spent in accurate computation of data will enable the first round to be close to the target, and the adjustment can be completed with great speed.

The observer must assist his S-3 in estimation of the correct amount of ammunition to be used on a fire mission. A common fault is to employ too little ammunition on enemy batteries. Our rule is that any observed mission merits sufficient ammunition to destroy the target completely. It is not sufficient merely to neutralize it.

Lastly, the RO should always seek to keep his OP where it will best enable him to accomplish his mission. Often it will be necessary for him to push forward or change his position upon his own initiative. In so doing it is necessary to obtain permission and directions from his battalion CP.

SURVEY ASPECTS IN S.W.P.A.

By Lt. John W. Hughes, FA

A SURVEY SOP

Btry Detail is responsible for:

1. Short-basing of terrain features relative to base point.
2. Location of Btry position on grid sheet, photo, or map as required by Bn.
3. Reporting of coordinates of all positions to Bn when they are known.

Bn Survey Section is responsible for:

1. Location of Btrys on grid sheet, photo, or map.
2. Providing Btrys with common orienting line.
3. Completing a connecting area survey where required.
4. Completion of target area survey.
5. Conversion to Div Arty control when available.
6. Reporting coordinates of all positions to Div Arty when they are known.

Div Arty Survey Section is responsible for:

1. Providing common control of all Bns.
2. Checking photos and maps that are available.
3. Completing target area survey when necessary.
4. Collection of coordinates of all positions as they become known.
5. Conversion to Corps control when available.

All survey sections must be proficient in:

1. Traverse carrying direction.
2. Computation of coordinates obtained through traverse or short-base.
3. Location of position by inspection on photo or map.
4. Location of position by resection.

Bn and Div Arty Survey Sections must in addition be proficient in:

1. Use of altimeters.
2. Use of the liaison airplane.
3. Use of K-20 camera mounted in liaison plane.
4. Rotation of coordinates to conform with control furnished by higher echelon.

SUMMARY OF SURVEY OPERATIONS

The situation tempers the exact actions, but whenever possible we follow the principles discussed here.

The *first condition* is a fast-moving situation where no accurate maps or mosaics are available, and registration is made on occupation; initially an observed-fire chart is to be used.

(1) Obtaining initial data for nonregistered batteries: The survey officer goes to the center battery and measures the approximate compass and distance to the right and left batteries. The center battery having completed registration, the approximate locations of the nonregistered batteries are polar plotted on the chart in relation to the center battery. Initial data for their registration are read from the chart.

(2) The battery detail at the OP: The OP detail has 200 yds. of W-130 wire knotted in 10-yd. lengths. If observation is possible, it stretches this as a base and obtains by short base the ranges to important terrain features, relative to the base point.

(3) Location of OPs on an observed firing chart: (a) If the OPs do not have a line of known direction, one round of high burst is fired by the same gun at each of three separated points, plotting on the firing chart. Angles between the bursts are measured at the OP, and by resecting with these angles on the firing chart the OPs are located. (b) If the OPs have direction, one round of high burst, fired at two separated points plotted on the firing chart, may be used. The OP reads azimuths to the bursts and they are located on the firing chart by intersection of back azimuths from the plotted locations of the bursts.

(4) Location of OPs on a grid sheet survey: The Bn survey section sets up a short base in the position area from which it can survey in bursts. One round of high burst is fired at three separated points (two points may be used if OPs have direction). OPs read angles between (or azimuth to) the bursts while the Bn survey section short-bases in the bursts and obtains their coordinates. OPs are located by resection (or back azimuth) from the survey coordinates of the bursts. When the coordinates of the firing piece are obtained, *K* and deflection correction can be computed. Should the burst be visible from the gun position the angle of site to a burst can be read and time correction determined.

(5) Completion of target area survey: OPs located by any of the above means can read azimuths or angles from other OPs to targets, and thus complete a target area survey. OPs having been located, the front lines can be sketched on the firing chart and important terrain features added as they become known.

(6) Position area survey: The Bn survey section establishes an orienting line and the relative locations of the batteries. These facts are plotted as an overlay. Upon completion of a Div Arty check point registration by one gun, the adjusted base angle is read by the adjusting gun and the orienting line is plotted on the firing chart. The survey overlay is then oriented and the locations of nonregistering batteries are determined. By utilizing one altimeter in the position area and one at an OP,

relative altitudes can be determined. A coordinated Div Arty altimeter reading will determine the relative altitudes of Bns.

(7) The liaison plane equipped with a *K-20* camera can take obliques of the target area to supplement the firing chart. If conditions permit the liaison plane to cross the front lines the Bn will mark points in the target area with smoke and vertical photographs (including points marked) will be taken, further supplementing the firing chart. If the Bn survey section has established a base, the plane can be surveyed in the instant a vertical photograph is taken.¹ Coordinates of the plane are the coordinates of the center of the photograph. All targets identifiable on two overlapping photographs whose centers are known can be fired upon.

(8) Bn grid sheet survey: The Bn survey section completes a grid sheet survey based on Div Arty control as soon as that control is available. Div Arty control may consist of points A and B, or an altimeter reading and the coordinates of two or more points visible to the Bn. The Bn can then compute a two- or three-point resection to obtain the coordinates of its point A. If no points on the ground are intervisible between Div Arty and the Bns, using coordinated radio communication the liaison plane may mark the three points required. These same methods may be used by Bns for carrying control forward to their OPs.

The *second condition* is a fast-moving situation where an accurate photo mosaic is available. The photo mosaic is the firing chart and Btry positions and OPs are located by inspection or short traverse. An orienting line is run, and given direction through registration. Direction at the OPs is the element that is most often in error, and should be checked by firing as soon as possible. Altimeter readings are the best means of carrying vertical control, though a third point, identifiable on the photo and visible from position and OP area, is an alternate means. A grid sheet survey using Div Arty control is completed as the situation develops, using all methods previously described.

The *third condition* is a fast-moving situation where an accurate 1/20,000 or 1/25,000 map is available. The map is the firing chart; positions are located by inspection, elevation is read from the map, and direction for an orienting line and for OPs is taken from the map. This third condition is the expected condition, and all principles which apply to the first two conditions may be utilized as warranted.

SURVEY USING ARTILLERY LIAISON AIRPLANE

Methods and Results

(1) The survey section located and marked two stations in the position area. Distance between stations giving best results was one yard of base for two yards of range. The liaison plane would fly from 3,000 yards in rear of the control points, successively on the lines Station 1—Target and Station 2—Target. By radio the plane would signify when it was on the line, and readings (back azimuths to the target) were taken. Computing the resultant short bases, 25% of results were 25 yds. or under in error, 25% were from 25 to 50 yds. in error, 40% were from 50 to 100 yds. in error, and 10% were over 100 yds. in error.

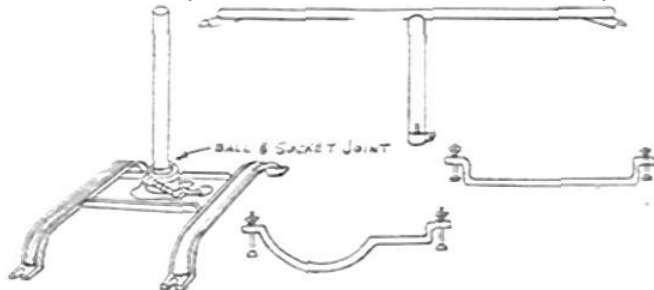
(2) Through radio communication, the liaison plane marked three points. The plane was surveyed in at these three points. An OP (by reading the angles between the three marked points) could be located within 20 yds. through resection.

¹See p. 452 of this JOURNAL for July, 1944.—Ed.

(3) The plane flew the G—T line behind the gun position. This back azimuth to the target averaged 5^m in error.

(4) The liaison plane, flying at 2,500 feet, flew directly above points to mark them. The error in location of the point was approximately 200 yds., and it varied 50 yds., depending on the judgment of the observer.

(5) A K-20 camera mounted to take vertical photographs was installed in the liaison plane to definitely determine the point the plane was over when it radioed "Mark." Tracking exercises proved that different sets of observers would locate the plane within 7 yds. of one another. The center of a vertical photo taken the instant the plane was surveyed did not increase this error when care was taken to level the camera. This is sufficient accuracy to control a series of verticals flown by the



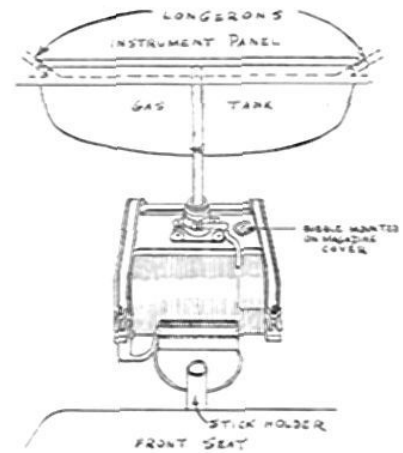
Mount for K-20 camera in liaison plane

Air Corps. Photos taken by the liaison plane for this purpose must include important terrain features to facilitate location by inspection on air corps verticals. Two overlapping verticals flown by the liaison plane and surveyed in may be used to supplement firing charts and to facilitate accurate unobserved fire.

(6) Strips of the target area were flown by the liaison plane with the K-20 camera. This proved uneconomical due to the small coverage of photos taken. Strips flown by the Air Corps are preferable.

CONCLUSION

Survey operations in jungle terrain can be speeded up without loss of accuracy by use of the liaison plane. Air survey can be run over terrain through which ground survey cannot be accomplished.



K-20 mounted in liaison plane

MINE SWEEPER, LAND STYLE

Britain has developed a "flail" device to facilitate tanks' passage through mined areas. Essentially it is a rotating drum which is projected ahead of the tank chassis; heavy chains whirl like a flail as the tank advances, exploding any

mines in its path. It has been adapted to different models: upper left photo shows "The Baron," mounted on a Matilda chassis, and in lower left is the "Crab."



NOTICE OF ANNUAL MEETING, U. S. FIELD ARTILLERY ASSOCIATION

In compliance with Article VII, Section 1, of the Constitution, notice is hereby given that the Executive Council has fixed 5:30 P. M., Monday, December 18, 1944, as the time of the annual meeting of the Association to be held at the Army and Navy Club, 1627 Eye St., N. W., Washington, D. C.

The business to be disposed of will be the election of three members of the Executive Council (two Regular Army, and one Organized Reserve), and the transaction of such other business as may properly come before the meeting. Nominations may be made by proxy, or from the floor of the meeting.

CELEBES

By Col. Conrad H. Lanza

Celebes (accent on second syllable) is the intermediate island between the Asiatic and Australian types. West of Celebes, Borneo, Java, and Sumatra are distinctively Asiatic as to fauna and flora; to the east, the islands represent the peculiarities of Australia.

The islands of Sumatra, Borneo, and Java are separated from each other and from the Malaya peninsula of Asia by shallow seas which seldom exceed 200 feet in depth. They probably all had land connections with Asia at some past time. Celebes is separated from Borneo and Java by very deep water, suggesting no previous land communication. On the north the sea passage between the island and Mindanao is also deep.

The fauna of Celebes is distinctive. None of the large animals of Asia and Australia are present. In their place are found types intermediate between the two. The local monkey is found nowhere else. A special type of oxen, quite small, is common. The babirusa resembles a cross between a deer and pig. More than half the species of birds are peculiar, and the same is true of the insects.

A similar situation exists as to flora. Rice is produced in

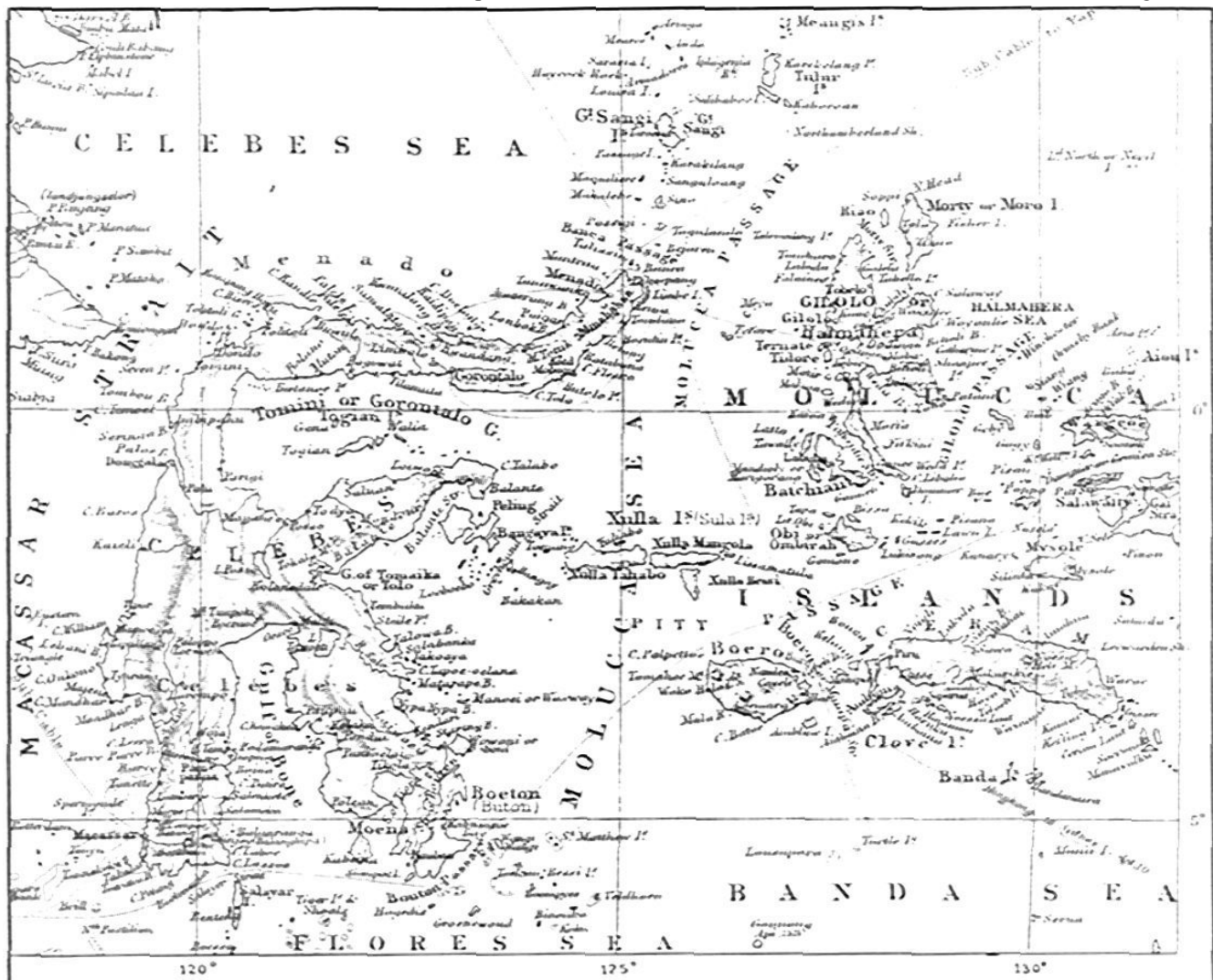
Celebes, but it is inferior in quality to that found on the Asiatic islands and superior to that of islands still further east.

Celebes has an area of about 77,000 square miles. This is as large as all of New England plus that part of New York State east of the Hudson. It consists of four peninsulas (pointing northeast, east, southeast, and south) all having a common base. The northeast peninsula has an average width of but 50 miles; the others are double this.

Down each peninsula is a range of mountains of volcanic origin, with individual mountains exceeding 10,000 feet in altitude. Active volcanoes are limited to the northeast peninsula.

The interior of the country is generally rough, with deep ravines, chasms, and gorges. It differs from Java in that the volcanoes, active and retired, are part of a mountain range in Celebes, whereas in Java they are often detached mountains. The Celebes mountains are in general densely wooded. Plateaus under cultivation, and level spaces near the coast and along stream lines, afford space for the native population.

Monsoons affect the south half of the island, and the west side more than the east. The northwest monsoon brings rain



from November to March; the southeast monsoon during the remainder of the year is materially drier. The northeast peninsula is exempt from the monsoon, and its rains, which may amount to 100 inches or more a year, have no connection with the monsoons. In monsoon territory rainfall on the coast exceeds 150 inches per annum.

The population is entirely Malay, belonging to six different groups, speaking somewhat different dialects, and with variations in customs. Last Dutch census reported 4,226,586 inhabitants, which is twice what it was supposed to be at the beginning of this century. This rapid increase occurred because Celebes only recently passed under complete Dutch control. The last wars ended in 1906. Prior to that date head hunting and inter-tribal wars were common; they kept the population down. The Dutch abolished these undesirable customs, much to the apparent delight of the natives themselves. The latter have eagerly accepted Dutch rule as infinitely better than their own previous lives under native rulers.

The Dutch did not dethrone the former rulers. They remain, but in consideration of a salary paid to them annually by the Dutch Government they have each designated and authorized a Dutch Resident to administer the law in their respective states. The Resident is also authorized to issue licenses for rights relating to mines, forests, and other public resources.

With exceptions the Malays are nominally Mohammedans, and to some extent follow their religious principles although without being fanatic. The Dutch Residents do not interfere with religious customs, which the native rulers control. Furthermore, the Residents regularly consult the native rulers on important matters relating to their people. They supervise the succession among the rulers, to assure that they are competent and ready to comply with the Dutch rule.

There has been no movement regarding independence. Until this century Celebes was split among numerous tribal chieftains. Only lately, then, have the people been able to travel freely within their own island. They have been so satisfied with this that prior to Japanese occupation they had shown no desire for greater liberty.

Dutch garrisons have been small—usually not over one company at but a few places. Naval vessels regularly visited the ports. There is a native police, which is omitted in many districts as unnecessary. Local disputes are generally settled by a headman, who is sometimes elected and sometimes succeeds by heredity. In general the people have become unusually peaceful and law abiding, and apparently were well contented with Dutch rule.

From a military point of view there are only two important locations in Celebes, at the extreme southwest and northeast corners.

Makassar is the capital of the Residency of Celebes, which covers the south and southeast peninsulas and the west coast. It is a city of 87,000 people and the principal commercial center. There is good roadstead for ships; it is satisfactory during the southeast monsoon, but liable to be rough during the northwest monsoon. As piers and warehouses are available, the port is suitable for a minor military base. There is a good system of hard surfaced roads in the vicinity. These were not connected with roads in the center of the island or beyond. The Dutch

have had a project for extending the road system from Makassar all the way to Manado (Menado) at the northeast extremity, where there is another local road net. This had not been undertaken at the date of Japanese occupation. Unless this has been done, Japanese forces at Makassar are isolated by land from other supporting troops. With loss of sea and air control eventual reduction is bound to follow a serious attack.

There are good beaches both north and south of Makassar (Mangkassar on some maps). The central part of the town has stone houses. Many houses have gardens, but enclosed by high stone walls, usually painted white. This part of the city lends itself to defensive positions for street fighting.

The government center has a good administrative building, a post office, hotel, quarters for the Resident (here designated as a Governor), and an old fort erected in 1650 with granite walls, still suitable for close defense. Inside the fort are barracks for about two companies. The whole arrangement would be convenient for a base station. Leading from the government center are two fine avenues with numerous European houses, some of which are official.

About 20 miles south of Makassar is Goa, which is the headquarters of the local Sultan, often designated as the King of Goa. Like other native rulers, his prerogatives and

dignities are confirmed by solemn treaty. In case of invasion, especially by non-Mohammedan forces, strict respect to local rulers is likely to be more than repaid by a willingness to collaborate in many matters which are bound to arise.

Makassar is a good base, then, but by no means a first class one. Its main value lies in operations against Java, about 400 miles to the west. There was an airport at Makassar, and it is probable that the Japanese have considerably enlarged it.

The hill country back of Makassar lies at elevations between 2,000 and 3,000 feet. It is considerably cooler in the hills, and good sites for hospitals, rest centers, and replacement camps are available.

Six hundred miles in an air line northeast of Makassar is the Minahassa country, designated as the Manado Residency, with headquarters at a town of the same name. Just as Makassar is a natural site for a base for operations against Java, Manado and adjacent ports form a natural base for operations against Mindanao. It is 400 miles to Davao in a north-northeast direction, and the same distance to Jolo, in the Sulu Islands, in a northwest direction.

Thirty miles southeast of Manado is the bay of Amoerang, with a small town of the same name. This is the best harbor in the Minahassa. It is, or was, completely undeveloped from a military viewpoint. The town is small and unimportant. There is considerable flat country in the vicinity, suitable for air fields, bivouacs, etc. This part of Celebes resembles Java in that volcanoes of nearly perfect conical shape rise high above the surrounding areas. Three are classified as active.

The natives belong to a special tribe of Malays. They resemble Japanese. They have songs and certain words resembling Japanese so strongly as to indicate that there may have been some connection with Japan long ago, of which there is now no record. The natives have been widely converted by



Celebes fishing boat

missionaries to Christianity, partly Protestant and partly Catholic. Wearing of European clothes is common. There are many good roads. The entire country is cultivated. Forests remain only on the higher altitudes of the volcanoes.

Towns are regularly laid out with streets at right angles in an orderly manner, and are very clean. Houses are often raised above ground on piles to reduce insect pests within buildings. Usually the houses follow the European type with doors, windows, porches, and the customary furniture. They are suitable for use of invasion forces.

The back country, at an elevation of 2,000 feet or so, contains lakes. Tondano Lake is the best known, and is a suitable place for rest, recreation, and hospital sites.

Manado is the capital and headquarters of the Resident. The long jetty at Manado can not be used by launches under certain condition of weather. There is a fine bay, but it is open toward the west. When the wind blows from this direction it is so rough as to prevent unloading of ships. Anchorage is limited due to the water's being very deep close to shore. (For these reasons Amoerang would be a better site for a base, with Manado as a sub-base, for ships up to the limited facilities of the port. In the absence of piers, mooring buoys are advisable.)

There is an European section, an administrative building, quarters for the Resident and some other officials, post office, etc., and two hotels. There are good private residences. The native section is separated from the European by a river.

Across the Minahassa peninsula is the sub-port of Kema, undeveloped but available. It contained a fuel depot for the Dutch Navy and commercial ships. When Manado is temporarily unavailable for unloading ships, due to high west winds and a heavy sea, Kema is perfectly quiet. This little port is connected by a good road with Manado, which is about 30 miles away.

On the southwest end of the Minahassa peninsula is the port of Gorontalo. Commercially it is the most important in the district. It could be used as a military base. Its location is such as to be sheltered from attacks from the north.

The central part of Celebes is renowned for the beauty of its scenery. Due to lack of roads it has little military value, and serves chiefly to separate the Macassar and Minahassa areas. It is practicable for only small parties to go overland from one of these areas to the other. There is practically no danger that Japanese troops in one of the areas could attack the other by marching 400 miles through mountain jungle.

SANGIR ISLANDS

From the northeast tip of the Minahassa the Sangir Islands extend in a due north line to within 60 miles of Mindanao. There are nearly 40 small islands in the group, excluding islets.

The largest island is Taroena (Taruna on some maps), which is near the center of the group. On it is Mount Aboe, a very active volcano. The Sangir Islands are thickly populated, and have been doing a thriving trade in copra. The natives have generally been converted to Christianity by missionaries, who were also responsible for introducing and cultivating the coconut palm. Contrary to the usual situation, the coconut palm here grows better on the slopes of the volcanoes than close to the sea shore. Consequently practically all of the islands are cultivated.

None of these islands is suitable for a military base. They are, however, natural stepping stones from the Minahassa peninsula to the Davao area of Mindanao. Small harbors, available for temporary use, exist at Taroena and at Siau (Siao on some maps). The latter, half way between the Minahassa and Taroena, has an active volcano 8,000 feet high.

TALAUT ISLANDS

A hundred miles northeast of Taroena are the Talaut (or Tular or Talauer) Islands.¹ These are similar to the Sangir Islands but the main island (Talauer or Karekelang) is larger than any other. It is 150 miles from the entrance of Davao Bay.

TERNATE

One hundred and seventy-five miles east of the Minahassa peninsula in Celebes is the small island of Ternate (25 square miles). It lies just off the west coast of

Halmahera, a much larger island. Twenty miles south of Ternate is Tidore, an other small island (30 square miles).

Ternate and Tidore each has a small port. Each is of political importance, as the headquarters of a Sultan. Each Sultan, under direction of a Dutch Resident, exercised considerable control over an extensive area which included all of Halmahera, the east central part of Celebes (which bears the name of Ternate District), the west part of Dutch New Guinea, and numerous islands between Celebes and New Guinea.

Ternate and Tidore form two of a chain of remarkable volcanoes which extends in a north-south line through the Philippines, the Sangir Islands, Ternate and on beyond. It is a very active range, although not all volcanoes are active at this date.

Ternate was the headquarters of the Resident, and is equipped with administrative buildings. The volcano, 5,400 feet high, consists of three superimposed cones rising one inside the other and symmetrical in shape. Earthquakes are frequent and are occasionally of destructive force.

Tidore has a larger town, and a larger volcano (5,700 feet high) but a less active one. The city is a walled town on the east coast.

Both Ternate and Tidore have been under European influence for 400 years. The people are nominally Mohammedans. There is a considerable mixed population of white and



Makassar

¹Previously known as the Salibabo Islands.

native blood, partly of Portuguese, Dutch, and other races. This section of the community is nominally Christian, mostly of the Protestant faith.

Ternate and Tidor are way stations on the way from New

Guinea to Celebes and lands further north and west. From a political point of view both have considerable importance over the natives of the eastern part of the Netherlands East Indies.

A PLEA FOR SIMPLIFICATION

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

A feature of our military maps to which we have long clung for no apparent reason is the practice of indicating altitude in feet. Presumably this was inherited from the military engineers of earlier days or from the Coast and Geodetic or Geological Survey people, who followed the fashion of the day. Since they were scientific folk they doubtless had good reason for the practice, but the reasons are not apparent as far as military maps are concerned.

For the infantry the custom is probably satisfactory, since they are interested in relative altitude only in a general way—only insofar as it affects their observation and movements. But for the artillery, vertical control is equally as vital as horizontal control. True, the present system is quite accurate, but for the preparation of artillery firing data it presents an unnecessary

annoyance—the necessity of always converting feet into yards; it simply provides another source of error and lost time.

The solution of any gunnery problem consists essentially in determining the relative positions of gun and target—relative position in *three dimensions*—and then determining firing data corresponding to this relationship. Why not, then, think of our surveyed points as having *three coordinates* in the same units, instead of two expressed in yards with an altitude in feet appended as an afterthought?

Then, instead of having an X and Y coordinate in yards and an altitude in feet, points would have an X, Y, and Z coordinate all in yards, Z being the altitude. It is just as easy to contour a map in yards as in feet.

TWO IMPORTANT MANUALS

FM 6-135, *Field Artillery Forward Observation*, was published on 10 Aug 44. A good bit of the material from which it was drawn is found in this and last month's JOURNAL under the title *Field Artillery Observation*. In addition, the manual has an excellent chapter on adjustment of artillery fires by forward observers.

FM 25-7, *Pack Transportation* (25 Aug 44), gives that subject its first adequate treatment. It supersedes Chap. 4 of FM 6-110, *Pack Artillery* (1 Mar 40), and Chap. 5 of FM 25-5, *Animal Transport* (15 June 39).

Sale copies will not be available for some time—not until all official distribution has been completed.

AN UNUSUAL METHOD OF MULTIPLICATION

A very interesting method of multiplication was presented in a recent issue of *Revista del Ejercito*, which is published in Mexico. In that publication it was referred to as the "Russian" system although no indication was given as to why it is so called.

The method, somewhat longer than the ordinary one, proceeds as follows:

1. Take the two factors to be multiplied and put them down opposite each other: e.g., 23 . . . 55.
2. Divide the left-hand figure by two until unity is reached. (Note: the result of this division will always be a whole number, any fraction being discarded. For example, dividing 23 by two, the answer is taken as 11 rather than 11½, and 11 divided by 2 will be 5 rather than 5½.)
3. Double the right-hand factor as many times as the left hand figure was divided to reach unity.
4. Wherever an *even* number appears in the left-hand column, cross out the figure immediately opposite and disregard it thereafter.
5. Add the remaining figures in the right-hand column, that is, those opposite *odd* numbers in the left-hand column, and the sum will be the product of the multiplication.

The following are examples of the method in use:

	23	55
	11	110
	5	220
even number→	2	440←cross out
	1	880
	<hr style="width: 50px; margin-left: 0;"/>	
	1,265	

even number→	64	44←cross out
even number→	32	88←cross out
even number→	16	176←cross out
even number→	8	352←cross out
even number→	4	704←cross out
even number→	2	1,408←cross out
	1	2,816

2,816

While more involved than the method in general use for multiplication, this procedure may be used as a good check or proof of the standard method. It sometimes occurs that one will make the same error in multiplication consistently, and the error does not come out in the regular proof by division. In such cases the method outlined above will be of value. Besides, it is of general interest—particularly as to determining why the method works.

—Military Review

Feldherr Hitler and the Hedgehog

By Stefan T. Possony

AUTHOR'S NOTE

Since this article was written Hitler has been forced from hedgehog positions in the Baltic, in Normandy, and in southern France. He still clings to that strategy, however, refusing to withdraw his forces when he still could without excessive loss, and considering territory more important than organized strength. There is little doubt that his "intuition" helps us gain our current victories—and that as long as he is directing German strategy it will continue to help us.

In his "Stalingrad" speech of September, 1942, Hitler boasted of his accomplishments as a *Feldherr* and praised his own artfulness in defensive warfare. Indeed, as a defensive warrior Hitler has a unique record. His military art led the German army to the two greatest defeats in its long history.

When the Germans entered the present war, they had a well-developed doctrine of defensive warfare. It had been formulated by Field Marshal Ritter von Leeb, who based it upon Clausewitz and upon experience gained during the First World War. The doctrine of elastic defense prescribes that the offensive of the enemy shall be slowed down, the heaviest possible loss inflicted upon the advancing adversary, and a counterattack be launched at the precise moment when the attacker has overreached himself. The attack should be pivoted upon a *Schwerpunkt* (center of gravity) and conducted, if possible, with superior forces against the flanks of the attacker. "The purpose of the defense," said Leeb, "is to break the strength of the attacker, to weaken him and to bleed him until the respective forces are equalized," or the ratio of forces reversed.

As it was demonstrated in the early campaigns of the present war, this doctrine is inapplicable if the offensive arms are much more effective than those of the defensive. Elastic defensive is also impractical if the attacker succeeds in breaking through and exploiting his breakthrough speedily. In 1940, the French army was cut into segments. Far from being able to equalize forces, it suffered heavier loss in its defensive fight than the German army. Instead of gaining strength by its retreat, the French army disintegrated in the process.

The Russians profited from this lesson, and amended the doctrine of elastic defense for use in a modern war of movement. Russian units did not retreat when they were strongly menaced in their rear, not even when they were threatened by encirclement. On the contrary, such forces offered resistance in *extremis*, and by sacrificing themselves inflicted heavier losses upon the German army. Thus, the German advance was slowed down and the Russians gained enough time for putting new armies into the field. This technique of defensive warfare, however, was made possible only by the immense spaces of Russia and by the equally immense manpower resources of that country. It was a temporary stratagem to compensate for Russia's initial inferiority in modern material. It is doubtful whether any other country, with the possible exception of China, could deliberately accept losses of similar magnitude.

When it was the turn of the German army to operate defensively in the winter of 1941-1942, the generals, of course,

wanted to fight according to Schlieffen's principle that it is better to sacrifice a province than to split the army. Hitler, however, was convinced that the striking power of the Red army had been broken and that the German retreat would only be a temporary expedient. Consequently, he reasoned, positions of ulterior offensive value should not be abandoned, even if their communications with the main German army were severed. When the hour of offensives would strike, it was hoped, contact could be quickly reestablished and deeper penetrations would become possible as a result of attacks launched from the formerly encircled positions. The isolated pockets were expected to accelerate subsequent German offensives just as three years later the advance of Lt. Gen. Clark's Fifth Army was accelerated by attacks from the Anzio beachhead. In the worst case, so Hitler's theory ran, such firmly-held positions would pin down large Russian forces and thereby limit the extent of the German retreat.

The German General of Artillery, Walter von Seydlitz, at present Russian prisoner-of-war and Vice-President of the National Committee "Free Germany," recently revealed that Hitler also coined the terminology for his strategic scheme, to wit, *sich einigeln*, which in literal translation means "to hedgehog oneself in," or to form a *laager*. A less colloquial term is *sich einkesseln*, or as noun *Einkesselung*, to kessel oneself in. Note that it is not, as grammatically and logically it should be, *sich einkesseln lassen*, or to permit oneself to be kesseled in. Instead of a passive, an active form is used which evidently implies that the encircled force, so to speak, executes the encirclement itself.

The first instance of this kind of action took place shortly after the battle of Moscow. In particular the units around Kholm and Valdai (Demjansk) were ordered to hold their positions in spite of the severing of their communications. The group at Kholm was under the command of General Scherer. At Valdai, the entire Second Army Corps under General Graf Brockdorff, a total of six divisions, was *kesseled* in. Kholm and Valdai are situated between Leningrad and Moscow and could serve as bases for offensive moves in either direction. General von Seydlitz revealed that Field Marshal Ritter von Leeb, then Commander of the German Army Group North, strongly objected to both *Einkesselungen*. The objections of this expert in defensive warfare were overruled by Hitler. Leeb executed the orders and resigned.

It is true that these first attempts at the *Einigel-Strategie* were partially vindicated, if only at heavy cost. Before the cutting of their communications, both positions had been amply provisioned. As the *Kessels* were small and not too distant from the main front, they could be supplied from the air, although the *Luftwaffe*, in order to get the necessary numbers of planes, was obliged temporarily to discontinue its transport flying schools. The *Kessels* were relieved after several weeks. General von Seydlitz, who reports the incident, himself commanded the troops which freed the Valdai *Kessel*, and he states that his relief offensive was extremely costly. The encircled garrison also had suffered heavy loss. The result was not worth the effort, because no subsequent offensive was undertaken on the northern Russian front.

The fact that contrary to the advice of the generals Kholm and Valдай had been held made Hitler confident that he could repeat his strategy at Stalingrad.

Shortly after the beginning of the Russian counteroffensive in November, 1942, according to General Seidlitz, Hitler called a council of war where his ideas were opposed by practically all the generals present, including Manstein, Zeitzler, Richthofen, and Paulus. It was pointed out that the German Sixth Army at Stalingrad was short of supplies and occupied poor defensive positions. Above all, Hitler was told that there was no practical way of supplying the Sixth Army. However, Goering flamboyantly announced: "Mein Fuehrer, I formally guarantee that my *Luftwaffe* will supply the Sixth Army adequately." Paulus, who wanted to break out from the siege, was overruled. Hitler gave the order that Stalingrad be held.

Goering's promise and Hitler's credulity shed a curious light on the military knowledge of the two top Nazis. There were, of course, not enough planes for provisioning 22 divisions. Besides, the tactical situation was as bad as it could be for the *Luftwaffe*. There was only one big airfield at Stalingrad suitable for transport planes, and this airfield was situated inside the range of Soviet artillery. The distances to be flown between Stalingrad and the rear bases were considerable and the flights were to be made over open steppes, i.e., over terrain where effective antiaircraft fire could be organized. The Soviet force had also become stronger. German transport planes were shot down by the score. On the average only 60 tons of supplies (mostly old bread!) reached the Sixth Army per day, or less than 250 grams daily for each of the encircled soldiers.

Stalingrad cost the Axis armies 22 divisions: approximately 220,000 prisoners and 110,000 killed. This altogether avoidable disaster was largely due to Hitler's inability to appraise hard military facts correctly.

Almost at the same time that the decision concerning Stalingrad was taken Hitler had also to decide upon a new course in North Africa, where after El Alamein and our landings in Morocco and Algeria the balance of power had been completely reversed. An orthodox commander would probably have tried to salvage the Afrika-Korps by evacuation. He might also have fought to the last shell, but it is inconceivable that after November 10, 1942, any sober military leader would have dispatched large additional forces to North Africa, thus throwing good money after bad. The attempt to hold Africa would have made sense only if the Germans were convinced (a) that Rommel could defeat (or at least stop) Montgomery, (b) that they would be able to concentrate stronger forces in Tunisia than the Allies, and (c) that the Germans and Italians would be able to maintain their sea communications across the Mediterranean.

Whatever his motives and hopes, in this case Hitler not only left forces behind in a *Kessel* but sent large units overseas into a *Kessel* created entirely by his own volition. He put the *Afrika-Korps* and the newly formed units under General Nehring (and later von Arnim) into a position where they were menaced from three sides and cut off from their supply bases. Thus, Hitler fought a perfect battle of *Cannae*. However, contrary to the German tradition, this time the Germans did not

play the role of Hannibal but that of Terentius Varro. Hitler paid tribute to Schlieffen by demonstrating that battles in the style of *Cannae* indeed inevitably lead to annihilation. Between November 1942 and May 1943 alone, the Axis lost in Tunisia 267,000 prisoners, 30,000 killed, and 27,000 seriously wounded—not to mention the losses which occurred between El Alamein and Tripoli.

Thus in three months Hitler achieved what popularly is called in Germany "the greatest bankruptcy of German history." He lost approximately 650,000 men. This was 100,000 more men than Napoleon lost during the half-year of his Russian campaign (which up to the present war had been considered as the greatest single defeat on the historical



Well-placed AT fire has just knocked out (in Normandy) this German tank, which is being examined cautiously by alert GIs. This is a Russian 76.2-mm gun mounted on the PzKw 38 (ex-Czech) chassis.

record). In the greatest defeat of the First World War, Caporetto, the Italians lost 265,000 prisoners, or a few less than the Axis lost in Tunisia. The two greatest German victories in the last war were the battles of Tannenberg and the Masurian Lakes, where respectively 93,000 and 110,000 prisoners were taken. The Allied victory in August 1918—the beginning of the ultimate German collapse—brought a haul of only 40,000 prisoners. These figures give an idea of the dimensions of the Hitlerian defeats.

Undaunted, Hitler forced the German army to retain his principles. In the course of the German retreat on the Eastern Front which began after the battle of Kursk, time and again *Kessels* were deliberately left behind. According to Russian reports, ten German divisions were encircled and annihilated at Cherkassy. Although the Germans claimed to have rescued part of this group, the fact remains that the Russians after their victory of Cherkassy carried out one of their fastest and deepest advances of the war, reaching the Carpathians exactly to the west of Cherkassy.

The "Kuban bridgehead" presents another example of the *Einigel-Strategie*. Why after the fall of Rostov a strong German corps was left behind on an 80-mile front in the Kuban estuary remains inexplicable. German war correspondents took pains to explain that the Kuban bridgehead was the first line of defense for the Crimea and the Ukraine. If so, it was ineffective. Four German divisions were routed alone during the capture of Novorossisk. The Kuban operation was criticized in the German army as a futile dispersion of force.

The Kuban operation was repeated on the Crimea with much larger forces. By any orthodox standard the Crimea should have been evacuated in November 1943, after the fall of Perekop. Yet Hitler left four German and seven Romanian

divisions (or at least 165,000 men) on the peninsula. Only after the fall of Odessa in April 1944 did the evacuation of the Axis forces begin. The Russians asserted that during the Crimean campaign the Axis had suffered approximately 90,000 casualties, including prisoners. This figure would indicate that the Germans had succeeded in evacuating more than 40% of their original force, yet it also shows that they had to pay an extremely high price for the Crimean hedgehog which failed to slow down the Russian advance on any of the important fronts. And even after the Crimea had already fallen into Russian hands, another futile *Einkesselung* was undertaken at Sevastopol.

There were still other small *Kessels*—for instance, at Kovel and Tarnopol. An interesting story is connected with the *Kessel* of Tarnopol. It was apparently considered unfortunate that the German garrison of Tarnopol had been annihilated on the eve of Hitler's birthday. Consequently, the German radio announced that Goebbels had received a delegation from the former garrison of Tarnopol. Brig. Gen. Neindorff, it was further stated, was not with the delegation because he had been killed in action. To this the Free Germany radio at Moscow replied: "Yes, General Neindorff could not appear before

Goebbels, but neither could any other member of the garrison of Tarnopol, which once numbered 16,000. They have been all killed except 2,400 men who surrendered."

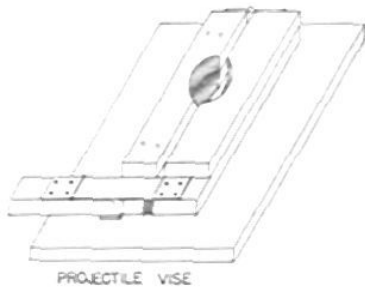
Altogether, the various *Einkesselungen* on the Russian front between 1942 and the spring of 1944 have cost the Germans and their allies the equivalent of 40 divisions. Even if some of the Russian claims are discounted, the Germans, as a result of Hitler's hedgehog strategy, lost undoubtedly more than 30 divisions. In addition, there are the losses of North Africa—a grand total of 50-60 divisions lost to the German High Command within only one year and a half. Such are the fruits of "intuition."

Hitler is the only "*Feldherr*" in history who has survived such defeats. "Hitler abandoned the proved principles of strategy," says Gen. von Seydlitz, "because he overrated the strength and effectiveness of the German troops and underrated the ability and effectiveness of their opponents. He thus committed mistakes which are characteristic of dilettantism as well as of lack of experience and training."

Allied generals may still find other opportunities to congratulate themselves for Hitler's intuitive dilettantism and his apparent inability to learn from previous mistakes.

PROJECTILE VISE

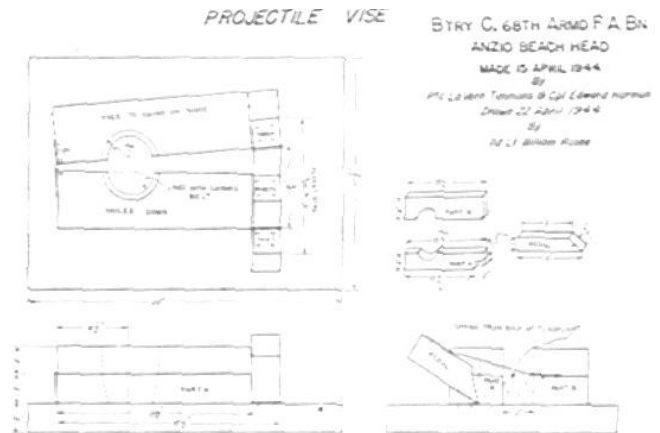
By Lt. William H. Rosee, FA



"Just a gadget that 1st Lt. Alvin E. Christensen and two of his gun crew men worked up," says Capt. Robert E. Bard, commanding Btry C of the 68th Armd FA Bn. The men are Pfc. LaVern Timmons and Acting Chief of Section Cpl. Edward Harmon.

Maybe so, maybe it is "just a gadget," but this bracket which clamps the time projectile in place while the fuze setter is applied is partly responsible for C Btry's reputation for turning out some of the fastest 105-mm time fire on the fighting front. Both time and manpower are saved, because formerly one man was needed to hold the shell while another applied the fuze setter. Now the man with the fuze setter does both jobs, and the extra man speeds up fire by fixing the charge and passing shells to the piece.

The accompanying diagram is self-explanatory. Hinges, wood, and other material from ammunition boxes, a bit of canvas, and the spring from the back of a flashlight are all you need.



RAIN FOREST OP

Difficulty of observing in New Guinea's jungle led to construction of this variant of a bosun's chair. The observer is hauled aloft by tackle rigged through a block securely fastened to a high but stout limb of the tallest tree in the neighborhood. Although the view is fine, this is no windy-day job for a person subject to seasickness!

TRENDS in Field Artillery Organization & Equipment

The field has long felt the need for information concerning new items of equipment and changes in Field Artillery organization before they are actually published in Tables of Organization and Equipment. To fill this need each future *Field Artillery Journal* will include changes as they are approved by War Department. It is not intended that this column prophesy, or consider items under development, but rather that it reveal approved changes that are actually to be made in organization and equipment.

Through these monthly columns Field Artillerymen will have advance information of changes which will later be reflected in published Tables of Organization and Equipment. This column does not constitute authority to requisition either personnel or equipment listed herein.

A Forward Observer Section [consisting of one officer, two enlisted men, one Radio Set SCR-619, one Remote Control Equipment RC-261, one truck, ¼-ton, and one trailer, ¼-ton, with allied equipment] has been authorized on the basis of one per 105-mm howitzer battery and one per medium battalion, when part of an Infantry Division; one per 75-mm howitzer battery when part of an Airborne or Light Division.

The grade of second lieutenant, formerly indicating the battery motor officer, will be listed in conjunction with a first lieutenant—i.e., the communication platoon commander in headquarters batteries, the reconnaissance officer in gun or howitzer batteries, and the ammunition train commander in light and medium artillery. The battery motor officer now has an opportunity for promotion to first lieutenant, if in the opinion of the Battery Commander he is the more efficient of the two officers in the combined listing.

The designation of the driver of the airplane maintenance truck has been changed to mechanic, army airplane and engine (747), technician grade 5. He will continue to drive the airplane maintenance truck. The ground crew helper has been deleted from all tables.

Higher echelon maintenance and supply of liaison airplanes will be furnished by the Army Air Forces Depot Unit, Army, T/O & E 1-407. One such depot will be assigned to each army. This unit will be under the supervision of the Army Artillery Air Officer.

Two mules with drivers have been added to the pack artillery battery, to help pack the increased loads caused by the weight of the wheels on the M8 carriage. The Carbine, cal. .30, M1, has been replaced by the M1A3 (folding stock) in pack artillery. The folding stock has the advantage of not causing the carbine to be in the way of the individuals loading or leading mules. Two additional Telephones EE-8-() have also been added to each pack howitzer battery.

A light known as Lamp, electric, portable, command post, is being produced on the basis of one per Tent, command post. This light is operated from two 6-volt batteries, vehicle batteries, or from a power unit. In addition, the Electric lighting equipment, set No. 3, 3 KVA, has been approved for

Headquarters Battery Infantry Division Artillery, Brigade, Corps Artillery, Group, Cavalry Division Artillery, Armored Division Artillery, and Light Division Artillery. The Electric lighting equipment, set No. 2, 1½ KW, is being included in all Battalion Headquarters Batteries except pack artillery. This equipment should amply fill the need for sufficient light in Field Artillery headquarters batteries.

The Kit, interpreter, photographic, type F-2, which is now in all headquarters batteries, is to be operated by present authorized personnel in addition to their other duties.

In the observation battalion, the Sound Ranging Set GR-3-C, is limited standard and will be replaced by the GR-8, a new, lighter set. A Protractor, fan, plastic, sound ranging, time scale 1/25,000, set of 2 is approved on the basis of 2 per observation battery and sound ranging platoon. Radio Set SCR-658 is authorized on the basis of one per headquarters battery, observation battalion.

In pack, truck-drawn, artillery the grade of the combined S-4—S-1 has been raised to Captain. One cook has been added to the motor transport platoon which may be assigned to augment this battalion.

Firing tables are now expendable Adjutant General publications and are being deleted from T/O & Es. The basis of issue is included in C2 to FM 21-6, dated 1 April 1944. Graphical firing tables are nonexpendable and will continue to be included in Section II of appropriate T/O & Es.

The Slide, M1, is a new item to be used with the substitute standard 18-inch graphical firing table. Its purpose is to assist in survey calculations.

A range deflection fan 1/50,000 scale, range 35,000 yards, and the range deflection fan, 1/25,000 scale, range 26,000 yards, will go to all higher headquarters, battalion headquarters, and gun or howitzer batteries of medium and heavy artillery.

All Field Artillery officers will receive a Templet, map, plastic, transparent, M2. Intrenching shovels are authorized to Field Artillery officers outside continental United States when authorized by Theater of Operations commander.

Radio Sets SCR-609 and SCR-610 are limited standard and will be replaced by the SCR-619, which possesses essentially the same characteristics but is a much lighter and more compact set. This is also true of the SCR-694, which replaced the SCR-284.

An Odograph, land, 6-volt, M1, is approved for each headquarters battery, Infantry Division Artillery, Group, Brigade and Corps Artillery in Theater of Operations when authorized by Theater of Operations commander.

The grade of the motor sergeant in the group headquarters battery has been raised to staff sergeant.

The Polarmeter, British, M1, a device for orientation on Polaris or other celestial bodies, is being included in tables for headquarters batteries, division artillery, battalions and gun and howitzer batteries of medium and heavy artillery.

Send us your change of address card whenever you (1) receive an A.P.O. number, or (2) move, or (3) change units, or (4) go to a P.O.E., or (5) ship overseas, or (6) return to this country, or (7) change A.P.O. numbers.



BRASSING OFF KRAUT

By Maj. Edward A. Raymond, FA

"A correct understanding of the capabilities and limitations of tank destroyers can only be given to artillery, infantry, and tank commanders by combined training with the TDs prior to combat. It is very necessary to develop teamwork between the tank destroyers and each of the three principal combat arms."—*Artillery Officer (U. S.) AFHQ.*

Far more German tanks have been knocked out during the North African and Italian Campaigns by one TD battalion than by any other. That battalion has had about the lowest losses in proportion to tanks KO'ed. Its men have fought for more days, have made more amphibious landings, and are more decorated, than any other Tigerheads extant. This is the story of their work at the Anzio Beachhead from D-day to the end of March.

The lessons the battalion learned in the battles of Sbeitla and El Guettar, during the Tunisian Campaign, were told in this JOURNAL for January, 1944*. Much water has run under the bridge since then. This battalion has turned in the old 75-mm guns on half-tracks with which it started fighting, and drawn 3" guns on a diesel-powered tank chassis, the M-10. Through constant, heavy fighting on the main Italian front the battalion learned the versatility of its equipment. In addition to doing its primary job, it learned to play on three teams—with infantry, with field artillery, and with tanks. It landed in the assault waves at Anzio.

OFFENSIVE PHASE

The battalion reached shore just after dawn on January 22nd. The first twenty-four hours were spent in unloading, moving to an assembly area, and de-waterproofing. Due to the marshy ground it took a lot of labor to reach the assembly area. Reconnaissance was initiated right away, and combat not long after. Next day B Co's 2nd Platoon destroyed a Kraut tank with APC and knocked out an enemy strong point in a house with HE delay.

It took the Germans until the 2nd of February to gather their forces and to start their major attempts to crush the beachhead. Meanwhile the Allied forces struggled desperately to extend

*P. 14, *Slugging It Out*, by the present author.

In Italy's Littoria area M10s served as reinforcing artillery. Their roadside positions (1) furnished a firm surface on which muzzle blast would not show and (2) automatically gave increased elevation, with the TDs tilted down in the ditch.

their positions.

After several days the German plan of defense became evident. Their hastily-assembled units used as positions for strong points houses, ruins, and the natural cover provided by canals, stream beds, and draws. Strong points often consisted of 50-mm or 75-mm AT guns, with machine guns and rifles. Frequently the Boche would permit our forces to penetrate through this network, then fire upon them from the rear. Houses, and a tower and a steeple in Cisterna, were used as OPs. At night 88-mm and 170-mm guns were brought up close to our lines to harass installations in our rear areas, and on several occasions harassing fire fell in the vicinity of the TD trains. Jerry snipers were very aggressive, and on one occasion German riflemen penetrated two miles behind our lines at night, crossing the Mussolini Canal and firing at vehicles and houses; they withdrew before daylight. The armor used by the Germans on the beachhead ran from Ferdinand assault guns, with 200-mm of armor in front and 110-mm on top, through the PzKw VI, the PzKw IV Special, and the PzKw IV, to the PzKw III. In addition, a wide variety of self-propelled guns was encountered.

In the period discussed, armor was roadbound. The beachhead was on ground reclaimed by Mussolini from the Pontine Marshes. During the winter rains the watertable rises, and everything below a thin crust of soil is liquid mud. Being restricted to roads, the Germans used their tanks in small groups. Although there was relatively little defilade on much of the beachhead, farmhouses afforded the TDs some cover and concealment. They were Government-built, serial-numbered, regularly spaced, and made of cement and tile. Commonly they had patriotic slogans painted in large black letters on their walls. Behind these houses the TDs would lie in wait for their dangerous quarry. Destroyers were used in pairs at least, and covered one another's movements. Ordinarily they caught their adversaries in a cross-fire.

In the opening phases of the fight the TDs were used in an assault gun role in the infantry front lines. Their .50-cal. machine guns were constantly employed. Targets were personnel, houses, strong points, machine guns, vehicles, and towed

guns, as well as tanks and SP guns. One house was fired upon at 300 yards. It had a German tank hidden behind it. An APC shell went into the house, on through, and out the other side, smashing the tank.

Lt. C. E. Bell was later in the same predicament as the German tank had been. His destroyer was sitting behind a house. An 88 started shooting at the house with direct fire. A round of AP came through the building about five feet above the destroyer. Lt. Bell backed away for a short distance. The fire ceased, and shortly afterward the 88 could be heard firing on another target. The TD ran out from behind the house and bagged the 88.

On another occasion Lt. Bell got within 200 yards of a haystack and saw that it had a door. He fired a round of HE and it bounced off. He fired with APCBC and flushed a dozen Krauts. In the "haystack" he found a 76.2-mm AT gun with a 75-mm round in the breech. Later in the day the Germans abandoned another loaded AT gun under similar circumstances. Lt. Bell plunked the sights down in front of his company commander when he made his report.

A tank platoon and a TD platoon were supporting an infantry assault company. The infantry had been brought to a halt on the night of January 24th. Enemy antitank, machine gun, and rifle fire had complete control of the route of attack, particularly the road which was our avenue of approach. The attack was to be renewed at dawn. The tank platoon commander said the fire was too heavy for a successful tank attack up the road, since antitank guns had already disabled one of his tanks.

When the attack started, S/Sgt. J. C. Ritso attacked up the road in his lone tank destroyer. He continued to advance about 100 yards forward of the advance infantry elements, partly exposing himself from time to time from the open turret of the M10, and directed fire on houses and machine gun nests at point-blank range. Machine pistol fire, enfilading cross-fire from machine guns, and sniper fire from right, left, and left rear were hitting the sides of the mount and flying within inches of him. He continued to fire for eight to ten minutes, covering a rush by our infantry, when two direct hits from a well-concealed AT gun knocked out his destroyer and set it afire. He received a compound fracture of the right leg.

The TD battalion executive and the commander of the reserve TD company were at the infantry company CP, following the progress of the attack. When they heard what had happened to Sgt. Ritso they left the comparative safety of the house, ran across 25-50 yards of open ground, across a driveway and then the road, and crawled along a ditch beside the road for 300 yards. It took them almost an hour to get to the destroyer. Every time they moved a bush they were fired on by enemy 50-200 yards distant. By the time they reached the destroyer the enemy had about a 100-yard skirmish line in a semi-circle around them and were sniping continuously. There was some mortar fire in the area, and a machine gun in a house 40 yards further on down the road had the destroyer covered and fired bursts at any observed movement. The major took Sgt. Ritso on his back, Lt. L. D. Matter took a man with a smashed foot on his, and they crawled for safety. The sergeant died from loss of blood, but this action unquestionably saved the life of one member of a distinguished tank destroyer crew.

On the previous day the same destroyer had greatly aided the engineers in blowing up a bridge in the face of an enemy counterattack. The destroyer had carried the engineers forward,

covered them for half an hour as they worked, and brought them back alive.

The division to which this TD battalion was attached began an attack on Cisterna on January 30th. The attack failed, but not because it lacked TD support.

The TDs destroyed German armor, won duels with AT guns at 500 yards, killed numbers of enemy infantry, wounded more, and took prisoners. One of these was a medical soldier with a Red Cross armband and a Parabellum .38 automatic pistol. The 3d Plat Recon Co fought off a fierce enemy counterattack. 37-mm HE was used, fired point-blank at 200 yards.

On Feb. 1st the destroyer of Sgt. W. B. Nesmith was the only one left in the 3d Plat of B Co. It did the work of all four, however, and stopped seven tanks attempting to break through our lines. One, a PzKw VI, was knocked out with three rounds of APC at 1,000 yards. On the 3d, Sgt. Nesmith was supporting an infantry attack in the vicinity of Cisterna. The other M10 with which he had been working had run over a mine that morning and was out of action for repairs. The enemy launched a counterattack of approximately a battalion of infantry with 20 or more tanks, threatening the flank of Sgt. Nesmith's position. He was behind a house, and as he started to run out to a firing position one of his motors went dead. Using the remaining motor he managed to get out beyond the corner of the house. The leading enemy tanks, now at a distance of about 900-1,000 yards, saw him and opened fire. A corner of the building fell down over the fighting compartment; a shell glanced off the front armor plate. Sgt. Nesmith opened fire and knocked out the first tank, a PzKw VI, with two rounds of AP. Then he fired at a second "VI" which was covering the first. He damaged it, but because of his dead engine could not maneuver to a position from which he could finish it off. The enemy tanks withdrew behind nearby houses, and retired about 45 minutes later when it grew dark.

DEFENSIVE PHASE

On 2 Feb the enemy took the initiative, and from then on until the 19th made a strong bid for the beachhead. He used elements of six divisions on a 3,000-yard front in the northern sector and gained five miles down the famous North Road to Anzio. An estimated 125-150 tanks, including PzKw Vis and Ferdinands, formed the spearhead of the offensive, which reached its height between the 16th and the 19th of February.

The battalion was on the eastern sector and so did not feel the impact of this fighting; nor was it involved in the American armored counterattack on February 19th, which was backed up successfully by a TD battalion in a direct support role. From the 19th to the 28th the enemy made only limited-objective thrusts and probing attacks.

By then the Kraut had reorganized. He shifted his attention from the northern to the eastern sector and struck along its entire front the division supported by our TD battalion. From 75-100 enemy tanks were employed in support of their infantry. The TD battalion committed all 36 guns over the division front of 25,000 yards in direct fire positions, and knocked out 25 German tanks with the loss of no M10s.

The development of the TDs in advance of action was dictated by a number of considerations. Being restricted to roads, the Germans used their tanks in small groups behind their infantry. Employment of tank destroyers in mass was dependent on the enemy using his armor in mass also, since

the 37-mm and other AT weapons with which the infantry was equipped were not counted on to stop the heaviest German machines, and the small amount of maneuvering space on the beachhead precluded a defense in depth. Linear defense tactics sound suicidal, particularly in country with little or no defilade, but again the Government houses provided a slender margin of surprise and protection that proved just sufficient.

In Fig. 1 the antitank warning net is shown. Upon the usual

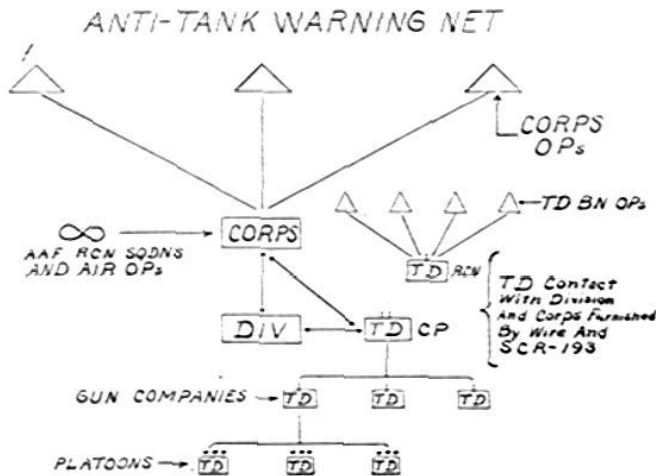


Figure 1

good warnings from Corps and Division G-2s, the TD crewmen had their lanyard arms limbered up on February 28th. The seriousness of the threat was not underestimated. Rear echelons had organized defensive positions against ground and air-borne attack.

The division gave way initially, counterattacked, regained most of the ground lost, lost it several times, and finally forced the Germans to drop the attempt after effecting small changes in the lines.

Selections are made from the Battalion Unit Journal for March 1st to indicate the nature of the TD action.

The TD liaison officer at division artillery Hq made the following reports by telephone:

0700—"30 enemy tanks at F-032298"

0702—"Alert 3d Plat 'A' Co, enemy counterattack in that vicinity. Enemy tank at F-975313"

0710—"10 enemy tanks at G-034284"

0715—"7 enemy tanks at F-980320"

Subsequent information from other sources showed 4 enemy tanks west of Ponte Rotto at F-993310 and an SP gun at F-926327, also enemy infantry moving south at G-010297.

At 1005 the following message was received from the division commander and relayed to 1st Plat B Co: "Enemy tanks moving south on Cisterna—Isola Bella Road. Stop them cold and leave them burning. We are pushing through with armor to regain ground lost."

At 1034 the battalion commander called Div CP to see if he could get word through to DivArty to fire on 7 tanks at A-980320, since they were out of TD range.

At 1040 a corps shoot was ordered; 5 rounds per gun at enemy infantry at G-012302.

At 1045, LO: "14-15 tanks at Isola Bella all dead (reported by Air OP planes). All road craters scheduled to be blown have been blown."

At 1105 a corps shoot was ordered, 5 rounds per gun at G-942322.

At 1132 BC to DivComdr: "All of those tanks at F-993310 are burning. 1st Plat B Co fired 40 rounds HE and APC at 4,000 yards (2 PzKw VIs and 2 PzKw IVs)."

At 1150, message received from 2nd Plat B Co that enemy artillery from G-048292 had pinned them down. BC arranged for artillery fire, and ordered (through B Co Exec) that 2nd Plat should pull out under cover of this barrage and take under fire the artillery that had fired on them.

At 1256 Recon Co OP reported a battalion of enemy infantry at F-957325, counterattacking. Message forwarded to Division.

At 1335 Recon Co reported that the infantry was at F-947336. "Our artillery is working on them. At a much greater range we can see the silhouettes of 5 tanks."

At 1400 Recon Co reported 2 batteries of nebelwerfers at F-956355, 1 battery at F-943362. Message forwarded to DivArty.

At 1410 Recon Co reported 2 batteries of enemy artillery at F-922364. Message forwarded to DivArty.

At 1425 DivArty asked if Recon Co could adjust artillery fire on targets. By time arrangements were completed haze had settled in and missions had to be postponed.

At 1540 2 live German tanks were reported to have sandwiched themselves in among the 4 knocked out at F-993310. 1st Plat B Co was given the mission. In anticipation of German thrusts during the night, indirect fire programs were drawn up on lines prescribed by the DivArty.

* * *

An individual destroyer action which took place on February 29th is worth recounting.

3d Plat Co B was interdicting the Cisterna Road. The destroyers of Sgts. H. J. Ritchie and J. C. Christian were behind buildings in Isola Bella. A Ferdinand (88-mm assault gun) and a PzKw VI tank attacked directly toward Sgt. Ritchie's building and reached a point on the road about 300 yards from him. They were being supported by the fire of three PzKw VI tanks 250 yards up the road behind them and another Ferdinand and a "VI" in a farmyard about 250 yards east of the position. As Cpl. J. P. Goldsmith, the gunner, tells the tale:

"Sgt. Ritchie ordered me to pull into open view around the corner of the building, and from this exposed position directed three hits onto the most exposed tank, it being about 550 yards up the road at that time, and knocked it out. We drew heavy AP and HE fire from the other tanks, shells barely missing our destroyer by a few feet and fragments hitting us. We were exposed for about five minutes. Then Sgt. Ritchie ducked his head and shoulders below the turret and pulled back behind the house. When enemy fire had ceased, Sgt. Ritchie had me pull out again, and from the same exposed position directed two rounds of AP shell that hit and bounced off the front armor of the Ferdinand 250 yards east of us. We again received intensive fire from the enemy tanks and shells were landing so close that fragments were coming through the open turret, one slightly wounding our gunner in the head when it hit our tank and damaging the counter-balance and .50-cal. machine gun mounted on the edge of the turret. We were again exposed to enemy fire for about five minutes. He ducked into the tank and we pulled behind the house again. We continued to fight throughout the day with our damaged gun."

Sgt. Ritchie continues the story: "The second time we fired, Sgt. Christian radioed me to cover him and pulled out behind

the house that he was using for defilade and directed the fire or five rounds, scoring two hits on the PzKw VI and two hits on the Ferdinand that were pinning us down. He definitely knocked them out: only two men got out of those two armored vehicles. Direct fire from the supporting enemy tanks was so intense that I saw two rounds hit the house around which he had moved to fire and another hit the corner of the building directly above his tank. If any of these shells had scored a hit, it would probably have put destroyer and crew out of action.

"A few minutes later Sgt. Christian again pulled out and fired on another supporting "VI" on the main road, scoring a direct hit and neutralizing that tank. He was exposed to intense enemy direct fire for about 15 minutes. By his coordinating the fire of our two weapons, diverting the attention of the enemy, that attack on our position was stopped. Prior to this action the sight extension bar on Sgt. Christian's gun had been bent, and the only means he had to adjust fire was to stand completely exposed above the turret with field glasses. Two teeth were broken off the turret worm gear, and throughout the engagement the gun was traversed by jolting against the gun housing and jerking the traverse handle until the gears would mesh."

LESSONS AND OPERATIONS

The German attack taught several lessons, among them that the enemy had carefully observed our movements and registered artillery on important points during periods of relative inactivity. Just before or during an attack, he will utilize this knowledge to neutralize these important points. Gun positions must be changed often to secure the element of surprise.

It was noted that the enemy would attempt any trickery which he thought might have even a remote possibility of bagging some of our guns. In several instances he would withdraw a knocked-out tank under cover of darkness and substitute a live tank in its place. Close observation on the part of the infantry and our gun crews exposed this trickery. It was found that the Kraut would re-man knocked-out tanks which had not burned and use them as pillboxes. It has become the policy of this TD unit to shell and set afire all enemy tanks knocked out.

March is said to come in like a lion and go out like a lamb. It never became very lamb-like on the Anzio Beachhead, but with the defeat of their second big offensive thrust the Germans evidently decided that they were not going to push the invaders into the sea at that point, and satisfied themselves with making the almost surrounded Allied forces as uncomfortable as they could. Our TD Battalion remained in the perimeter defense of the Beachhead, with always one full

company and often more in the infantry lines.

TDs on "pillbox" missions remained in position a week at a time, exposed to enemy mortar fire without overhead protection. Sometimes they were within 50 yards of the infantry outposts and ahead of our minefields. Companies were placed under infantry regiments and platoons under battalions.

Use of TDs to take advantage of their armor alone is unconventional, since the superstructure is open and is made of armor in places only 1½" thick. M10s have an equally obvious weakness in armament, when it comes to fighting against infantry infiltration. The M10 turret must be rotated to permit forward fire of the .50-cal. machine gun—and even then it can not be depressed enough to fire at infantry close-in. There is no flexible machine gun over the assistant driver's seat as in a tank, nor is there one coaxially mounted with the tube. There are not even fighting slits in the turret. Hand grenades are not carried by experienced units, as they may be set off by enemy shells striking the sides of the destroyer.

The men in some of the positions were under sniper fire and could not show themselves above the turret during daylight. Five could sleep in a destroyer by arranging themselves in a star inside the hull, their feet pointing toward the center. Most of the men were sleeping on two or three different levels at once, each with a sharp edge. It was often cold, and rarely quiet for more than a few minutes or so. For other living functions, a small dugout was scooped out beneath the M10.

The battalion feels that infantry commanders do not always put destroyers in positions with big enough fields of fire. Particularly after their attack from Cisterna, the Germans were wary of committing their tanks until their infantry had probed our defenses for antitank weapons, keeping the armor 3-5,000 yards out until they felt it safe to advance.

Guns should be mutually supporting. They should be in hull-defilade or, lacking this, under some sort of cover. They should not betray a fixed position by frequent firing on cannon company targets. According to established doctrine the infantry AT guns should normally be emplaced ahead of M10s, not behind them.

The TDs showed that they were capable of functioning in an assault gun role, if given a fairly free hand. TDs prefer to work up to a fixed objective deliberately, using indirect fire if possible; otherwise they launch a coordinated direct fire attack, using destroyers in pairs: one to fire, the other as a covering gun. Fire should be combined with movement. A successful commander of armor has said that in armor it is "Dig and Die." The battalion felt that infantry commanders could get much more from the TDs by assigning general missions, letting TD commanders make detailed tactical decisions.

This TD battalion—like others in Italy—thinks that it should tie right in as a battalion to the divisional artillery when acting in its secondary role as artillery. Its officers are mainly artillerymen, and after spending entire months on the main front in a secondary artillery role the rest of the officers became fully qualified. Tank Destroyer battalions in this theater like to run their own show, and feel that they do better work when they do their own forward observation, fire direction, and position area survey. The tie-in with the division artillery provides for long-range harassing missions beyond the capabilities of the 105-mm howitzer M2, and makes available TD observers, particularly in the reconnaissance



A French crew from an Algerian division fires its M10 against Castleforte in May

company, capable of adjusting the divisional artillery.

Particularly in the final phases of an enemy infantry attack, the ability of the TDs to adjust artillery fire has proved extremely valuable. When one or two members of every TD crew are qualified observers, as is the case in this battalion, every TD becomes an artillery OP. Each destroyer has its own radio and is in touch with any division artillery unit through the TD battalion's FDC.

Another artillery function of great importance to the division artillery has been the use of TDs as roving guns. This was tried on the main front with a variety of self-propelled weapons, but was carried further on the beachhead. It was done for two purposes. One was to answer the Kraut's "Flak-Wagon Serenade," a nightly harassing program to prevent our men from sleeping. The battalion has learned that the TDs are highly successful when they do the same thing. Our 3" shell arrives, like the German 88, before the sound of the projectile in flight; that is to say, it comes entirely without warning. The battalion sends out two or three destroyers to fire a few rounds from each of a number of positions up and down the line, firing at definitely located targets (such as houses, dugouts, trails, etc.), which are known to be in current use. Firing is never done at random.

The other purpose of hit-and-run play is for counterbattery missions. When employed, this was as effective as firing from regularly occupied positions, did not betray our field artillery emplacements, and confused the enemy as to the numbers, location, and type of our artillery. To minimize retaliatory fire, TD guns were fired singly or from well scattered locations.

A tie-in with the divisional artillery provided the TDs with air observation, which was especially valuable in registering the long-range and small-burst 3" gun.

It was reserved for a neighboring battalion to support a major American tank attack. The battalion feels that TDs suffer from the feeling of higher commanders that TDs are defensive weapons. They are defensive weapons, but their most neglected and perhaps their ideal role is to supply close-support fire for tanks while the tanks employ shock action. The Russians have long used this technique with self-propelled artillery and it is seen in the German employment of the Ferdinand with PzKw VI tanks. Teamwork is the secret of success here, and a TD battalion must work closely with its supported tank unit over a long period of time, so that each can learn the other's habits and know always what the other is able to do. In Italy the enemy has used large numbers of tanks, but due to terrain limitations has rarely used them in mass. It has been more normal to see groups of four to six. The TDs attempt to use cross fire from two or more guns on each successive target. Therefore a high ratio of TDs to friendly tanks appears to be desirable. Advance is made by leap-frogging from one set of mutually-supporting hull-defiladed positions to another set. It has been the experience of this battalion that high-speed armored engagements are a news-reel fiction, and that speed is not essential to keep up with a tank fight; 6 mph seemed to be plenty.

The battalion wants the biggest gun it can carry. It views the German Ferdinand with respect, but thinks that the German 128-mm Gun, SP, with less armor and more tube, will probably prove a more dangerous opponent.

MATERIEL NOTES

This section was provided by the battalion commander.

a. German tanks employ smoke generating apparatus to advantage for screening their movements or covering the evacuation of a crew when the tank can no longer move. TDs need them too.

b. When TDs were used as pillboxes in the front lines, a light armored hood that could be thrown off prior to antitank action was tried and found to be desirable.

c. Greater magnification is desired for the direct fire telescopic sights. The M12A4 panoramic sight should be retained, as it is more satisfactory than the azimuth indicator for artillery missions.

d. The 75-mm Howitzer Motor Carriage M8 would be preferred to the Armored Car M8 for TD reconnaissance companies. It has a superior flotation characteristics and is better protected underneath against mines.

g. The comparison of self-propelled TDs with the towed antitank guns of the British in the northern sector emphasized the superiority of the M10. Our TDs could follow the advance of our infantry much more closely, and when enemy infantry infiltrated into Allied positions could withdraw in daylight. The thin-skinned prime-movers for the towed guns could in general only approach the front at night. The limited traverse of towed guns also proved a serious handicap. The chevron type rubber track was called "the only logical type to be used in combat."

f. Illuminating shell was used under battle conditions by a neighboring TD battalion. Within the time of burning afforded, this ammunition worked very well and filled a long-felt need. An M10 used as a flare gun, one gun per platoon, lays back to obtain a higher trajectory. The battalion itself has had good success in getting the infantry to illuminate the target area with mortar flares on request.

CONCLUSION

Damage done to the enemy between January 22nd and March 31st is shown in Fig. 2. The outstanding conclusion to be drawn from the experiences of this TD battalion on the

STATISTICS				
22 January—31 March 1944				
GAINS	Jan.	Feb.	Mar.	Total
Tanks & SP	10	14	27	51
Probables	—	(3)	(3)	(6)
Armored Cars & HTs	4	1	—	5
Artillery & AT Guns	3	2	1	6
MGs	17	3	—	20
PWs	16	4	—	20
Misc.—				
Aircraft	—	1	1	2
Vehicle	1	—	1	2
LOSSES				
M10s (O/A more than 24 hrs)	2	1	—	3
Officers	1	2	—	3
E/M	6	34	29	69

Figure 2

Anzio Beachhead is that the M10 is one of the most versatile weapons on the battlefield. It is a quadruple threat, not only doing its defensive job in spectacular fashion but also acting offensively as an infantry assault gun, as a mobile artillery weapon, and as an invaluable adjunct in tank attacks.

Occupying a TD Position—Sequence of Events

By Lt.-Col. G. D. W. Court, M.C., R.A.

AUTHOR'S NOTE

There is a definite order to follow to ensure that the most important things are done first, in case tanks arrive before they are expected or when there's a limited amount of time available. This is not necessarily the only way, but it is one which has been proved in combat—and while it obviously cannot always be followed meticulously, it is generally sound.

1. *Emergency Action by Forward Observer*

The moment the Gun Commander arrives in the area of his position, he places the gun in emergency action covering the primary field of fire and posts a lookout who will watch the terrain to ensure that the crew are not caught by tanks or infantry unprepared. The gun will be loaded when boresighting has been finished and the sights will be aligned on the most likely avenue of approach.

2. *Inform Platoon Commander "In Emergency Action"*

The Gun Commander then informs the Platoon Commander that his gun is in emergency action. He will use radio if he has it, or send a runner either to the other gun of the section which has radio or straight to Platoon HQ. (This very important move helps the platoon commander considerably. He has a great number of things to do and the more his Gun Commanders can help him, the better for the efficiency of the Platoon and its Commander.)

3. *Inform Crew of Situation, Put Them in the Picture*

At the moment the Gun Commander is the only man in the crew who knows the tactical situation. If a stray round comes over and he gets knocked out, then all his information dies with him and the gun and all its crew will become nothing more than a liability for the time being. So now is the time for the Gun Commander to give his men the general situation—put them in the picture; this must be done early and doesn't take more than a minute or two. There are three things which even the most backward man in the battalion must always know, and must remember to ask until he is told:

- a. *Where* are the enemy?
- b. *Where* are we going in order to hit that enemy?
- c. *How long* have we got?

In official order-language that would read:

- a. Information concerning the enemy.
- b. Location of the gun position.
- c. Time factor.

In the simple language, however, it is more likely to be remembered in the logical sequence illustrated above.

4. *Prime Mover—If Any*

Either before or after putting the men in the picture, you must send the prime mover (if any) away from the area of the gun position to the motor park—but remember first to remove all the digging tools and other equipment required. On the subject of prime movers, never drive right up onto the gun position unless there is literally no hope of manhandling the gun into its pit, and even when manhandling has been done the tracks up to the pit must be obliterated if you want your crew to live; with grass one of the best methods is to get down on your

hands and knees and "ruffle up" the grass with your fingers as if you were playing hell with another guy's hair!

5. *"Size Up" the Gun Position Before Occupation*

All this sounds very long-winded but it is all done very quickly when the crew know what they are doing. Before anyone is allowed to approach the actual gun position after the Gun Commander has chosen it, the latter has a good look at it from the front and makes his crew do the same; thus they will carry in their minds a mental picture of what the position looked like before they started to disrupt it by digging, etc.—that is, what the completed position must look like after the gun is in and everything is ready to fight—a most important point. The Gun Commander will chip out with a spade the *actual area* to be dug; the crew should be trained not to be "hamfisted," to treat the area carefully—not to tread down grass, not to break natural foliage, not to tread on the rim of the pit, not to walk about in front of it, not to leave anything in front of the pit at any time, to avoid making tracks to and from the pit, almost to walk on tip-toe.

6. *Work at Gun Position*

While this digging is going on, the Gun Commander must see to the following:

a. Prepare range card, which should be left in the care of the lookout for the time being.

b. Organize the checking of every round of ammunition. In these days of extensive mass production, it sometimes happens that one round will stick in the breech on being either loaded or unloaded. Maybe only one round out of several hundred will stick, but when it does it matters vitally. When fighting tanks, split seconds count—and a "gummy" round may make all the difference not only between life and death to the detachment but also success or failure to the entire action. Therefore every single round must be loaded into the gun, the breech closed, and the round unloaded again. Occasionally a round will become separated, but that doesn't matter.

c. Prepare lookout relief roster. Normally the lookout should be a man just off digging: work and rest.

7. *Progressive Digging: General Points*

Then the Gun Commander goes back to inspect the digging. His crew have been trained in the art—and it is quite an art—and this is the way they are trained. There is a difference between a primary and a secondary field of fire (normal and contingent sectors, if you like) and this applies not only to the area laterally but also from the point of view of range. All this means is that when the towed gun has been dug in completely, it will be capable of firing over a larger area than is its primary field of fire. It will probably be capable of covering something like 90° and up to a range of maybe 2,000 yards, but its primary field of fire will normally be about 40° to 45° and up to a range of about 1,000 or 1,200 yards. The rest is its secondary field of fire, for emergencies. The men in this particular crew have been trained to realize that the mere fact that they can see 3,000 yards does not necessarily mean that they will ever shoot at that range—and though this gun can cover 100° field of fire and is dug in for that amount,

they are not responsible for all that as a primary responsibility. They do realize, however, that they must end up by being able to cover all that, if required.

You must always dig as much as possible. If it is a very quick action you may only have time to dig in the spades (you must do this if you want to get a hit with your first round and if you want your gunner to keep both his eyes intact), so this comes first; next dig in the wheels. Then as time goes on the hasty digging can be improved and extended until the gun is completely dug in as described below.

When these men first went into combat they were given a primary field of fire of 40° and, being in an open position, were told to dig the gun in to cover something like 120° altogether.



An M-10 tank destroyer well dug in near Mignano

They forthwith dug out the whole surface at once. The time they spent digging out the whole area to half the required depth was equivalent to the time which would have been required to dig the gun in completely for its primary field of fire. Tanks arrived before they were ready for them and the result was that the gun had to fight when only half dug in.

This time they are not being caught like that: they are digging the gun in completely for its primary field of fire. The pit is the shape of a keyhole or a slice of pie; when that is completed they will then enlarge it to the required size by carving bits off at each side until they have the required dimensions (which might be up to 360° in an open position). Then at no time can they be caught unprepared to take on their *primary* field of fire. You might think it is a small point, but it is an all-important one.

Use of trail logs is advocated to ensure stability and ease of shifting trails. A foxhole must be dug for the Gun Commander's OP: one on each flank, or in front, to be used according to the way the wind blows the dust and muzzle smoke. If feasible, a crawl trench should connect each OP with the gun pit.

You will also see that the gun comes first, then ammunition trenches, and finally personnel pits. Of course, under certain circumstances, but not normally, the crew will probably dig *scrapes* for themselves after the gun has been dug in in a hasty manner. This is a system of progressive digging—continually improve. Dig, dig, dig, that's what the Germans say. And they

are absolutely right. The longer you are in a position the more improved it should be, and this goes for self-propelled as well as towed. As regards self-propelled guns, the digging is of course different, although the principles of progressive digging are the same in either case; first dig trenches to admit the tracks, using the spoil for a parapet and camouflaging in the same method as is described for towed guns. Then if tanks do not appear, as before dig, dig, dig. Go on as far as time and the avoidance of dead space allow, up to gun defilade. Meanwhile the SP gun remains in a cover position nearby. If you are in a position a week, it should be like living at the Waldorf-Astoria.

Remember that slit trenches must be at right angles to the line of fire, so that the tanks' machine guns won't literally enfilade them. Also remember that the crawl trench connecting it with the gun pit must be under cover. Crawl trenches should be zig-zag.

A word on parapets; normally do not have a parapet at all. Have one only when digging in will produce dead space in your field of fire. Therefore the spoil must be got rid of. Don't back up your prime mover to the gun pit—that is unpardonable! Carry the spoil away in empty sandbags or in a tarpaulin, a slow job but the only way. Of course, there may be so many tracks in the area anyway that one or two more won't seem to matter, but even then you must consider the question of observation from air and ground OPs.

8. Camouflage and Defilade

This crew has also been well-trained in the art of camouflage. All this is linked up with the previous remarks on not being ham-fisted in the gun-position. Treat it as if you were in your mother's drawing-room. (This Gun Commander has threatened to break the neck of anyone who walks outside the front of the pit or who breaks any branches unnecessarily, and he is a big fellow.)

This gun has been sited in a little corner of a woods, and the men are defiladed from the tanks following the one they will be shooting in the flank when it gets into their field of fire. They are also defiladed from the high ground in the enemy's hands which will certainly be studded with artillery OPs which will see a gun which is not defiladed long before it even opens fire. This Gun Commander has been careful to ensure that his gun is drawn well back behind the defilade. Notice that there is about six feet between the muzzle of the gun and the end of the defilade, because the flash must be defiladed as well as the gun and its crew, etc. This crew once covered their gun with natural camouflage and were dismayed to find that the moment they traversed and fired the gun everything fell off, and although they had been camouflaged as far as the first tank was concerned, they were utterly naked as regards the following tanks. So now they are careful to tie all the camouflage on the shield or turret and the barrel, and they also take care that the vision of the gunner is not obscured. The back wall of the pit shows up black or white, as the case may be, from a little distance out, so branches of camouflage similar to those round the gun (but taken from a spot some distance away) are being put in to cover that wall. They have learned never to use a net unless there is no local camouflage available. They are applying this lesson to the question of cover from the air—instead of using a net to cover them above, which will make them look like Barnum's circus, they are gently bending the saplings over their heads and wiring them there so that they form a natural growing roof; take care not to bend the branches too far or they will look unnatural. There is one more thing they are doing—they are digging a trench

in front of the gun pit into which they can depress the tube at all times except when they actually begin to track a tank. This alters the silhouette and conceals the muzzle, which always shows up as a tell-tale black hole. This gun will be invisible at 100 yards, through field glasses.

If this crew had their gun in the open where a flat top was essential they would first camouflage the gun with local vegetation against ground observation, then erect the flat top. The reason? When they are alerted for tanks they will generally have to remove the flat top because it will give them away to ground observation and will generally hamper their fighting the gun—so this comes off as late as possible, and then they are still concealed from ground observation. Intensive drill is required to obtain the necessary speed in removing the net.

9. *Mutual Support*

Now to return to the duties of the Gun Commander. He must next check mutual support. This means that he must find out (if he doesn't know already) the positions of the other guns of the platoon, and if he is a flank gun he must know at least the nearest gun position of the neighboring platoon. He wants to know because he must ensure that his gun is covered by the fire of at least one other (this will have been arranged by the Platoon Commander and included in his orders, but the Gun Commander must check for himself—and the way to do it is not to sit and wait, but to go and find out for himself). He must check that his fire interlocks with the other guns, that there are no gaps.

10. *Alternate Position and Range Card for It*

The Gun Commander then chooses an alternate position and makes out a range card for it. This means another position from which he can accomplish that same mission. He ensures that all his crew know not only where it is but also the route to it. This is SOP. He will only use it if his position becomes untenable, and this doesn't often happen, because you can sit in your pits and trenches for days and days under heavy shell fire and still be all right. But if you fight a tank and antitank action and still stay in your area after that, then you should move to an alternate position because generally one of the tanks will have radioed back your position.

11. *Supplementary Positions*

Supplementary positions—i.e., for a different mission from a different direction—will of necessity be coordinated (if not chosen) by the Platoon Commander. That will be done in conjunction with the Company Commander, who will be working in with the Battalion Commander or the local infantry commander—probably both.

12. *Security*

The Gun Commander finds out, if he doesn't know already, actually where the local security are on the ground, and points them out to his crew. (Note that the Company and Platoon Commanders must ensure that the area is covered by small arms fire, first to repel any infantry attacks and second to open up on tanks and make them close down.)

13. *Administration, Including First Echelon Maintenance*

Administration must be attended to—gas, rations, ammunition, water, medical ("grawm").

The gun commander must ensure that his driver carries out his maintenance as regularly as possible. Generally the only time available for this in combat is the moment he gets to the motor park after the gun has gone into action. For SP the problem is even more difficult, but it must be done.

The Gun Commander should prepare a daily administration report covering all this in writing for his platoon commander and if the situation permits should take it in himself during the evening to Platoon H.Q.

14. *Inform Platoon Commander That All This Has Been Done*

Finally, the Gun Commander should inform the Platoon Commander that all this has been done.

Summary

1. Mission. (Attention to *flank fire* and *defilade from the following tanks*.)
"Size up" the position.
2. Emergency Action and post lookout.
3. Inform Platoon Commander "in emergency action."
4. Bore sight.
5. Inform crew of situation (this must be done early).
6. Send prime mover to motor park, first removing everything required.
7. "Progressive" digging and camouflage. Meanwhile make out range card and check ammunition (N.B.: Always test each round in the gun).
Prepare lookout relief roster.
8. Position of other guns, *mutual support* (see that your gun is covered by at least one other); check *interlocking fire*.
This coordination starts with the Gun Commander.
9. Alternate position, and gun card for it. (Note that supplementary positions will be reconnoitered by Platoon Commander on orders from his Company Commander.)
10. Gas; Rations; Ammunition; Water; Medic.
11. 1st echelon maintenance.
12. Inform Platoon Commander this has been done.

TO A FALLEN ARTILLERYMAN BY D. S. S.

In a place beyond the maximum range where the overs all fall short,
Where, soon or late, good gunners are ordered to report,
One better day, artilleryman, we all shall sometime meet
When the last mission's accomplished and the last round's complete.

Till then know this, artilleryman, as quietly you sleep,
Your guidon we still hold aloft, the faith you kept we keep;
And we shall on that far off day, together boot to boot,
Ride past The Great Commander and give our proud salute.

AMMUNITION CARE

By Capt. Herbert W. Pike, FA

AUTHOR'S NOTE

A round of "105" may now find himself a world traveler, manhandled as much as a hundred times—by manufacturer, stevedore, native labor, and theater troops. After many rough landings in a cargo net and a few kicks in the brass, Mr. One O. Five cried for heavier packing and got it. But even with the heavier packing, he is still apt to find himself a dud or a noneffective if some careless cannoneer lets him get soaking wet or burrs up his bourrelet.

With this in mind, an attempt has been made in this article to assemble some practical tips on the handling and storage of ammunition which will assist the artilleryman in making every round count.

CARE AND HANDLING

Experienced commanders tell us that troops in training pass through two stages in their attitude toward live ammunition. The first is one of fear and overcautiousness. Then, as familiarity breeds contempt, troops begin throwing live ammunition around as if it were cordwood. Both extremes are to be avoided. Men must be trained to handle ammunition rapidly and efficiently while still maintaining a healthy respect for it. Careful handling is necessary to insure proper functioning as well as to avoid accidents.

Another hazard is fire, so it is necessary to prohibit smoking and open flames around live ammunition. Even the exhaust pipe from a vehicle may cause a disastrous fire.

Projectiles. Just as Joe Cannoneer once eyed the girls passing the corner drug store, he should now be taught to give each projectile a practiced once-over to make sure that it is correctly assembled and free from burrs or dents. With a file it is a relatively easy matter to remove burrs on the rotating band. Projectiles which will not seat properly in the bore should be rejected. Also, projectiles should be free from dirt and grease so that a harmful residue will not be left in the cannon.

Exudation of the HE filler increases the danger of fire in storage, but the new *Ammunition Inspection Guide*, TM 9-1904, tells us such projectiles may be fired without undue hazard after wiping off the exudate. Projectiles, especially those with no fuze and booster assembled, are relatively safe from detonation by small arms fire and shell fragments. It is important, however, that separate-loading projectiles be protected with an eyebolt lifting plug. Detonation of one projectile is not apt to detonate adjoining projectiles sympathetically if they are separated by as much as the diameter of the projectile.

Propelling charges. No matter how much care is exercised in setting the quadrant and leveling the bubble, cannon will not put them out in the right place unless fired with the proper charge.

Shortages and mix-ups in propelling charge increments do occur. Sometimes it is the fault of the manufacturer, but more often it is the fault of the battery which prepared a charge for firing and in the haste of executing *March order* neglected to repack the charge completely. A recent change to FM 6-75, the 105-mm howitzer manual, requires that before an unfired

round is replaced in its container an officer of the battery will certify on a slip of paper (to be placed under the sealing tape of the container) that these checks have been made:

- (1) All increments are present
- (2) Increments are serviceable and undamaged
- (3) Increments are in proper numerical order
- (4) Increments have same lot number
- (5) Lot number of ammunition is same as that on container

It is an easy matter to check each round before firing to make sure that the proper increments have been removed from the charge and that the remaining increments are all present and of the same lot number. Neglect of this simple precaution, however, requiring only enough mental ability to count to seven, is still a common cause of OP jitters with resulting financial embarrassment to safety officers.

Propelling charges are vulnerable to moisture and are therefore kept in the sealed containers until just before use. This also lessens the possibility of fire from sparks, flarebacks, small arms fire, and hot shell fragments.

Safety regulations (AR 750-10) prescribe that the powder chamber of separate-loading weapons be wiped with a wet sponge after each round to kill sparks, and that the charge for the next round be kept away from the breech until the sponge has been withdrawn. There should be no leakage of contents from any of the powder bags. With separate-loading ammunition, the tag and igniter pad cover must be removed prior to loading the charge.

Propellants must be protected from extreme and rapid changes in temperature. They must be kept out of the direct rays of the sun. High temperatures greatly accelerate the normal rate of deterioration and cause excessive and irregular chamber pressures in firing, resulting in erratic ranges. Sudden changes in temperature may cause moisture to condense upon the charges.

Excessive chamber pressures. To prevent a void or pocket in the powder chamber of separate-loading cannon, AR 750-10 directs that the total length of charge, *when firing maximum charge*, should be at least nine-tenths of the distance from mushroom head to base of projectile. Bulged charges should not be fired, as dangerous pressures may result, but they may be rolled to decrease the diameter and increase the length to the proper dimensions. Less-than-maximum charges should not exceed the proper diameter, but there is no requirement as to length.

Substituting numbered increments for other increments of apparently the same size and weight is only asking for trouble, because charges with the same exterior appearance may contain different-size powder grains, and therefore have greatly different ballistic properties. For the same reason a green and a white powder bag, like a wife and a mistress, are not compatible in the same chamber.

Cartridge cases. In order to give proper obturation cartridge cases must be made of a relatively thin, expandable metal and are therefore easily damaged. They should be carefully inspected for cracks or dents which might affect their functioning. Badly corroded cases will increase the difficulty

of extraction and may result in ruptures. With semi-fixed ammunition it is important that the mouth of the case not be deformed. A deformed case will be difficult to load and may result in a serious blowback if fired.

Several improvised methods have been proposed for removing dents, one of the simplest being the use of a pounding block made from an empty projectile.¹ Recent improvements in packing have greatly reduced the number of dented cartridge cases, however.²

Fuzes are sensitive to shock, and their functioning is likely to be impaired by moisture and high temperatures. The tetryl booster assembled to the fuze will detonate from the impact of a rifle bullet. The fuze should be carefully inspected to ascertain that it is properly assembled and properly set. Separate fuzes should be tightened to the projectile with a fuze wrench.

Troops have been known to fire rounds without removing the packing stop—a practice which is a first cousin to leaving the rammer staff in the bore. And if you want to sit out a round, try leaving the safety pin in the time fuze. Time fuzes which have been cut but not fired are re-set at SAFE and the safety pin inserted before replacing in the containers. Fuzes on fixed and semi-fixed ammunition are staked in place and must not be removed by battery personnel.

Primers. Like fuzes, primers are sensitive to both shock and moisture. They should not be carried on the person except in the regular primer belt, should be kept away from powder bags, and should be left sealed in the container as long as possible.

Flash reducers. During night firing flash reducer pads are sometimes tied around propelling charges. Although muzzle flash is reduced the amount of smoke is increased, a feature which makes them undesirable for daylight firing. Flash reducers increase muzzle velocity slightly, giving a plus range effect. The pads contain a high proportion of black powder and so are highly inflammable, somewhat sensitive to shock, and adversely affected by moisture.

Chemical shell. Safety regulations prescribe that when gas shell is being fired all personnel at the battery position must have gas masks and that those handling the ammunition should wear gloves. When firing a persistent gas all personnel should wear protective clothing and decontaminating agents should be held in readiness. Water and other fire-fighting equipment should be provided when WP smoke is fired. WP shells should be stacked vertically and protected from high temperatures by storing out of the direct rays of the sun, since if stacked horizontally in the hot sun the WP filler (melting point 111° F) is apt to shift to one side of the shell cavity and result in an unbalanced projectile.

Salvage. Cartridge cases, ammunition boxes, packing stops, and eyebolt lifting plugs should be salvaged whenever the situation permits, as such components may be used again if handled with care. If it is not practical to salvage the unused increments of propelling charges, small quantities of nitrocellulose powder grains may be disposed of by burning in the open. Sometimes they are used for heating water and rations. Igniter pads contain black powder and should be destroyed by cutting open under water or by igniting in the open with a time train.

¹See *Shell Case Straightener for 105-mm Howitzer*, by Lt. Mike W. Folk, FIELD ARTILLERY JOURNAL, December, 1943.

²Lt. Col. Robert C. Gildart, in discussing some of the ammunition problems on New Guinea, states that the wooden crating should solve the problem of bent shell cases. See p. 88 of this JOURNAL for February, 1944.

Ammunition at the battery position must be protected from the enemy and from the weather. Defilade and good drainage are necessary attributes of a good ammunition storage site. Initially, ammunition will probably be stacked above ground, placed on logs or brush to keep it out of contact with the damp ground, and covered with a tarpaulin to keep it dry and shield it from the sun. Tarpaulins should be raised above the top and kept away from the sides of the pile so that air can circulate freely. Only enough ammunition to meet current requirements is placed at the guns, the remainder either being held in the ammunition vehicles or stored at a battery dump, as the situation dictates. Dispersion, concealment, and cover are employed to give passive protection.

Dispersion of stacks. Ammunition should be dispersed into as many small stacks as possible, with the stacks at least 10 yards apart and scattered in a non-uniform pattern. It is well to divide each type of ammunition into at least two piles so that not all the eggs will be in one basket. FM 6-40 limits the number of rounds and number of layers per stack as follows:

Caliber	No. Rounds	No. Layers
75-mm	100	5
105-mm	75	4
155-mm	50	3
8" and 240-mm	25	1

These restrictions are probably tactical rather than technical, for stacks in ordnance dumps usually run much larger. To facilitate accurate firing, all rounds in a stack should have the same lot number.

Dispersion of components. It is desirable to store separately the various components of separate-loading ammunition. Because of the fire hazard propelling charges should always be isolated and, at the gun position, never placed directly behind the piece because of the possibility of a flareback.³

Fuzes, primers, and small arms ammunition, being about equally sensitive, may be stored together, but size of pile should be kept to a minimum. Projectiles are stored separately to minimize the risk of damage from more sensitive elements. Chemical ammunition should be stored downwind from the position, apart from all other kinds, and with no two types of chemicals stored together.

Concealment is one of the most practical means of protecting ammunition from enemy fire. Take advantage of natural concealment in selecting the storage site and supplement with camouflage measures. Concealment of routes used in bringing ammunition to the dump and in carrying it from the dump to the pieces will be the principal problem. The use of established roads, trails, fence lines, and wooded streamlines, together with strict circulation control of vehicles and individuals, will assist in concealing supply routes.

Cover. Proper cover for ammunition not only reduces the risk of damage by enemy fire, but also serves to protect the ammunition from moisture and extremes of temperature. Cover can best be developed by storing ammunition below the level of the ground. The prime requisite of ammunition storage is, however, that it be *dry*. If it is impossible to waterproof underground storage and to provide adequate drainage,

³Reports from combat areas stress the danger of fire in propelling charges. See *Care of Separate-Loading Ammunition*, by Capt. Edward G. Seidel, FIELD ARTILLERY JOURNAL, June, 1944.



ARTILLERY AMMUNITION

When operations are amphibious, only in the later stages can satisfactory dumps be established, with ammunition properly sorted and stacked by type and lot.



Newer types of packing protect 105 rounds much better than did the clover-leaf method.



On the initial landings ammunition (like everything else) is hustled ashore as fast as possible. It must be stacked above high-tide at the first opportunity. Here that job is about completed.

Packing must be stout, so that ammunition can survive many handlings and much inevitably rough treatment. Lurching on a trailer through New Guinea Jungle, for example, is hard on everything concerned.

Lower left: 155-how projectiles need all the protection that rope grommets and nose plugs can give.

Ammunition doesn't suffer so much in Italy, where ports are available for unloading and trucks can often haul directly to the howitzer positions.



When it comes to storage, keep ammunition clean, cool, dry, and protected. This dugout arrangement permits easy fuzing, after which projectiles are carried directly to the loading tray.



Ammunition consumption varies immensely with the mission. For instance, in stabilized situations the M-7 may be nearly overshadowed by its "private" dump. Here two of the gun squad are having breakfast after an early morning barrage of 187 rounds from their piece.



In flat terrain ammunition can well be kept below ground. On the Anzio beachhead, cardboard propellant containers were buried and the projectiles kept in them, the whole being covered with a tarp, of course.



Fuzes must be cut cleanly, carefully, accurately.



Battalion totals run high, even when mounts are mobile. One armored FA battalion reached 100,000 last January.

ammunition had better be piled above ground.

The first stage in the development of cover is the construction of simple storage trenches. It is essential that some type of platform be underneath the rounds and that provision be made for drainage through gutters, sumps, or slanting floor surfaces. As the position is improved these trenches can be converted into *splinter-proof* shelters by the addition of overhead cover. The construction of gun emplacements permits the use of niches in the parapet for storage of ammunition held in readiness at the gun. Construction of *shellproof* cover involves the use of considerable labor and materials.⁴

DATA FOR METRO MESSAGES

Should you be a battery executive, you can expect to be asked to supply the FDC with the following ammunition data for computing metro messages:

Weight of projectile. Projectiles are grouped by weight and appropriate ballistic corrections made for those which vary from standard. Even projectiles of the same weight but of different lot numbers have different ballistics, due to slight differences in manufacture, so it is preferable to fire a mission with projectiles of the same lot number whenever possible.

Muzzle velocity of propellant. The ammunition data card may indicate the muzzle velocity, by zones, for that particular lot of powder. When these data vary from standard the executive reports the velocities (by zones) for the lot or lots which he expects to fire.

Powder temperature. Metro corrections must also be made for the temperature of the propelling charge, a factor in rate of burning which has an effect upon muzzle velocity. The powder temperature reported should be a representative figure for the charges to be fired by the battery, considering variations within stacks and differences between sections. Powder Thermometer M1 is issued for this purpose. The method of sampling will vary with the type of ammunition. For separate-loading ammunition,



Powder Thermometer M-1, with propelling charge of separate-loading ammunition. After stem of thermometer is inserted in the bag, the charge (in its container) is stored under the same conditions as the balance of the ammunition.

⁴For information on basic types of ammunition shelters and gun emplacements see the revised edition of FM 5-15. *Engineer Fortifications*. 14 Feb. 44.

insert the thermometer in the end of a test charge, replace in a marked container, and store under the same conditions as the charges to be fired. With semi-fixed ammunition the test charge with thermometer inserted is replaced in the cartridge case and stored in a fiber container the same as charges to be fired. With fixed ammunition there is a temperature lag between the exterior and interior of the cartridge case.

A powder temperature indicator is provided for fixed antiaircraft ammunition and consists of a special cartridge case with propellant into which the stem of a powder thermometer can be inserted to get an interior reading.

WHEN THINGS GO HAYWIRE

Misfires. The required waiting time in case of a misfire has been greatly reduced in the revised safety regulations. Of course, if you are the conservative type you can wait longer, but the minimum now required by AR 750-10 is:

"(1) *Cannon using fixed or semi-fixed ammunition.* Two attempts will be made to fire the piece before the breech is opened and the round removed. For guns which cannot be recocked without opening the breech, wait 30 seconds from the time of the occurrence of the misfire. Then remove the round.

"(2) *Cannon using separate-loading ammunition.* Two attempts will be made to fire the primer before it may be removed. If upon examination it is found that the primer is not fired, a new primer will be inserted and fire continued. If the primer has fired, a minimum of 60 seconds will be allowed before the breech may be opened and the faulty charge removed. The faulty charge must be stored separately from other charges.

"(3) *Mortars, 3-inch, 4.2-inch, 81-mm, and 60-mm.* The mortar will not be touched until at least 1 minute has elapsed from the time of misfire.

"(4) All personnel must keep clear of the line of fire and the path of recoil at all times during these misfire procedures."

With semi-fixed ammunition it is logical to assume that a new cartridge case and charge may be inserted without removing the projectile.

Unloading the piece. Whenever possible a piece is fired rather than unloaded. A piece is not unloaded for a change in fuze setting unless friendly troops are endangered. An officer directly supervises unloading, and personnel of the section not engaged in the unloading operation remain under cover. A rammer or other device which provides clearance around the fuze is employed, great care being exercised to see that the fuze is not struck with the rammer.

With fixed ammunition the breech is opened slowly to reduce the likelihood of the extractor's separating the cartridge case from the projectile. When a projectile must be unseated with the rammer, the tube should be leveled and waste placed in the powder chamber to prevent damage to the breechblock.

Defective rounds or components should be returned to the ordnance unit from which they were drawn, thus enabling the ordnance to determine the cause of the defect. If return is not practical, bury the ammunition at least 3' deep in a place not likely to be the scene of future digging and plainly mark with a sign. Never dispose of ammunition by throwing it into a pond or creek because TNT will pollute the water and projectiles will be hazardous to fording vehicles.

Duds. A projectile which has failed to explode after firing is likely to have an armed fuze and is therefore dangerous to handle. It should be plainly marked with a warning sign. Normally, duds will be destroyed in place by qualified ordnance or engineer personnel.

Accidents. Because of the possibility of a malfunction, the battery executive should always have a record of the lot numbers of all projectiles, propellants, fuzes, and primers to be fired.

AR 750-10 prescribes in detail the procedure for reporting a premature explosion or other ammunition accident. Responsibilities of the officer in charge at the battery position are:

- a. Render first aid to those injured.

- b. Notify immediate superior.
- c. Obtain statements from eyewitnesses while details are still clear in mind.
- d. Preserve all evidence in as nearly the original state as possible until seen by the ordnance officer.
- e. Record data bearing on the accident:
 - (1) Lot numbers of all ammunition components
 - (2) Setting on gun and fuze
 - (3) Propelling charge
 - (4) Type of fire (slow, rapid)
 - (5) Length of recoil
 - (6) Number of rounds fired previously on same day
 - (7) Condition of weapon and ammunition

AMMUNITION REFERENCES

The surest guide to the proper care and handling of ammunition is a detailed knowledge of the marking, purpose, and functioning of each component. The technical manual issued with the weapon describes the authorized rounds, tells

how they are packed, and sets forth other technical information with which the battery officer should be familiar. In any one battalion there are not so many types of ammunition but that all battalion officers can and should know the nomenclature and characteristics of each.

For a general discussion of ammunition see TM 9-1900, and for characteristics of all types of artillery ammunition see the new publication, TM 9-1901. Standard nomenclature lists contain information on packing and the identification code symbols used in making up requisitions. Those pertaining to artillery ammunition are:

SNL	P-1	Projectiles, heavy artillery
SNL	P-2	Propelling charges, heavy artillery
SNL	R-1	Ammunition for light artillery
SNL	R-2	Projectiles and charges, medium artillery
SNL	R-3	Fuzes and primers



Our jeep has been adapted for railway use! When on the road, four trolley wheels are carried in special brackets without restricting the passenger space. For use on rails the wheels are changed, a clamp on the front axle holds the wheels straight, and a turntable device is brought into play at the point of balance under the transmission. This road-rail car should be useful for line inspection, and also for reconnaissance purposes.

BRITISH

A pocket-size motorcycle helps solve one of the parachutists' greatest difficulties—transportation after reaching the ground. These folding "Wellbikes" are dropped in containers. They are stout enough to be ridden over rough country, develop 40 to 45 m.p.h., and yield 180 miles per gallon. So skeletonized are they that the rider at the extreme left appears to be supported only by the grass!

INGENUITY



Artillery In Attacks On Stone Villages

By Col. Francis H. Boucher, FA

An increasingly noticeable feature of this war is the difficulty of capturing villages and cities. When stubbornly held, a town is captured only after many successive attacks, each netting small gains and heavy losses. The defenders' success seems to increase more or less proportionately with the amount of demolition. This is especially true of towns the buildings of which are composed of stone—which is the case with most European houses in regions where stone is readily available.

Possibly Stalingrad was the first notable example, although Sevastopol was defended stubbornly for months by the Russians and captured only after having been practically surrounded and deprived of munitions and food. But at Stalingrad, which could be supplied, the Germans received their first real lesson in the defense of piles of rubble which formerly constituted a city. They did not capture it, although they expended fully a half-million men in the attempt. They did learn the method, though, and employed it systematically in all of their subsequent defensive operations.

This new knowledge has not been of great value to the Germans on the eastern front. The Russians soon learned the defensive power of the aptly named German "hedgehogs" and adopted the policy of envelopment (or "by-passing") so evident in recent operations. These wide envelopments served the double purpose of preventing the escape as well as the supply and reinforcement of the garrisons thus trapped in their pursuance of the Hitler policy of holding to the last, and Russian offensive operations against the town were reduced to cleaning-up methods by reserve or second line troops while continuing the pressure farther to the front. The difficulty of such envelopments lies in the problems involved in movement and supply of troops for considerable distances without the use of roads. The Russians' solution has been simplified by the fact that their operations have been chiefly in plains country, not in the Italian mountains nor in semi-submerged lands like our beachhead in Normandy. Although it is probably true that our armies are too greatly "road-bound," it is certain that there are cases when it is necessary to attack enemy-held towns and villages.

Cassino is a name known to all Americans, who know also that it was assaulted by the heaviest weight of airplane bombs ever placed upon such a small area. Following this record aerial bombardment a terrific amount of artillery shells was poured into this unfortunate town, so that it was almost entirely demolished. But it was not captured—at least, not by storm. Despite heavy assaults by courageous, well-led, and well-supported troops, the Germans held on and even increased their

holdings in the fluctuating battle. Cassino fell only after it was outflanked, whereupon the Germans quietly evacuated the long contested city.

Why could we not capture Cassino? Partly because of enemy possession of strongly held heights to its rear and flank, which afforded excellent observation and positions for supporting weapons. Attempts had been made, unsuccessfully, to capture these heights, culminating in the destruction by aerial bombardment of the monastery on the mountain. But even this destruction was fruitless, for the ruined monastery was held despite heavy losses among the courageous troops sent against it.

There are other reasons why Cassino was not captured. One was the rubble-filled streets, accomplished largely by our own bombardment. Tanks could not progress through the streets; the rubble afforded the Germans many admirable

places in which to deposit antitank and antipersonnel mines easily and with little regard for camouflage. Another reason was the excellent field of fire over and among the piles of rubble where buildings had stood. Others were the wealth of material available for construction of defensive works and the ease of camouflaging such works amid the ruins.

Since tanks could not negotiate the easily constructed tank barriers, and riflemen as well as mine-clearing squads were subjected to effective short-range fire from the defenders, resort was made to a new weapon. Here the tank-dozer had its birth, although the combat value of the bulldozer previously had been demonstrated in the Pacific. But clearing rubble-filled streets and removing mines from the rubble, for the subsequent advance of other tanks and self-propelled guns without which the storming of a city is almost impossible, is a dangerous and slow progress. Progress through a city with buildings intact (though filled with enemy) and over streets whose undisturbed cobbles give reassurance against mines may easily be preferable and less costly.

These are facts quite well known to the Germans. Their defensive preparations in a city include the demolition of selected buildings in order to provide (1) fields of fire, (2) rubble piles as obstacles, (3) material for breastworks and barricades, (4) emplacements for weapons among debris so as to cover selected "killing-grounds." In withdrawal, the Germans frequently have demolished buildings in order to deny observation to the attacker. In their preparation of a city for defense the Germans site armored steel and concrete pillboxes in buildings at cut-away corners, as well as inside buildings and basements. These pillboxes are proof against anything



In the Libyan desert the Germans strengthened their defensive positions by digging in damaged tanks so as to constitute armored dugouts, with only the turret above ground. In Italy they extended this method, embedding the turrets alone in concrete. Here is a PzKw-V turret with its 75-mm gun, near Pontecorvo; the flat area before it was liberally sown with all types of mines. Similar types of defenses can readily be installed in cities.

except a direct hit, unlikely except under accurate aimed artillery fire.

If it is true that the demolition of a city or village prior to attack enables the defender to make a more protracted defense, it is also true that a heavy artillery preparation, resulting in the destruction of a large percentage of the buildings, may not only fail to aid the attack but actually help the defender. This is more easily seen when it is realized that the attacking troops cannot possibly assault an entire village, even a small one, before some of the defenders have had an opportunity to recover from the effects of the bombardment. With streets debris-filled, only the near edge of the village can be overrun quickly by infantry, properly supported by tanks and self-propelled guns. The experiences of the Germans at Stalingrad, and of the Allies at Cassino, Ortona, Caen, and La Haye du Puits, show quite clearly that to capture just part of a ruined city is not sufficient.

The storming of a more or less intact city is a laborious task, involving sending many parties along parallel routes. Some must advance through courts (backyards), others through the streets, while still others move from house to house by crossing roofs and by "mouse-holing," clearing out one house at a time. Bitter and dangerous though this may be, the infantry can be closely supported at short ranges by tanks and direct-fire artillery, both of which may maneuver easily through streets relatively free of debris.

If artillery is not to be used to fire a preparation on a city prior to assault, it still has many uses during the attack, even with indirect laying. If not required during the preparation—and consideration of the ammunition supply and the life of the guns, always critical matters, should preclude any fire not expected to produce real results—it may be held mobile for future action. As soon as the position areas can be known with certainty, this artillery should be sited in localities from which its fire upon selected areas can be placed most accurately and effectively. Light field artillery, with its low velocities and relatively small bursting charges, is not of great value when fired against heavy stone buildings, some walls of which may be as thick as fifteen feet. Even with high angle fire, the slope of fall of its projectiles is not sufficiently steep for effective fire in areas defiladed closely behind buildings. But it is effective (especially with time fire) against troops in the open or behind

uncovered barricades, and is of value for destruction of light cover. Medium and even heavy artillery can be used to advantage—some of it from short ranges, and even with direct laying—for fire against strong points and pillboxes. High velocity weapons of calibers smaller than 155-mm should be used to fire from close range into windows and loopholes to destroy enemy weapons and personnel within. Each weapon should be sited to obtain its most accurate fire and the greatest effect.

To say that artillery should not be used in placing preparation fire on cities to be assaulted does not mean that no preparation should be fired. On the contrary, the preparation is required more than under other circumstances. Supporting weapons to the rear and installations to the flanks should be neutralized. Communications and command echelons need a careful and complete treatment, to interfere with maneuver, reinforcement, and supply of the threatened garrison. This fire should continue throughout the attack, in an attempt to isolate the troops in the city. Some preparation fire may be placed upon the city itself—but not of the usual massed fire type, which covers areas as large as 500 × 500 yards each. Accurately directed and observed fire should be placed upon enemy shelters on the edges of the city while advanced posts and outposts are neutralized. Selected buildings within the city may be singled out for destruction, especially telephone exchanges, waterworks, railroad centers. But these fires should be with small fire units (batteries and even single pieces) of calibers large enough to demolish a building and kill all its occupants with a few rounds.

Summing up, it may be stated that for the assault of a city preparation fires, at least those of the usual massed fire variety, should be placed only on areas outside of the city proper, while any fires within the city should be executed by small fire units, preferably of heavy caliber, accurately directed on small, specific targets. The same is true of supporting fires during the attack, with the exception that massed fires should be used when the known existence of enemy installations warrants such use and in full realization that the mere destruction of buildings will not assist the task of advancing the attacks. In cities, the importance of accurately directed fires of medium and heavy calibers as well as of high velocity weapons, assumes an importance even greater than at other times.

EXTENDING ACCURATE OBSERVATION

Obsn Bn Term for "Target Locating"

By Lt. Col. Edward R. Melton, FA

Tests conducted by the 288th FA Observation Battalion indicate a greater use for the flash ranging section of the observation battalion and the field artillery liaison plane when employed together. By having the observers of a flash ranging base obtain a fix on the liaison plane at the instant the latter observes on a target, in a few seconds coordinate locations can be obtained for targets which normally can not be fixed by either of the individual observing systems.

The scheme of the combined system is shown in Fig. 1. An observing base as installed for normal flash ranging is used, OPs 1 to 4. A reference point is selected on which the flash

OPs and the plane, when in the air, can observe. The RP is forward of or to the rear of the base, depending on whether the plane is to fly in front of or behind the base. Radio communication between the plane and all ground observers is established by a ground radio's being connected through the flash switchboard to the ground observer's party line. Flying in view of the observation base and at a height and on a course at which it can see the RP and target, the plane observer radios, "Ready to observe." The flash base radios back "Ready," and each ground observer begins tracking the plane with his

azimuth instrument. The plane observer, using a sextant, lays on the RP and target, keeping the observed angle, and radios to the flash base, "Read - one - two - three - four." At the instant of "four" the plane observer clamps his sextant, and the ground observers clamp their azimuth instruments which indicate the angle between the RP and the plane. The plane radios its observed angle and the ground observers report their angles by telephone to the flash plotting central. These angles are plotted on the flash ranging board, thereby fixing the plane (A in Fig. 1) and the observed angle at that point. In the

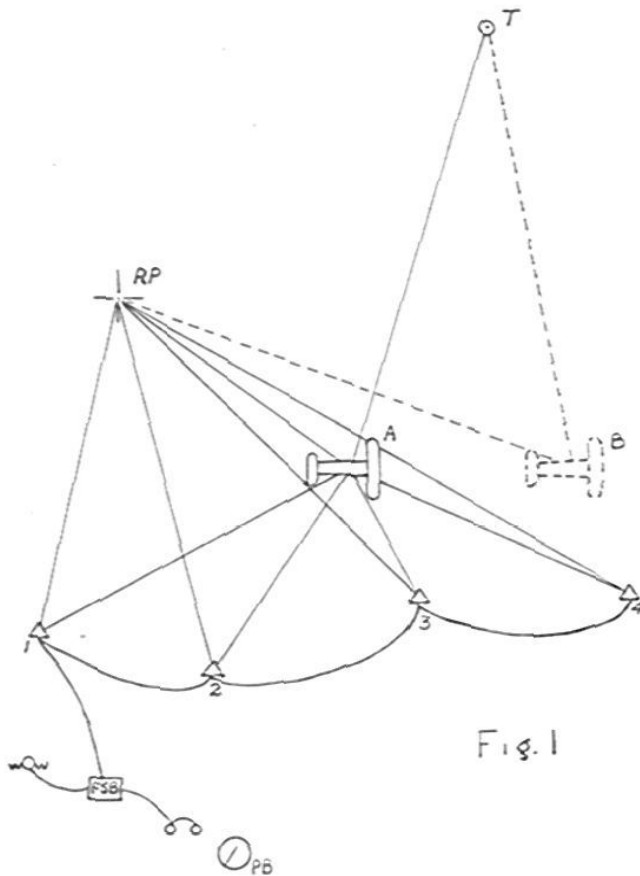


Fig. 1

meantime the plane has continued on its flight and at any point B the same observations are made, thereby giving a two-ray intersection for the target, and thus the target becomes fixed in relation to the flash ranging base. More rays can of course be obtained from the plane.

A first reaction to the system is the error introduced by the relative altitude of the plane and the ground observers. The tests indicate accuracy well within accuracy of guns used for the ranges, if the liaison plane does not exceed its usual combat ceiling of 2,000 feet. At a range of 11,000 yards from the flash base a farmhouse was located within 30 yards of its true position.

With the plane flying at an altitude of approximately 2,000 feet above the ground base and at a speed of 60 miles an hour the following typical results were obtained plotted on a 1/20,000 scale:

- (1) On the first try of the system, three plane positions were plotted and three triangulation points fell on observed rays from the plane.
- (2) Target 5,500 yards in front of base, plane 1,400 yards in front of base; single ray from plane position was 0.25 mil out.

(3) Target 10,000 yards in front of base, plane 2,000 yards in front of base; five rays from five plane positions passed through the target, sixth ray was out 0.3 mil.

(4) Target 11,000 yards in front of base, plane 1,450 yards in front of base; three rays from plane positions passed through the target; two rays spread 0.25 mil, giving a range error of 160 yards.

(5) Target 3,400 yards in front of base, plane 1,300 yards in rear of base; four plane rays passed through the target, fifth ray was out 2.5 mil (it is believed the fifth ray error was due to error in reporting angle).

(6) Target on flash base extended (approximately 2,500 yards), plane 1,900 yards in rear of base; three plane rays passed through target, fourth ray was 0.25 mil out.

Where more than three observations were made on the same target, the plane gave three observations flying in one direction and the remainder of the observations coming back on the same course.

The azimuth instrument M1 was used by the ground observers. The new British observing instrument is better adapted for this particular application because of the vertical bend in the optical axis, making it easier for the observer to observe vertically. The M5 flash ranging plotting board is designed to plot azimuths so reference point—plane angles were read as azimuths, the angle observed in the plane being plotted as a deflection from the RP or converted azimuth. A Huson sextant having a 160-degree scale and a rapid motion was used in the plane, but the 4x telescope on the sextant was removed because of difficulty in keeping the RP and target in the field of view due to plane motion. Alignment of RP and target was by mirror only. An SCR-610 was used in the plane and an SCR-608 radio at the flash switchboard. The switchboard was plugged into the remote control jack of the SCR-608. By pressing the anti-howl button on the SCR-608 the switchboard operator or ground observers can talk to the plane. The ground observers were told to observe on the bottom of the plane between the wheels; this could be facilitated by having a white cross painted on the plane directly under the observer, or by using a light at night. A throat microphone should be used by the plane observer to allow freedom of hands in handling the sextant. At least four ground observers should be used and the air observer must take at least two readings to the target. Any number of reference points can be used; the ground observers need not see the RP, but its location must be known so it can be plotted, or the azimuth computed. To prevent enemy intercept a prearranged code can be used between the plane and ground for target identification.

Two obvious advantages of the combined system are: (1) the air observer gives information resulting in coordinate locations and (2) the flash ranging base is able to observe on targets it could not otherwise see. Targets defiladed from ground observers or targets having a mask can be located. Targets can be fixed in flat territory devoid of observation points. Silent enemy guns which would not be observed by flash or sound ranging, enemy bivouac areas, ammunition dumps, motor parks, observation posts, and road junctions can be fixed for future surprise fire missions. The system can simplify restitution of air photos. For long range guns it provides a relative calibration where the ground observers can not observe. In unmapped areas survey control can be extended for greater distances into enemy territory.

Accuracy of the results will depend on coordination ability of the ground and air observers. It is easier to observe on distant targets as the angle observed in the plane changes more slowly.



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 FRANCE (19 July to 18 August 44)

At the beginning of the period the Allied 21st Army Group held a beachhead in Normandy, the front line of which was:
AY River—Périers (exc)—Remilly (inc)—St. Lo (inc)—boundary between 1st U. S. and 2nd British Armies—Caumont (inc)—Noyers (inc)—Evrecy (exc)—Caen (inclusive, less south section)—Emieville (exc)—Troarn (exc)—Varaville (exc).

Opposing was the German 7th Army, with about 28 divisions. The Germans also had their 15th Army (about 15 divisions) defending the Low Countries and that part of France northeast of the Seine River. This army was fresh, had not been engaged, and was reported to contain only first class divisions.

In southeast and southwest France were respectively the 1st and 19th Armies, each estimated as containing 6 or 7 divisions. They had already detached troops to reinforce their 7th Army, or to replace divisions in their GHQ reserve. The latter had about 9 divisions, including some which had been in line.

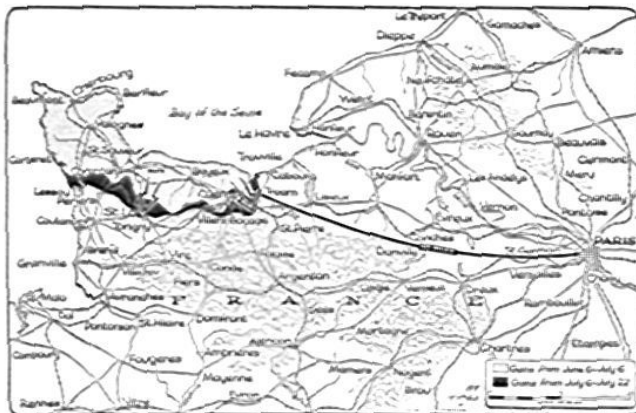
Besides the divisions there were in France a large number of German special and service troops, estimated as:

Military Police	75,000	
Air Corps	200,000	includes antiaircraft
Garrison 2nd line troops	70,000	includes depots and staffs
Total	345,000	

The German C-in-C was Marshal von Kluge. His plan for the campaign seems to have been established by German GHQ a long time in advance. This was to contain the Allied beachhead(s) until the Allies had committed most or all of the 80 to 90 divisions which the German Intelligence Service reported were available in the British Isles. At the beginning of the period the Germans had identified about half of this force as on shore in Normandy.

As there was a possibility that the remaining half of the Allied forces might land in Flanders the 15th Army could not be withdrawn from that area. Neither could forces be withdrawn altogether from the west and south coasts of France.

It was intended that as soon as the major Allied forces had landed a German counter-offensive would be undertaken with a view of driving one of the Allied invasions into the sea. The time for this had not arrived at the date this account opens.



On 20 July came the change of chiefs of staff at German GHQ, with a new strategical plan which involved making the main German effort in Russia, and not in France.¹ As a result the German army in France was required to release several divisions, apparently about 10, for duty in Russia. The plan for a counteroffensive was abandoned, and strict adherence to the strategical and tactical defensive was required.

As it was foreseen that this would eventually lead to the German armies' being forced back to the frontier of Germany on some line joining the North Sea and the Swiss border, a large force of labor troops was detailed to recondition the West Wall, last occupied in the spring of 1940. Families of Germans were moved out of France immediately. Steps to evacuate the greater part of France, in rear of a screen, were initiated.

The 21st Allied Army Group formed part of the command of Gen. Eisenhower, whose headquarters at the beginning of the period were in England. It is not known at date of writing whether the original plan of campaign contemplated more than one invasion area in northern France. In any event the Allied divisions in Britain were transported as rapidly as possible to the one beachhead in Normandy. Thus by the first of August, instead of one army group of two armies there were two army groups having four armies, each of which was stronger than either of the two armies in the original landing.

Securing a port was the first objective. This had been accomplished in June, with the capture of Cherbourg. The next objective was to destroy the hostile army before it. Three plans to accomplish this were tried.

The earliest plan was to break out of the beachhead on the east flank (in the Caen area) and advance southeast. Had this succeeded it would have placed the Allies closer to Paris than the bulk of the German 7th Army, and on its line of communications to Germany. This plan failed. The next plan was to pierce the enemy's center near the St. Lô area. Had this been accomplished the enemy would have been split and the western part of his forces separated from their base. This failed also. The last plan was to pierce the enemy's lines at the west end. This cut off no part of the enemy's main army, but it would enable Allied armored troops to undertake a wide envelopment by passing around the enemy's left. This plan did succeed. To enable supplies to be brought forward after the break-through on the west, additional ports such as Brest or St. Nazaire were desirable. Capture of these places was a secondary objective.

ALLIED OPERATIONS PRELIMINARY TO THE BREAK-THROUGH

On 19 July the British Army was engaged in a battle, already commenced, in the vicinity of Caen. Its principal effort was toward the southeast. A very large force of British armor was used in the center; strong infantry forces supported the flanks. The main attack cleared the enemy out of the part of Caen still held by him and kept on for nearly 5 miles astride the road to Mézidon, until stopped by a German AT barrier in front of Vimont. The infantry on the left advanced to near Troarn, that on the right reached Fleury, 2

¹For more on this see section relating to the war in Russia.

miles south of Caen. Next day this attack was extended on the flanks, it being difficult to get the center forward.²

The battle of Caen kept on. It was being fought in an area of utter desolation. Towns marked on maps were gone, except as images of rubble showed where they had been. Roads were impassable, as they had been so shelled and bombed that they had become lines of craters. Dead lay unburied, for it was hazardous to be seen moving. What had been orchards were now dead trees. Through this land of ruins the Germans had erected an AT barrier. This consisted of AT guns in appropriate locations supported by machine guns and infantry mortars. 3,000 to 7,000 yards back of these was the advance artillery zone. A supporting zone equally deep was 2 to 5 miles behind the advance zone. Reserves were still further to the rear. British and Canadian troops who attacked on the 21st made gains south and southwest of Caen, then met a strong armored counterattack.

On 25 July the Allied attack was renewed—this time by the British 2nd Army astride the road from Caen to Falaise, and by the 1st U. S. Army against the line St. Lô—Périers. In the area of both attacks the terrain is rolling country, cut up into many small orchards and fields separated from one another by hedges consisting of earth dams up to 6 feet high and 15 feet thick on which trees and bushes grew. Many of these dams were lined by ditches. Views were limited in all directions and from the air. For both attacks, as a result of previous experience, the tanks did not precede the infantry—they accompanied it.

The British attacked at 0330 hours, in pitch dark, after a very severe air and artillery preparation, on a 4-mile front. Gains were later partly lost to a German counterattack.

The American attack did not start until 1000 hours, when a 2½-hour air preparation started in which 1,500 heavy bombers and an equal number of lighter planes took part. Observation should have been excellent as it was a bright sunny day. Smoke from the first waves of bombers (HBs started the preparation) drifted toward our lines under a light wind. Succeeding waves at altitudes of 10,000 to 12,000 feet assumed that the target was where the smoke was. This resulted in some bombs' falling among friendly troops.

At 1100 hours the artillery preparation started. Behind a rolling barrage of shells and bombs the infantry attacked, making a maximum gain of 1½ miles to across the Périers—St. Lô road.

On 26 July the Caen offensive died down to local fighting. The Americans (using 4 divisions³) made a decided advance west of St. Lô and reached the line Canisy—Marigny. New armored forces now entered the American line. Using a larger tank force than ever before⁴ the 1st Army renewed the attack early on the 27th and fought onward all day. Tanks led, and were accompanied and supported by strong air forces. One tank column headed from Marigny toward Coutances and reached a point 6 miles from it. Two columns started from the vicinity of Canisy; one reached Cerisy la Salle, the other Le Mesnil Herman. At the end of the day these columns had no direct liaison between them. In view of this situation the enemy abandoned his line from Périers to the sea and withdrew toward Coutances.

The American attack appears to have lost about 75 tanks, but they were replaced and the attack continued on the morning of 28 July. A considerable advance was made to the line Coutances (exc)—St. Denis-le-Gast—Percy—Tessy-sur-Vire—St. Lô, thus creating a 12-mile-wide salient into the enemy's lines.

On 29 July the Germans evacuating Coutances were intercepted by Americans who had cut in in rear from the salient to the east. The Americans were not strong enough, and the Germans got through. In continuous fighting the line was advanced to practically along the bow-shaped RR line from Coutances through Hyenville, St. Denis-le-Gast, Percy, Tessy-sur-Vire, to St. Lô. At this date the Germans estimated that

²It was later announced that to include 20 July the Allied losses in the Norman invasion since 6 June totaled as follows (for 45 days of combat):

	Killed	Wounded	Missing	Total
Americans	11,026	52,669	5,831	69,526
British	5,646	27,776	6,182	39,594
Canadian	919	4,354	1,272	6,545
Total	17,591	84,799	13,285	115,665

³1st, 4th, 9th, and 30th Inf Divs.

⁴2nd and 3d Armd Divs.

the Americans had 24 divisions in line, the Americans that opposite them were 8 German divisions.

On 30 July the Americans made a considerable advance. The 3d Armd Div. broke through the German line near St. Denis-le-Gast by 1100 hours, and then meeting but little opposition reached Avranches (12 miles away) that evening. Other troops closed around Granville.

Although the Americans had reached Avranches on the 30th, the Germans were not entirely expelled at the time. This is a small walled town, normally of about 8,000 people. It took all of the 31st to clear this place. On this day the Germans initiated a counteroffensive against what had become an American salient. This now extended along the line Avranches—Villedieu les Poêles—Percy—Tessy-sur-Vire—St. Lô. The Germans retook Percy and Tessy-sur-Vire. The Americans consolidated their position around Avranches and cleared a number of enemy groups in their rear which had been by-passed. They also advanced south from St. Lô astride the Vire to reach a line through Torigny-sur-Vire.

On 1 Aug the American armor at Avranches attacked southeast and southwest. Against considerable resistance they approached Vezins and Pontorson. They were practically through the German line around the Normandy beachhead at its most western point. In eight days of continuous fighting an advance of 35 miles had been made over very difficult country. 18,587 prisoners are reported as having been taken in this operation, which completed the phase of penetrating the enemy's front.

The constant flow of new divisions to the Allied forces in Normandy now led to a reorganization of the command. GHQ under Gen. Eisenhower moved to Normandy.

The 1st U. S. Army was relieved from duty with the 21st Army Group, and together with the newly-arrived 3d U. S. Army was formed into a new 12th Army Group Lt. Gen. Omar N. Bradley. Lt. Gens. Courtney H. Hodges and George S. Patton commanded the two armies.

A newly formed 1st Canadian Army under Lt. Gen. H. D. G. Crear, and containing a Canadian Corps, a Polish Corps, and British, Dutch, and Belgian troops, was assigned to the 21st Army Group and took over the left of the line.

EXPLOITATION OF THE BREAK-THROUGH

The first German reaction to the American break-through was to attack westward from the line Tessy-sur-Vire—Villedieu les Poêles with a view to cutting the American corridor along the west coast of the Cotentin peninsula. Allied reaction was to go ahead with pouring troops through the gap near Avranches and to attack south through Torigny-sur-Vire toward the town of Vire, or toward the right rear of the German counteroffensive.

On 2 Aug the 6th U. S. Armd Div started westward from the vicinity of Pontorson with the mission of capturing Brest, desired as a base. Other armored troops started south. By evening of the 3d these troops had reached Dinan and Rennes without meeting important resistance.

Next day the armored troops went 50 miles west from Rennes to Loudeac without encountering strong hostile forces. Southward, Chateaubriant was reached. Infantry following moved from Avranches to Fougères. The Germans assembled 2 Panzer and 2 infantry divisions in the area around Mortain, with a view of attacking westward.

On 5 Aug the Americans commenced a movement eastward. Troops from Fougères and Rennes attacked toward the line Mayenne—Laval. Strong enemy resistance was met. The armored troops in Brittany against minor opposition reached the line St. Brieux (exc)—Pontivy (inc)—Redon (inc)—Chateaubriant (exc).

Next day both Americans and British began a general attack south along the line Tessy-sur-Vire—Torigny-sur-Vire—Villers Bocage. This was preceded by a strong air preparation. The main effort was made by American armor against Vire, the outskirts of which were reached, and by the British against Mt. Pinçon (1200 feet high), which was almost taken. American armor in Brittany reached the outskirts of Brest, found to be held by the enemy with about 3 divisions. Other armor reached the line Vannes—Redon—Chateaubriant. The attack against the line Mayenne-Laval was continued. As the enemy held, his position was turned by armored and motorized troops who crossed the Mayenne river at Château Gontier, 17 miles south of Laval.

On 7 Aug Brittany was almost cleared of German forces—all except

the ports. Brest was strongly held, and other garrisons held Lorient on the south coast and St. Malo on the north coast.

American attacks toward the east got under way on a 55-mile front. Three divisions centering about Domfront (German), Ambrières, and Mayenne attacked toward Alençon. Two (or 3) divisions attacked from Laval and Château Gontier toward Le Mans. North of the sector of these attacks the German offensive by 5 Panzer divisions attacked westward from the vicinity of Mortain and gained 3 miles to Chérence-le-Roussel. Further north the American attack toward Vire was continued, and beyond that the British attacked southward of Caen in an easterly direction across the Orne. The latter attack was preceded by an unusually intense and prolonged air and artillery preparation.

On 8 Aug the great battle against the line Alençon—Le Mans made progress. Main American effort was on the right, with a view to turning the enemy's left. The German attack to the north continued but made only slight progress in some places and none in others. German tanks were attacked by rocket planes; many were disabled. The Allied attack on the line Vire—Mt. Pinçon made slight progress at the latter place only. A British attack preceded by a pre-dawn air and artillery preparation enabled the infantry and tank attack to advance 4 miles immediately after daylight, to include Bretteville-sur-Laize. The attack was renewed at midday following a second artillery preparation, but this failed before a new enemy AT barrier line.

On the 9th, Canadian troops attacked in continuation of the preceding day's efforts down the Caen and Falaise road on a 3-mile front. German armor attacked their left flank, but the advance reached the vicinity of Pontigny. There was heavy fighting westward to Vire, and again around Mortain, where the German attack persisted. Mortain had been retaken by the Americans but they lost it for a third time to the Germans.

The American attack (now under the 3d Army) against the line Alençon—Le Mans entered the latter town. This attack now had 10 divisions in line. The armored divisions in Brittany were ordered to join the main effort. Infantry divisions were detailed to reduce the defended ports of Lorient, Brest, and St. Malo, needed badly for bases.

On 10 Aug the situation was:

1st Canadian Army attacking south from Caen reached a line 5 miles from Falaise; other attacks were made southeast from Caen for a gain of 2½ miles.

2nd British Army attacked on the Canadian right for minor gains.

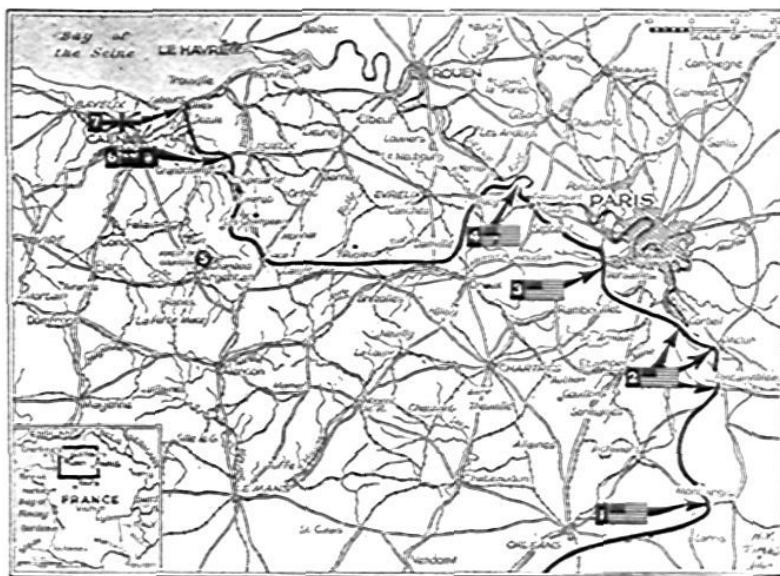
1st American Army was in a hard fight with enemy Panzer divisions between Vire and Mortain.

3d American Army advanced its right from Le Mans to the line Beaufay—Montfort, while its left was still held before Alençon. Right flank guard reached the Loire River from Nantes to Angers and found only weak enemy forces.

On 11 Aug American armor carrying infantry on tanks started north toward Alençon, while a flank guard covered the movement on the east side. Coupled with an attack from the west, Alençon was captured. Leaving this town to the infantry divisions coming in from the west the armor proceeded north on the road to Argentan.

In view of this move the German 7th Army ordered discontinuance of their attack about Mortain, and a withdrawal of the front between that town and Vire. Troops released by thus shortening the front were sent to the vicinity of Argentan to head off the Americans who attacked from the south, and toward Falaise to head off Canadians attacking from the north. The Allies made slight gains all along the line on the following day.

On 13 Aug Allied GHQ, seeing the opportunity of closing the gap between Falaise and Argentan, issued a General Order appealing to and directing the Air Force to use every possible plane to unceasingly blast all enemy lines of communication, so that his only escape from destruction would be surrender. In compliance, every available plane was called off the ground to turn any German retreat into a route. The Allies attacked everywhere: Americans advanced 4 miles southeast from Vire, the British 2nd Army made a 3-mile gain in one sector.



Just after this period, American armored spearheads began to thrust south and southeast of Paris. One, racing east from Orleans, was approaching Montargis (1). Others were near Fontainebleau, Melun, and Corbeil (2). Closer to the capital tank columns were in the vicinity of Meudon and Versailles (3). Between Mantes and Vernon (4) American troops were reported to have smashed across the Seine in an effort to block further the flight of disorganized German forces fleeing from Normandy, where the bulk of 14 enemy divisions and remnants of four others were being hammered in pockets west of Argentan and around Trun and Chambois (5). Nearer the coast the Canadians smashed to within four miles of Lisieux (6) and the British crushed through Cabourg (7).

Next day the Allies concentrated on attempting to close the gap. The Canadian army attacked toward Falaise. The air preparation, started at 1400 hours, called for dropping 3200 tons of bombs in 4 waves—20 minutes to a wave. The infantry remained quiet during the first three waves but at the end of the third wave opened fire with machine guns and heavy weapons. The 4th wave mistook the heavy weapon fire for the enemy, and spent the prescribed 20 minutes dropping 800 tons of bombs on friendly troops. This in turn set off ammunition dumps which the infantry had in forward areas to facilitate resupply in view of the excessively bad condition of roads and terrain due to weeks of shelling and bombing. The infantry attack only made a slight gain.

The American attack toward Argentan failed to take that place. Troops were brought up to extend the attack to the right and left, with hope that somewhere the enemy's defense might be pierced. At the end of the day the line in this sector was Rânes (inc)—Argentan (exc)—Gaprée (inc). The enemy was still holding strongly just outside of Alençon.

During the day the Germans withdrew troops and materiel from the area west of the line Falaise—Argentan, while the Allied air force attacked most intensively all enemy transportation, roads, and railroads.

On 15 Aug the Americans attacked hard and reached the line Domfront (inc)—La Ferté Macé (inc)—Rânes (inc)—Argentan (south edge of town taken). The Canadians reached the outskirts of Falaise. The Germans continued to withdraw.

On the 16th the Canadians attacked toward Falaise. It was raining. The continuous shelling and bombing had uprooted the country. Entire woods and villages had been destroyed and their rubble strewn over roads. The enemy had strewn mines liberally. The advance was slow and limited. In the center, as the Germans withdrew, a line through Flers was reached without heavy fighting. A new American operation was started from the Le Mans area. American armor pushed eastward; meeting minor resistance it reached the line Dreux—Chartres—Orléans.

On 17 Aug the Canadians entered Falaise, but the enemy remained just outside that town. The line through Flers advanced to a new line through Athis. Near Argentan slight gains were made near Rânes. Further south, Americans from Dreux and Chartres advanced a few

miles eastward. The German Seventh Army received orders during the night 16, 17 to withdraw to in rear of the Seine. It evacuated Troarn, which the Canadians occupied.

Next day the Canadians pushed south from Falaise half way toward Argentan, and southeast to Trun. The Americans were still held at Argentan but their line was extended to the east to Gacé and Laigle, where liaison was made with the armored troops at Dreux. The latter sent out patrols which reached the Seine River near Vernon and Mantes.

During this campaign the siege of the German-held ports of Lorient, Brest, and St. Malo had been continued. Strong attacks against Brest failed. Attacks against St. Malo succeeded, however: this place garrisoned by

about 2 battalions surrendered on 17 Aug. The capture of St. Malo does not open the port at that place. The enemy still holds the fortified island of Cézembre (4 miles off shore) which blocks the port entrance.

At the end of the period the line was:

Varaville (Canadian) — Troarn (Can) — Mezidon (Can) — Trun (Can) — Chambois (Can) — Montabard (British) — Putanges (?) — Briouze St. Gervais (junction between 2nd British and 1st U. S. Army) — Ranes (1st US) — Argentan (German) — Orne River — Gacé (1st US) — Laigle (1st US) — Verneuil (Ger) — Nonancourt (Ger) — Dreux (3d US) — Eure River (German on west side to Pacy) — Vernon (3d US) — Seine River to Mantes (3d US) — Rambouillet (Ger) — St. Arnoult (3d US) — Etampes (Ger) — Orleans (3d US) — Loire River to the Atlantic Ocean.

THE WAR IN SOUTH FRANCE (19 July to 18 August 44)

On 15 Aug, a new major operation was launched. The U. S. Seventh Army (Lt. Gen. (then Maj. Gen.) Alexander M. Patch) in an amphibious expedition debarked in south France with main landing between Cap Camarat and Cap de Dramont. In an air line these capes are 15 miles apart. Between them are the gulfs of St. Tropez and Fréjus, which have small but good beaches.

In this area were landed the U.S. VI Army Corps, with the 3d, 36th, and 45th Divs. All of these had previously been with the American Fifth Army in Italy. A French force which included armor was landed near Bormes. Landings were preceded by the dropping of the 1st Airborne Task Force (mixed British and American) in the area inland between Draguignan and Le Muy.

The main landing involved over 800 ships and a large air force. Part of the planes were based on fields in Corsica, part on naval aircraft carriers—7 British and 2 American. The air preparation lasted from 0550 to 0800 hours, was very heavy, and covered all towns and probable targets near the coast. Strong naval forces (which included American, British, and French units plus detachments of the Canadian, Dutch, Belgian, Polish, and Greek navies) fired a strong artillery preparation.

From French sources information concerning the enemy was good, and subsequently found to have been complete. No enemy troops were encountered other than those which had been previously located. The enemy also had good information concerning the proposed landing. From his air reconnaissance he had located the invasion fleet assembling in Corsica. From its size he was able to determine the approximate strength of the invasion forces. At first he had believed the landing would be in the Gulf of Genoa, later he decided it would be in southeast France. It is not known how he determined this, but the same information appears to have been diffused all through France, and to have been generally known and expected by the entire population.

H-hour was 0800 hours—broad daylight. The invasion coast was defended by two second-class regiments. About half of these German troops were Russians, Poles, Czechs, etc., who had no interest in repulsing the landing. Many surrendered.

Opposition was not very serious. The landing went according to plan. The airborne troops landed at 0430 hours and secured their objectives, which blocked enemy reinforcements coming from the direction of Italy. That is, they would have blocked them had there been any. Only there weren't. The French similarly covered the west flank. There were some Allied losses due to dropping troops in the wrong place, and others due to glider-borne troops' crashing in the darkness against unexpected obstacles.

On 16 Aug the beachhead was developed and contact established with the airborne troops. Engagements were limited to minor actions with small forces seeking to delay the Allied advance.

On 17 Aug the Allies captured off the Bay of Hyères the islands of Port Cros and Levant. Initial operations against these (which contained coast artillery batteries) had been commenced on the 15th. Their reduction made it possible to use the Bay of Hyères for landing new troops and supplies. It



While one column continued to advance on the great naval base of Toulon from the east (1), another drove down from the northeast to capture Sollies-Pont (2). Still farther north other forces pushed west along roads leading to Marseille, reaching the vicinity of Brignoles (3) and a point 3 miles west of Draguignan (4). The advance toward Cannes continued (5).

had been necessary to use major caliber guns of a battleship to drive the enemy out of the coast forts. The beachhead was extended to include all of the newly-taken bay, which brought the advance up against the east edge of Toulon, a major naval base. No important reaction had yet appeared.

On 18 Aug the beachhead was still further extended. Enemy troops were in Toulon on the west and in Cannes to the east. In between the Allied line was:

Giens peninsula (inc) — Hyeres — Sollies-Pont — Puget-Ville — Besse-sur-Isle — Le Luc — Lorgues — Flayosc—Draguignan—Bargemon—Fayence—Siagne River.

More than 10,000 prisoners had been reported as taken, including a number taken by rising French forces.

In rear of the enemy extensive French uprisings have occurred. They have seized a number of German garrisons, and appear to have cut the enemy's lines of communication from both the Italian frontier south of Switzerland and the German frontier north of Switzerland. The only enemy line troops identified in southeast France to date has been their LXII Reserve Corps, with 3 divisions.

The mission of the invasion has been announced by Gen. Sir Henry Maitland Wilson, the Supreme Commander for all Allied troops within the Mediterranean area. He visited the beachhead on 16 Aug and stated that the advance would be directed toward the north, with a view of joining the Allied forces already operating in north France.

THE WAR IN ITALY (19 July to 18 August 44)

Under Gen. Sir Harold R. L. G. Alexander, the Allied Central Mediterranean Force constituted that part of the Supreme Command Mediterranean Theater which operated in Italy. The Supreme Commander was Gen. Sir Henry Maitland Wilson.

The Army Group in Italy consisted of the American Fifth Army (Lt.

Gen. Mark W. Clark) on the left and of the British Eighth Army (Lt. Gen. Sir Oliver W. H. Leese) on the right. The Elsa River was the boundary between them. The front line was:

Livorno (Allies)—Fauglia (A)—Pontedera (A)—Peccioli (A)—Certaldo (German)—Barberino (G)—Montevarchi (G)—Arezzo (A)—Citta di Castello (G)—Sassoferrato (G)—Esino River.

Measuring straight across the American Army covered about a fourth

of the front, the British the rest. The total distance measured around the curves in the line was some 170 miles, which was reduced to 155 miles by going across salients.

The enemy consisted of a German Army estimated as having 25 divisions, including their reserve. It was aided by a small detachment of Italian Fascists who operated an air force, specializing in torpedo planes, which made occasional raids as far as the North African coast and toward Gibraltar. A Fascist motor torpedo detachment operated a few boats on both the Adriatic and the Ligurian seas.

In general, the Germans received but minor help from the Fascists. Their greatest contribution to the Axis cause was the enlistment of a certain number of Italians within German units, particularly noncombat organizations. As an offset, anti-Fascists engaged in sabotage on an extensive scale in occupied Italy, and required a considerable number of troops to keep them within bounds.

Due to the Italian people's being divided between Fascists and anti-Fascists, and to operations' being within their own country, both sides have found it convenient to use Italians as spies. Spies have been able to pass back and forth. Both sides have been well oriented as to the dispositions of the other.

The strength and organization of the Allied forces had not been released at date of writing, except to state that it was superior to the enemy's forces. They were engaged in the mission of driving the enemy from his hold on Italy. On 19 July, when this account opens, the entire front was active, with daily heavy fighting.

On the 19th the Americans entered Livorno. For some time they had been at the outskirts. Some street fighting developed and lasted until evening, by which time all of the enemy had withdrawn.

The Germans had accomplished an unusual amount of destruction in Livorno. In the harbor out of 60 berths for ships, none remained useable. The main road into the city from the south was such a mass of mines that the infantry had taken to the hills and detoured around, notwithstanding that this had given the enemy opportunities for delaying actions. The artillery went right along with the infantry which it supported.

On the extreme right, near the Adriatic, Polish troops established a small bridgehead across the Esino River. Amidst the mountainous center the Allies made small advances. Continuing their advance the Poles reached Senigallia on the Misa River on the 21st.

Next day the Eighth Army cleared Citta di Castello, while the Fifth Army, not meeting much opposition, closed in on the Arno River, which it had already reached at some places. By the 23d the entire south bank of the Arno from the Elsa River to the sea was in Allied possession. This included the south part of Pisa, which city is bisected by the Arno River; the enemy held the north part.

This west section of the front now stabilized. A redistribution of Allied troops in line was noted by the Germans, from which they drew the conclusion that the Allies did not intend to push the offensive further at this time.

At this date the Eighth Army was in rear of the Fifth, with the line approximately Certaldo (G)—Greve (G)—Figline (G)—Bibbiena (G)—Sansepolcro (G)—Sassoferrato (G)—Ostra (G)—Senigallia (A).

On 25 July the left of the Eighth Army launched a major attack from the Elsa to the Arno, inclusive. The axis of the attack was northwest; the objective was Firenze (Florence), 16 miles away. The center of the line advanced almost to San Casciano. Lesser gains were made on the flanks.

The battle became intense. The terrain is hilly, and covered with small stone villages, vineyards, and olive groves. Slopes are steep, and often impracticable for tanks or motor vehicles. There is excellent cover, many stone walls and hedges. It was hard to determine just where the enemy was. Taking full advantage of the ground the Germans fought a slow retiring action. By evening of the 27th the line was: point 4 miles south of Empoli—San Casciano (G)—Greve (G)—Figline (G).

According to German reports the Allies were using 8 divisions in this battle; the Allies identified 4 German divisions including one Panzer division. It was a hot summer, and on the hills there was little water. Allied progress was slow, but it was steady.

Attacking daily, the Allies on 29 July reached the outskirts of Empoli and Montelupo. This day the Germans delivered a strong counterattack and drove back a New Zealand division near the center of the battle area. The Allies thereupon shelled the new enemy position for 6 hours, when the New Zealanders counterattacked, only to find that the enemy had disappeared. According to German accounts the Allies had in line (starting at their right) British, South African, New Zealand, and India divisions. The fighting had been very hard, the weather trying, and the terrain



Near the end of the period, on the Adriatic front the enemy withdrew along the Cesano from Monteporzio to the sea (1) and Polish forces established a bridgehead two miles from the coast. The British front in the mountainous interior (2) was quiet. The Germans, however, pulled out of Florence (3) and Allied civil officials and Italian partisans crossed the Arno into the main part of the city. To the west artillery fire forced the British from San Colombano, but they drove forward on both sides of Empoli. Bad weather curbed action in the American sector around Pisa (4).

difficult. On 30 July the general attack was suspended. Only minor local engagements occurred.

On 2 Aug the general battle was resumed. Main effort was made on the left. The India division which has been west of the Pesa River crossed it and advanced eastward almost a mile. Due south from Florence the opposition was heavy; only slight gains resulted. The enemy was resisting as hard as before. In view of the Allied gains on the west side of the battle area, however, the German High Command determined to withdraw to the north side of the Arno River.

On 3 Aug the Allies renewing their attack reached the line of the Ema River, parallel to and about 2½ miles south of the Arno, from its junction with the Greve River eastward to where its course changes from north to west. The line then continued on across country to a point 5 miles south of Pontassieve.

During the night 3/4 Aug the South Africa division, reinforced by a brigade of British Guards, forced a crossing of the Ema River near its mouth, and by daylight had gained Galluzzo. They then fought their way to near the southwest exit of Firenze. On the left the India Division made substantial gains. During the succeeding night the enemy withdrew the last of his rear guards to the north side of the Arno. He destroyed all bridges within Firenze over the Arno except the Ponte Vecchio, which was blocked. He had previously destroyed all other bridges outside of the city.

On 5 Aug the Eighth Army occupied the south bank of the Arno. As had been the case with the Fifth Army, the situation along this river now stabilized. The enemy held two small bridgeheads near Empoli and Pontassieve, until the 9th. On 12 Aug representatives of the AMG crossed the Arno and initiated measures to feed and care for the civilian population. It was found that the Germans had withdrawn to the old city boundary, approximately along the railroad tracks on the northwest and northeast sides of the city. The apex of this line is 2,700 yards from the Arno River. From their lines the Germans have enfilade fire down certain streets. Their line is also a base for Fascist patrols, who enter the city to fight anti-Fascists.

During the severe battles on the west side of the Italian peninsula lesser fighting occurred on the east side, with correspondingly small gains. These were generally discontinued after 6 Aug, apparently under orders from superior authority and with a view of utilizing troops in part in other theaters.

At the end of the period the line was:

Arno River—Pontassieve (G)—Castelfranco (A)—Bibbiena (G)—Sansepolcro (G)—Cesano River.

THE WAR IN RUSSIA (19 July to 18 August 44)

During this period the entire front, less the extreme north and extreme south, has been active, although the Russian offensive in Finland was reduced to a minor operation. Elsewhere the Russians were on the strategical and tactical offensive.

Since February, 1943 the Germans had been on the strategical defensive, and generally, but not always, on the tactical defensive. The purpose was to reduce the forces employed on the Russian front in order to accumulate troops in west Europe in sufficient force to meet the expected invasion of the Allies. This purpose was accomplished. Up to June, 1944 the number of German divisions had been increased in west and south Europe approximately as follows:

in France	from 30 to 65	being an increase of 35 divisions	
Italy	6	25	19
Balkans	6	25	19
			—
	Total increase		73

In order to obtain these additional divisions the front in Russia was withdrawn in a fighting retreat. It had been hoped and planned that this could be conducted in such a way as to force the Russians constantly to attack a series of fortified positions which would in the long run cost them such heavy losses that their armies would be exhausted by the time they arrived near the German frontier. This mission was not accomplished.

In the period described in the last JOURNAL the Russians had such large forces and so much materiel that they made surprising advances. This led to a reconsideration of the German strategical plan, which was



At the period's start, in a new offensive near the northeastern corner of Latvia the Russians advanced on a broad front between Zabolotye (near Ostrov) and Ragoziki (1). In the center of the long battle line Krynki station (2), 25 miles from Bialystok, was captured. The Bialystok—Brest-Litovsk railway was cut at Kleschcheli (3), 95 miles from Warsaw. Near Brest-Litovsk itself the Russians took Imenin and Gorodets (4). The line of the 1939 Polish partition was crossed at Krystynopol (5). In the Lwow area Soviet forces pocketed Germans west of Brody and moved forward to Dzibulki and Remenov (6), only 8½ miles from Lwow.

based upon seeking a decision in west Europe first. It was now evident that Germany could not wait this long: the Russians were already at the gates.

The German crisis came on 20 July. It has been represented as an attempt to assassinate Hitler, apparently at German GHQ. As represented by German communiqués, Hitler with his chief of staff (Gen. Keitel) and the German equivalent for G-3 (Gen. Jodl) while in conference together had a bomb thrown among them. Gen. Jodl was reported wounded, but Hitler and Keitel escaped. Immediately afterward, on the same day, Gen. Keitel was relieved as chief of staff and replaced by Col. Gen. Guderian. Gen. Jodl was also relieved.

It would make no sense to relieve a chief of staff if his policies had been satisfactory. It must therefore be presumed that the extensive defeats in Russia had convinced Hitler, and many other Germans as well, that the advice previously given was now obviously yielding bad results. A change was necessary.

Guderian appears to have arrived at GHQ on 21 July. There is no evidence so far that he had any direct connection with the events on 20 July. His first orders appear to have been issued on 22 July, in connection with holding the front along the Hungarian boundary in the Carpathian Mountains. Thereafter it became clear that the German policy had been reversed. The decision was to withdraw, at least in France. Divisions taken from other fronts have been sent to the Russian front.

Another measure taken was the increase of replacements to make up for losses sustained. A large part of the replacements are non-German. It may seem strange, but many are Russian. Large numbers of Poles, Czechs, and other nationalities are present. Many German divisions consist of 40% foreigners, who seem to think they will have to fight anyway.

Many are uninterested or ignorant as to the objectives of the war and feel that it is immaterial which side they are on. They would prefer not fighting at all, and are inclined to surrender when suitable opportunities present themselves.

Since the change at German GHQ the Germans have remained on the strategical defensive on the Russian front, but they have resumed the tactical offensive in many sectors. They seem to be building up forces with the apparent objective of either undertaking the strategical offensive or of stabilizing the line outside of Germany by the beginning of October, when autumn rains usually set in and make major offensives difficult to conduct.

As a whole, the new German plan depends for success on preventing an Allied entry into Germany (including Austria and Hungary) before the coming winter.

THE ARCTIC AND FINLAND FRONTS

On the German side the Arctic Front is held by an army (under Col. Gen. Luther Rendulic) estimated to have 6 or 7 divisions. Its mission is to prevent a Russian advance into north Norway, and to cover the left of Finland's army to its south. The boundary between the two Axis allies is near Lake Kunto. The entire line, German and Finn, has been:

Liza River (30 miles east of Petsamo)—Notosersk (Russian)—south branch Lake Nuot—Lake Pyav—Magovoritsk (?)—Lake Yushk—Lake Ruka—Lake Tolva—Ilamantsi (Finn)—Lake Loimola—Lake Suo—north edge Lake Ladoga—Taipaie (F)—Rautu (?)—Lake Suvanto—Lake Vuoksi (Russian bridgehead at Vuosalmi)—Heinjoki (R)—Karissalmi (R)—Ihantala (F)—Viipuri (R)—Viipuri Bay.

At the beginning of the period the Russians were engaged in an offensive around the north end of Lake Ladoga. In hard fighting they reached the original boundary near Lake Naisten on 22 July. The right of this attack was extended north to Lake Tolva and south to Lake Janis, a front of about 100 miles.

The Finns fought back. Further Russian advances were small. On 30 July the Russian offensive ceased. Thereupon the Finns initiated a counteroffensive against the center of the Russian front. This part of Finland contains numerous lakes and many forests, affording opportunities for maneuvering. The Finns were able to encircle and partially destroy the Russians' 176th and 289th Divs, and to recover

some of the ground previously lost by them.

With the above exception, activity on the remainder of the long front between the Arctic Ocean and the Gulf of Finland has been limited to patrol and raid activities, with no change in the line.

THE MAIN RUSSIAN FRONT

At the beginning of the period the line was

Narova River (Russian bridgehead southwest of Narva) — Lake Peipus—Lake Pskov—Velikaya River (German bridgehead at Ostrov)—Sunnyaya River—Lake Osveya—Rositsa (R)—Druya (R)—Braslav (R)—Zarasai (G)—Utena (R)—Ukmergė (Vilkomir) (G)—Kasiadorys (Koshedary) (R)—Niemen River (Russian bridgehead at Grodno)—Hajnowka (R)—Brest Litovsk (G)—Luboml (G)—Włodzimierz (Vladimir Volynski) (R)—Sokal (G)—Kamienka (G)—Brody (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 of Iasi—Koroneshty (G)—Orhei (R)—Reut River—Dneestr River.

That part of the front which was active was covered by the following Russian Army Groups, with south boundaries approximately as shown:

Leningrad—across Lake Peipus to Ema River.

3d Baltic—Col. Gen. Ivan S. Maslenikov—south border of Estonia.

2nd Baltic—Gen. Andrei I. Yeremenko—south border of Latvia.

1st Baltic—Gen. Ivan C. Bagramian—Wilno (or Vilna) and Kaunas (both to 3d White Russian)—Kaunas River.

3d White Russian—Gen. Ivan D. Chernyakovsky—Lida—Suwalki (both to 3d White Russian).

2nd White Russian—Gen. Matvei Zakharov—Sokolka—Narew River.

1st White Russian—Gen. Konstantin Rokossovsky—Kovel—Lublin—Radom (all to 1st White Russian).

1st Ukraine—Marshal Ivan S. Konev—Zloczow (1st Ukr)—Chodorow (4th Ukr)—Drohobycz (4th Ukr)—Boryslav (4th Ukr).

4th Ukraine—

The opposing German armies are listed below; boundaries between them were not ascertained:

North Army Group: 18th Army—Estonia; 16th Army—Latvia.

North Central Army Group: 3d Panzer Army—Lithuania; 4th Army—Augustov to near Warsaw; 9th Army—Warsaw to Deblin.

South Central Army Group—1st Panzer Army—Deblin to near Mielec; 4th Panzer Army—Mielec to the Carpathian Mountains; 1st Hungarian Army—Carpathian Mountains.

* * *

At the beginning of the period all Russian Army Groups except the 4th Ukraine were heavily engaged in a major offensive. For all, the axis of advance was to the west. Maneuvering was tactical rather than strategical.

The 3d Baltic had commenced its offensive only on 18 July. By evening of the 19th it had forced a crossing of the Velikaya River south of Pskov and advanced 25 miles on a front of 45 miles. On the opposite flank, the 1st Ukraine made a noticeable advance toward Lwow (Lemberg) and closed to within 8 miles of that city.¹ Near Brody the Russians encircled a German force of several divisions.

On 20 July the extensive battle continued along the entire front. The 1st Baltic attacked northwestwardly from Utena toward Riga and reached the railroad from Panevezys to Dvinsk (Daugavpils). In the south the Russians reached the Bug River from west of Kowel to Lwow. Next day the 1st Baltic failed to continue its advance, but the 1st White Russian and 1st Ukraine both made gains.

On the 22nd the 3d Baltic entered Pskov while the 1st Baltic, still headed for Riga, advanced 24 miles into Panevezys. In the south the Russians reached the San River with patrols. They failed to take Lwow, so that city was by-passed on the north by strong armored forces who went west nearly 20 miles.

All three Baltic Groups attacked and made progress on the 23d. The most important advances were by the 1st White Russian (which pushed forward to near Lublin) and the 1st Ukraine (which, still by-passing Lwow, reached the vicinity of Przemysl). A new Russian attack was commenced

¹The Germans had foreseen the attack in this sector. They had withdrawn from forward lines, leaving only weak outposts. The main line of resistance was beyond the range of the Russian artillery. The Russians overran the original German line, after a severe artillery and air preparation. It was then necessary to displace the artillery forward to attack the next enemy line, which was defended.

against the Hungarian Army in the Carpathians. In compliance with orders from the new German chief of staff, the Hungarians only lightly held the forward lines: having foreseen the coming attack they had fallen back to new positions in the foothills. The German divisions² near Brody surrendered their survivors, stated as over 17,000 men.

On 25 July Lwow was still resisting. A detachment of the U. S. 15th Air Force aided the Russians in their attack on this place, an important road and railroad center the possession of which by the enemy constituted a road block having considerable nuisance value. Principal Russian advance was south of Lwow, in a westerly direction to include Delatyn. Most important advance was the capture of Lublin (Ivangorod on maps) by the 1st White Russian, completed on the 26th.

On 27 July a German GHQ General Order announced that by direction of the new chief of staff salients in the line had been withdrawn (to include Dvinsk, Bialystok, Brest Litovsk, and Lwow) while the line in the Carpathians had been changed from the low country in front back to the mountains. These movements had now been completed. The Russians occupied the important places mentioned without further difficulty. The object of this move was to obtain divisions for use in other areas. This new regrouping of German forces appears to have involved the strengthening of the front north of Warsaw.

The Russians started an attack against the new German line in the Carpathians on 28 July. These mountains are unusually rough, with steep slopes quite unsuitable for armored troops. Numerous Russian attacks occurred in this sector throughout the remainder of the period, but no substantial gains were made. The Carpathian sector has held.

By the 28th the Baltic Armies had reached the line Rezekne—Dvinsk—Birzai (exc)—Shavli (Siauliai)—Ukmergė. This constituted a Russian salient. Originally pointing toward Riga, it now pointed due west through Shavli. This area contains many lakes,

²340th, 361st, and 454th Divs: XIII Corps.



As the period closed the Red Army captured Sandomierz (1) and closed a trap around three German divisions (inset), the pocket being bounded by Lenarezye (A), Przewody (B), and Lukawa and Kichary (C). Near Warsaw (2) continued attacks east of Praga were repulsed. Moscow was silent on the fighting at the East Prussian Frontier (3). It acknowledged the enemy had driven a wedge into the lines west of Siauliai (4). East of Riga the Russians took Aronies and Cesvaine station (5). In Estonia the force moving up Lake Pskov won Ahja and Karste (6) and was joined by troops that crossed the channel linking Lakes Pskov and Peipus, seizing Laane (7).

swamps, and forests. The campaign involved a large number of small actions among numerous isthmuses between lakes and swamps. On the south the Russians passed Przemysl.

On 29 July the Leningrad Army Group commenced a major attack against the isthmus between the Gulf of Finland and Lake Peipus. It was preceded by a violent air and artillery preparation, and was continued for several days. The attack had some success, but it was unable to pierce the enemy's main line of resistance. As in other sectors, the front line had not been seriously defended.

At this date the 1st White Russian was rapidly approaching Warsaw, while the 1st Baltic attempted without much success to advance beyond Shavli. On the 31st Russian troops were just outside the eastern suburbs of Warsaw. In view of this situation a large number of Poles within the city, forming an underground unit, started a revolt. In the north the 1st Baltic pushed into Jelgava (Mitau) and next day still further, cutting all roads passing into Riga from the south or west. This left the German armies in Estonia and northeast Latvia without land communication with Germany. Communication by sea or by ferries across the Gulf of Riga was still possible.

Next day the 3d White Russian entered Kaunas.

On 2 Aug the Germans launched the first of their tactical offensives. This Panzer attack just northeast of Warsaw succeeded in advancing several miles, disengaging Warsaw on that flank. Elsewhere the Russians continued onward.

Next day a German attack in the vicinity of Besko Pass in the Carpathians had another limited success. The Russians had a bigger one. They crossed the Vistula River just south of its junction with the San, and established a substantial bridgehead. This was extended on the following days.

On 4 Aug the 3d White Russian advanced westward to Mariampole. This is a lake and swamp region hampering operations. Strong opposition was now met, and the Russian advance was slowed.

On the 6th the Germans, who the day before had completed their offensive near Warsaw, commenced a new one in the Sandomierz area. After crossing the Vistula the Russians were in front of a series of low hills favorable for defense. Using these as a base the Germans sallied out. Without themselves making much progress, they brought the Russian advance in this sector to a halt. The Russians were not easily discouraged; next day they recovered most of their lost ground. They attacked in all other sectors. Also on the 6th, the Russians established a new bridgehead across the Vistula near Warka, with a view of attacking Warsaw from the southeast, in view of the repulse to the attacks from the east.

On 9 Aug several strong German offensives began. The most important was in the Mariampole area, where the Russians were almost on the border of East Prussia. Other attacks were against the Russian bridgeheads near Warka and Sandomierz. On their part the Russians advanced in hard fighting westward from Jelgava and northward from Siedlce. The latter attack was to turn Warsaw by crossing the Bug and then moving westward. To head off the German attack near Mariampole a new Russian attack was launched on the front Kaunas—Raseiniai by the 1st Baltic and 3d White Russian. All of these attacks were continued on the following days.

On 11 Aug still another Russian attack was started in Estonia: an advance westward from the Pskov area had considerable success.

By the 13th the Russian attack in Estonia was moving steadily westward. It was extended on the south to an attack north of the Daugava (Dvinsk) River toward Riga. In Lithuania the Russians had Riga blocked off and held a line through Shavli and Mariampole, with alternate offensive and defensive sectors. From Bialystok to the vicinity of Warsaw the Russians were attacking northwestward, but were making slow progress only on their right. In Warsaw the Pole underground movement had seized a section of the city; they were supplied by arms dropped by the Allies. The Russian bridgehead southeast of Warka had been slightly reduced, while that near Sandomierz had been slightly enlarged. There had been no material change along the Carpathian Mountain line.

On 14 Aug a new German offensive started in the Raseiniai area. This seems to have recovered some ground which had been lost to the Russians on the 9th.

Next day the Germans attacked just north of the Carpathians (in the vicinity of Sanok) with a limited gain. They attacked around Warsaw, and continued with the Raseiniai operation. The Russians attacked only around the Sandomierz sector (in a mixed offensive and defensive battle) and in Estonia (the only sector where a large scale offensive was gaining). Here a 6-mile advance was made through a lake and swamp country. Russian reports stated that fresh German troops were just arriving in this area. Since there was no land communication since Riga had been blocked off, these new troops presumably came by sea.

The situation did not change on the 16th. The Russians continued to gain in Estonia. They were on the defensive in Lithuania and near Warsaw, where a German attack east of that city made a small gain. In the Sandomierz bridgehead the Russians entered that town.

On 17 Aug a major Russian offensive was launched with about 17 divisions (including 3 armored divisions) westward from the Mariampole area. It advanced several miles but failed to reach the East Prussia border.

On 18 Aug Russians crossed the strait between Lakes Peipus and Pskov and established a bridgehead which later in the day connected on its right with the 3d Baltic, continuing on with its offensive. Sandomierz was also completely occupied.

On the last two days of this period Russian raids were made along the lower Dnestr River. These were apparently of an exploratory nature with a view of obtaining identifications and information for a forthcoming offensive.

At the end of the period the line was
isthmus between Gulf of Finland and Lake Peipus, about on line Johvi and Isaku—line parallel to and 10 miles south of the Ema River—point 18 miles west of Voru (Verro)—Aluksne (G)—Gulbene (G)—Madona (G)—Plavinas (G)—Jelgava (R)—Slovka (G)—[at this point Russians hold 10 miles of coast along the Gulf of Riga excluding Angern (G)]—Tukums (R)—Auce (G)—Siauliai (Shavli) (R)—Raseiniai (R)—Vilkaviskis (R)—Suvalki (G)—Augustov (G)—Osovets (R)—Bobr River—Malkinia (G)—Lochov (G)—Tluszc (G)—Praga (G)—Vistula River (Russian bridgeheads south of Pilica River and opposite Deblin)—Sandomierz (R)—Stashov (R)—Mielec (?)—Rzeszow (R)—Sanok (R)—Usko (R)—Boryslav (R)—Dolina (R)—Nadvorna (R)—Delatyn (R)—Kuty (R)—Radauti (G)—Suceava (G)—Harlau (R)—8 miles north of Iasi—Koroneshty (G)—Orhei (R)—Reut River—Dnestr River.

The general result of the German change of policy has been to reduce the Russian offensive to only a part of the front, where it has been materially slowed. This has been accomplished at the expense of weakening fronts in other theaters of operation.

THE WAR AGAINST JAPAN (19 July to 18 August 44)

NOTE: All dates in this section are local (East Longitude) dates. USN communiques are ordinarily in West Longitude time, which makes their dates one day earlier than standard.

SOUTHEAST ASIA

Palembang, a center of the Sumatra oil industry, was bombed on 10 Aug with apparently good results and without noticeable enemy reaction. With this exception operations within the area have been limited to a few sectors along the Burma border; there the rainy season is at its height.

Manipur

The result of a month's campaigning has been that Manipur is now clear of the enemy.

North Burma

Allied forces in this area (under Gen. Joseph W. Stillwell) were disposed as follows:

The Chinese 22nd and 38th Divs were near Mogaung.

Detachments of the Chinese 14th, 30th, and 50th Divs plus a provisional American Force (known as the *Marauders*), all under Brig. Gen. T. F. Wessles, U.S.A., were besieging a detachment of the Japanese 18th Div at Myitkyina.

A mixed detachment of Americans, British, and Indians (known as the *Chindits*), under Maj. Gen. W. D. A. Lentaigne, British Army, was south of Mogaung and Myitkyina, raiding in enemy rear areas.

A force of Kachin Levies under British direction was operating east of the Irrawaddy River in the general vicinity of Myitkyina.

A force of American engineers, plus India and local labor, was building the Ledo road from the railhead of that name in Assam to Mogaung; it was approaching the latter place.

The mission of the entire force was to extend the Ledo Road to connect with the Burma Road. The principal fighting has been around Myitkyina, which has been besieged since 17 May with Americans on the north, Kachin Levies across the Irrawaddy to the east, and Chinese troops on the west and south. Numerous attacks were made by Chinese and Americans supported by light artillery and heavy infantry weapons. In spite of all that could be done, it had been impossible to capture this small town.

One 155-mm gun was brought in. It was ready to fire at the end of July. When it did the Japanese commander decided that further resistance was useless. He thereupon assembled about 100 sick and wounded men, as a rear guard. The balance of the Japanese force withdrew during the nights 1/2 and 2/3 Aug. They went south, apparently between the Chinese troops and the Kachin Levies. On the afternoon of 3 Aug the Allies entered Myitkyina.

The road and railroad between Mogaung and Myitkyina have both been opened for traffic. The Chinese divisions—22nd and 38th—at Mogaung have to the end of the period advanced about 8 miles down the Mogaung valley. The Allied troops at Myitkyina are 20 miles south of that town. A new division (36th Indian Div) has entered line on the extreme right, and advanced about 10 miles from Mogaung along the railroad to Mandalay.

Salween Front

The Chinese 20th Army Group is engaged in opening the Burma road from the China end, trying to advance westward to join the Allied forces coming east with the Ledo Road.

The Burma Road divides at Paoshan, east of the Salween River. The north branch proceeds via Tengyueh to Bhamo. The south branch extends to Lashio, from where a railroad runs to Mandalay. The river valleys crossing the Burma Road at nearly right angles are deep, and separated from one another by high mountains. At this season rains are frequent and heavy. Rivers are swollen, and roads are muddy, slippery, and often impassable. Chinese troops have been supplied largely by air from the American 14th Air Force, but many articles can not be dropped. Air supply is practicable only when clouds are not too low. The supply of the Chinese forces, with which are some American detachments, has not been easy.

The enemy did not defend the Salween river crossings which were taken last May. He established road blocks on the high ground west of the Salween. On the north road the Japanese hold Tengyueh, on the south road Lungling and Manshih, on trails further south Hsiangta and Pingka.

Main Chinese effort has been against Tengyueh, a walled town. The enemy also has detached posts outside of the walls. He received supplies by air. The siege of Tengyueh has been prosecuted with vigor. The 14th Air Force has breached the walls at points called for by the ground troops. Attacks through the breaches failed due to cross machine gun fire from pill boxes in stone houses within the walls. Use of flame throwers to overcome the pill boxes has been only partially successful. At the end of the period the Chinese held posts on the wall at several places; the enemy continued to hold the town itself.

On the south road Lungling operations have centered about detached Japanese posts, several of which have been taken. The main defensive position has not been materially affected. Minor operations have occurred around Mangshih. Chinese efforts about Hsiangta and Pingka are of a blockading nature.

For the first time this season Japanese planes have commenced to operate in this sector. Fighters have attacked Allied troops, while transport planes have dropped supplies.

The general situation has not changed during the period.

SOUTHWEST PACIFIC

New Guinea

On 19 July the Japanese 18th Army (Gen. Adachi) occupied that part of the coast of New Guinea between the Driniumor River on the west and Wewak, about 70 miles to the east. It had three divisions—20th, 41st, and 51st—estimated as some 40,000 men. Prior Allied occupation

of Hollandia, Sarmi, and Biak to the west, and an air and naval blockade, had reduced these Japs to a state approaching starvation. The enemy nevertheless undertook to attack toward the west.

The terrain consists of a low coastal strip about 7 miles wide, behind which rise the Torricelli Mountains. There is a trail close to and parallel to the shore, and a number of native villages. The mountains are reported as uninhabited, without roads or trails, and rough, steep, and jungle-covered.

The enemy first attempted to by-pass the Allied line along the Driniumor by going around the right flank. This was defeated with a loss to the Japs of 582 killed. In this fighting the Japanese had no air force, while the Allies did. The latter could locate enemy movements; besides, they daily bombed and strafed bivouacs, dumps, and other installations.

On 21 July the Japanese raided across the Driniumor, presumably to secure identifications. On the 24th they attacked. Some Japs got across the river; the fight continued into the following day. The Japs failed with a reported loss to them of 105 killed, presumably representing bodies found within Allied territory. Additional attacks made on 1 and 3 Aug were repelled with enemy losses reported respectively as 409 and 602 killed.

On 5 Aug the Allies attacked eastward across the Driniumor, with main efforts on the flanks. These having got over the river by the 7th, an attempt was made to encircle the enemy. This failed on 9 Aug, after severe fighting; the enemy withdrew in time toward Wewak. In five days of fighting 2,050 enemy dead were found and 77 prisoners taken. Allied losses have not been reported.

No activity has been reported in the Hollandia area, which is occupied by the Allies.

On Biak Island it has been found that all of the enemy had not been exterminated. The original landing on this island and air base was on 27 May. Enemy forces of some size were located in the northern part of the island. This force was engaged on 22 July and again on 2 Aug. Japanese losses were reported as 583 killed and 127 prisoners for the two battles, but the enemy was not overcome. An amphibious expedition was thereupon prepared and landed in rear of the enemy on the northeast coast on 16 Aug and on the west coast on the 18th. In these two days the enemy had a further loss of 830 killed, making a total since the beginning of the campaign of 4,468.

At Sarmi on the mainland small Japanese forces are still at large. During the period their casualties are reported as 160 killed and 22 captured, making a total to date for that sector of 3,297 killed and 64 prisoners.

At Numfor Island the situation resembled that on Biak. Some enemy remained and engagements resulted on 19 and 21 July, and 2 and 18 Aug. In the last two the enemy was reported as having lost 786 killed, with a total to date for this island of 1,457 killed and 633 prisoners. Besides, 405 Jap captives (mostly Javanese) were freed. Allied losses for this sector have been given for the entire campaign, now stated to be completed, as 61 killed, 289 wounded, and 2 missing, or a total of 352.

On 30 July a new operation was started. An amphibious expedition landed near Sansapor, on the north coast of Vogelkop peninsula, about 200 miles west of Numfor. This was practically unopposed. A good beachhead was soon established.

The enemy on Vogelkop is reported as the Japanese 35th Div, under Lt. Gen. Sunkichi Ikada. This division is part of the Japanese 2nd Army (Gen. Teshima) covering the islands west of New Guinea. Present indications are that the enemy will not dispute the new Allied landing. The Japanese appear to be withdrawing to the south coast, and may endeavor to evacuate New Guinea. To prevent this the Allies are maintaining an air and naval blockade.

Air operations have been started against Halmahera (Djilolo or Halmahera on some maps) Island. This is an enemy naval and air center. Strong Allied air attacks were delivered on 24 July and on 1 Aug and almost daily between 12 and 18 Aug. An air and naval blockade has been established around Halmahera. Its air fields are believed to be practically neutralized.

CENTRAL PACIFIC AREA

Caroline Islands

Enemy bases in these islands are frequently bombed, in part by

planes of Gen. MacArthur's forces in the southwest Pacific, and partly by planes belonging to the naval forces of the Pacific Fleet (Admiral Nimitz). Most-bombed islands are Palau (14 times), Yap (10), Woleai (18), Truk and Ulithi (8 each), Nauru (10), Ponape (7). Other islands bombed were Ngulu, Sorol, Eurapik, and Nomoi.

Marianas Islands

Operations by the Pacific Fleet to recapture Guam commenced on 19 and 20 July. On those two days planes dropped 1,028 tons of bombs and fired 147 rockets against enemy targets.

On 21 July the III Marine Corps (amphibious) with the 3d Marine and 77th Inf Divs, plus the 1st Provisional Marine Brigade, landed at two places on the west side of Guam at about the center of the island. Maj. Gen. Roy S. Geiger, USMC, was in command. The naval commander was Rear Admiral L. Connolly. The initial objective was to capture Apra Harbor. The 77th Inf Div with the Marine Provisional Brigade attacked to gain the south side of the harbor bounded by Orote peninsula, while the 3d Marine Div attacked from the north.

First important success was on the 23d, when Cabras Island (on the north side of the harbor) and Piti (a village opposite) were taken. Orote peninsula was almost cut off. Next day it was completely so. On the 25th the north and south landings joined about opposite the center of Apra Harbor. The fighting had been severe. For the first four days losses are reported as 443 killed, 2,366 wounded, and 209 missing.

On the night 26/27 July the enemy attacked and pierced the north line by infiltration. Heavy fighting resulted. At the same time the enemy on Orote peninsula (estimated as 2,000) fought on. They held on until the 1st, when the entire harbor was cleared. The line at this time was around Apra Harbor as far inland as Mt. Tenjo, a depth of 2 miles. The north boundary was at Agana.

Now the enemy commenced to give way. His losses were believed to have been high. In the south our attacks were limited to mopping against minor forces. In the north resistance was stiff. The air force (largely based on aircraft carriers) aided. By 4 Aug the north advance was at Tumon Bay.

The 77th Div moved north along the east coast and came into line on 5 Aug, when a substantial advance was made. The enemy's resistance quickly declined and the end came on 10 Aug.

American losses at date of writing have not been announced. Enemy losses are reported only as more than 10,000 killed.

* * * *

Another amphibious expedition landed on Tinian Island on 24 July. This consisted of the V Marine Corps (amphibious), with 2nd and 4th Marine Divs (Major Gen. Harry Schmidt, USMC). The naval commander was Rear Admiral Harry W. Hill. The artillery preparation was fired from Saipan (3 to 4 miles to the northeast) and supplemented by naval fire and bombing. The landing was at the north end. Batteries on Saipan had near-enfilade fire on enemy on the east coast of Tinian.

According to Japanese accounts the initial landing waves failed to secure a firm foothold, but later ones did. By evening the Marines had a beachhead 2½ miles deep. Before dawn on the 25th the enemy attacked. It took all morning to dispose of this. Then the Marines attacked in turn and advanced the front to a line 3½ miles from the north end of the island.

Hard fighting continued for several days. By 28 July approximately half of the island had been taken, including the Jap air field on the west. On the night 30/31 July the Japanese made another attack, which was again repulsed with a loss to them of 300 killed. With daylight the Marines renewed their advance. The south tip of Tinian was reached on 1 Aug. Scattered enemy resistance continued until the 5th. Total enemy losses are reported as 5,000 killed—presumed to have been his entire force. American losses have not been revealed.

* * * *

Other islands in the vicinity have been attacked. Rota (intermediate between Guam and Tinian) has been frequently and heavily bombed. Less so has Pagan to the north.

In the Bonin Islands (just north of the Marianas and part of the same volcanic chain), Iwo, Haha, and Chichi Islands have been bombed and shelled several times.

BRITISH

The Smith gun is a 3" smooth-bore, outstanding for its ease of handling. Highly mobile, it can be towed by any car. When in position the wheels of piece and limber give some overhead protection.

INGENUITY



Habit is one of the most important things in a soldier's life, because when the shooting starts there isn't time to stop and think. Things happen too fast. Everything must be done automatically. Now the only way to get in the habit of doing something is to do it regularly—over and over again. That's why performance of preventive maintenance services on equipment during training is as important as learning to shoot a rifle or throw a grenade. The day is bound to come, sooner or later, when lives may be saved, objectives taken, battles won, because a piece of equipment was in the right place at the right time and in the right working order. Forgetting to perform preventive maintenance services on a piece of equipment may cause it to fail to arrive at the right place or to arrive too late or to break down after it gets there. The preventive maintenance services that are habitual won't be forgotten.

FIELD ARTILLERY OBSERVATION

PART II—FORWARD OBSERVATION

A forward observer is assigned to observe and conduct fires in the zone of action of a given unit and to maintain contact with that unit. From his post up forward he can distinguish friend from foe and can adjust fire in close support of our troops. Combat has proven that most artillery targets are reported from the front lines.

The artillery FO is potentially the most powerful individual in the forward area. Other officers control and maneuver the fire power of platoons or companies, but the forward observer can control and direct the sledge-hammer power of all the artillery within range. Supported commanders soon realize this and are quick to nurture and protect the artillery observer and his party. Therefore, the best qualified officers available should be detailed as forward observers, irrespective of rank.

Primary mission of the forward observer is to watch closely the movements of the supported unit and to adjust artillery fire



Figure 16. List of forward observer equipment



Figure 18. Forward observer party loaded and mounted.



Figure 17. Forward observer checking his equipment

on those hostile elements which interfere with the mission of that unit. He accomplishes this through surveillance and correction of prearranged fires, and by adjusting fire on targets of opportunity which he observes or which are identified to him by others. He must closely follow the leading elements to the objective and immediately adjust protective barrages to stop enemy counterattacks. His point of observation should be on commanding ground from which he can observe any hostile attempt at envelopment or flanking action.

His secondary mission is to keep the artillery battalion informed of the situation as to all enemy activity and dispositions as well as the location of our own troops.

Lastly, it is the duty of the FO to establish contact with the commander of the infantry company at the earliest practicable moment. The infantry has a mutual responsibility with the FO to effect and maintain contact. The latter, however, cannot permit his contact with the infantry to interfere with his mission of establishing observation, watching the movement of the supported unit, adjusting and observing fires, and reporting combat information.

The FO is assisted by a small party consisting of an NCO and a radio operator. The observer and his party should be fully equipped to carry out the mission. This equipment includes transportation, means of communication, field glasses, copies of appropriate maps and air photos, and prearranged message codes. Any information of

value to the enemy appearing on maps, charts, or photos should be readily destroyable. The individual intrenching tools, rations, weapons, and equipment should be taken.

PROCEDURE OF THE FORWARD OBSERVER

As soon as he is designated, a forward observer will obtain, check, and load his equipment in his assigned vehicle (see Figs. 16, 17, and 18):

- (1) Vehicle and its equipment.
- (2) Party personnel and their equipment.
- (3) Radio and telephone equipment.
- (4) Maps, photos, codes, pads, pencils, pins, and message books.
- (5) Field glasses, compass, GFT, intrenching tools, rations, and pyrotechnic signalling equipment.
- (6) Extra equipment, such as water can (filled), extra batteries, and replacement radios and telephones if available. Empty sandbags and a first aid kit are desirable.

Before going forward the observer obtains information pertaining to:

- (1) The situation.
- (2) Location of the CP of the supported battalion, and general locations of other units in that sector.
- (3) Location of the base point, check and index points, concentrations and their numbers, and any special fires that are planned. Only these may be recorded or placed on map or map substitute.
- (4) The pyrotechnic codes, prearranged message codes, and map coordinate templates.
- (5) Arrangements to maintain communication, to include duplication and even triplication of communication facilities if possible.
- (6) Location of his own batteries.
- (7) Any instructions relative to displacement.

On the way to the supported unit the observer makes note of terrain features, such as observation, fields of fire, concealment and cover, obstacles, and communication routes (see Fig. 19).

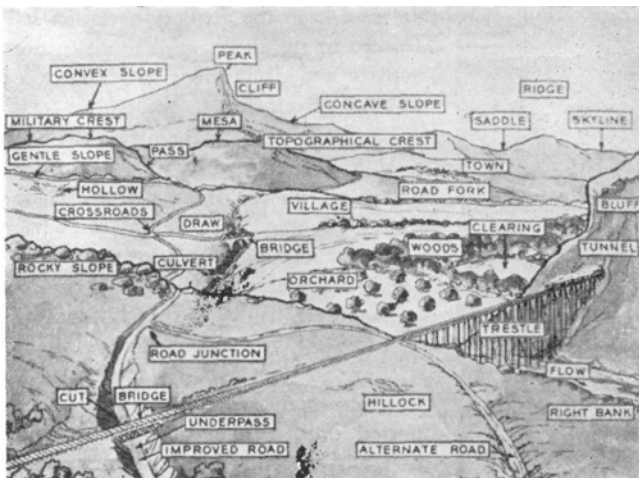


Figure 19. Terrain check list

He notices the position of installations so that he will have an idea of what is behind him and can answer any questions which may be asked when he reaches the CP of the supported unit. He has his men memorize the route in case they must return for rations or replacements.

On reaching the CP of the supported unit, the FO reports to the LnO of his battalion who is at the infantry or supported CP, and gets the following information:

- (1) The situation and scheme of maneuver of the supported unit, including the location and plans of the employment of the heavy weapons and infantry cannons. He should work very closely with the cannon and mortar platoons belonging to the unit which his artillery unit is supporting.
- (2) The location of the unit with which he is to work.
- (3) Other information affecting his coming work that was not available at the time he left his organization.

Upon arrival in the forward area, the observer:

- (1) Contacts the commander of the company with which he is to work and ascertains the company's dispositions and scheme of maneuver. Arranges for rations and locates the aid man. Explains to supported troops the capabilities and limitations of his battalion and brings out the fact that any member of the supported arm can help him adjust fire on targets of opportunity which they see. Prepares to exploit all of their communication facilities in case his own are knocked out.
- (2) "Shoots himself in" by registering on one or more check points or base point if not restricted (doesn't wait to be told to start shooting).
- (3) Arranges with the supported-unit commander to keep him informed of changes in his plans and dispositions.
- (4) Contacts the observers or commanders of heavy weapons and infantry cannon operating in his vicinity and arranges for coordination of fires.
- (5) Selects an OP from which he can observe the action of the unit. Plans an axis of advance based on the scheme of maneuver of the organization with which he is working.
- (6) Informs the supported organization of his location and plans.
- (7) Reports to his battalion or battery:
 - (a) His location and field of observation.
 - (b) The location of our own troops and changes in their dispositions. When patrol or reconnaissance elements move forward, he will inform FDC.
 - (c) All hostile dispositions and movements—their exact nature (including aircraft warning).
- (8) Watches and reports on the movement of the supported troops.
- (9) Observes and adjusts fire and reports the results of fire. Makes periodic negative reports during intervals when no activity



Figure 20. Install alternate observation posts

is observed.

(10) Improves his OP as to cover and camouflage and field of observation as time allows.

(11) Plans and installs alternate communications and alternate OPs (Fig. 20).

(12) Begins a panoramic sketch of the area to his front, recording thereon base point, index points, concentrations, and



Figure 21a. Terrain as seen by forward observer

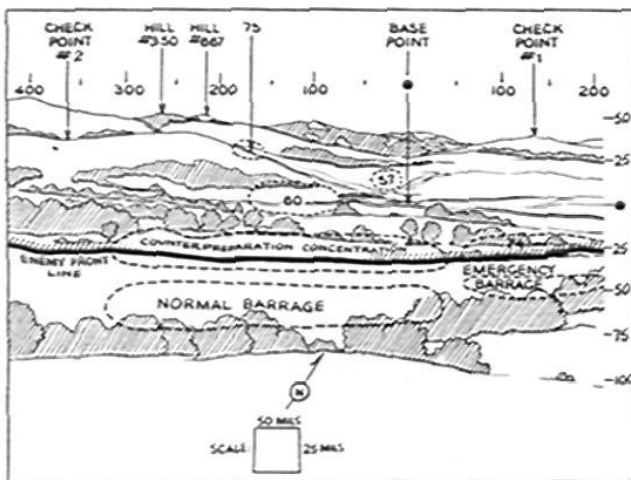


Figure 21b. Panoramic sketch made by forward observer

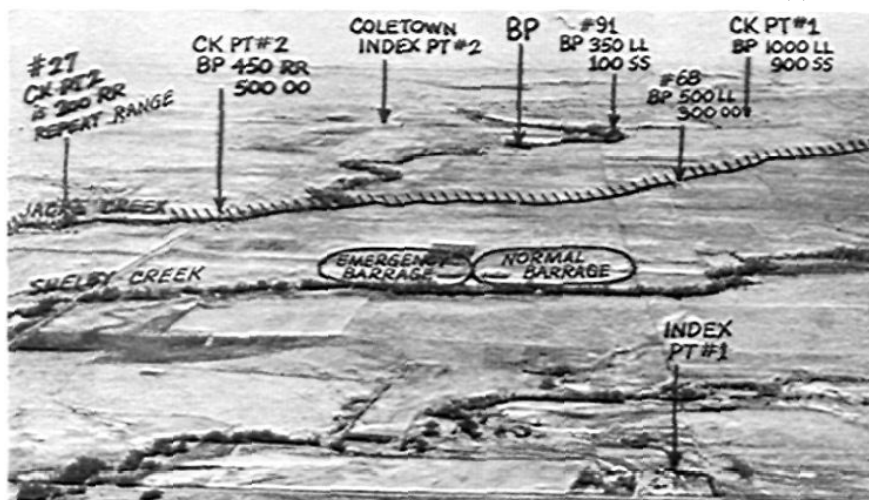


Figure 22. Oblique photo as used by the forward observer

check points (Fig. 21). Makes copies of this panoramic sketch and distributes them to the front line platoon commanders so they will know the numbers and location of concentrations and be able to call for them in case the FO is neutralized. He may

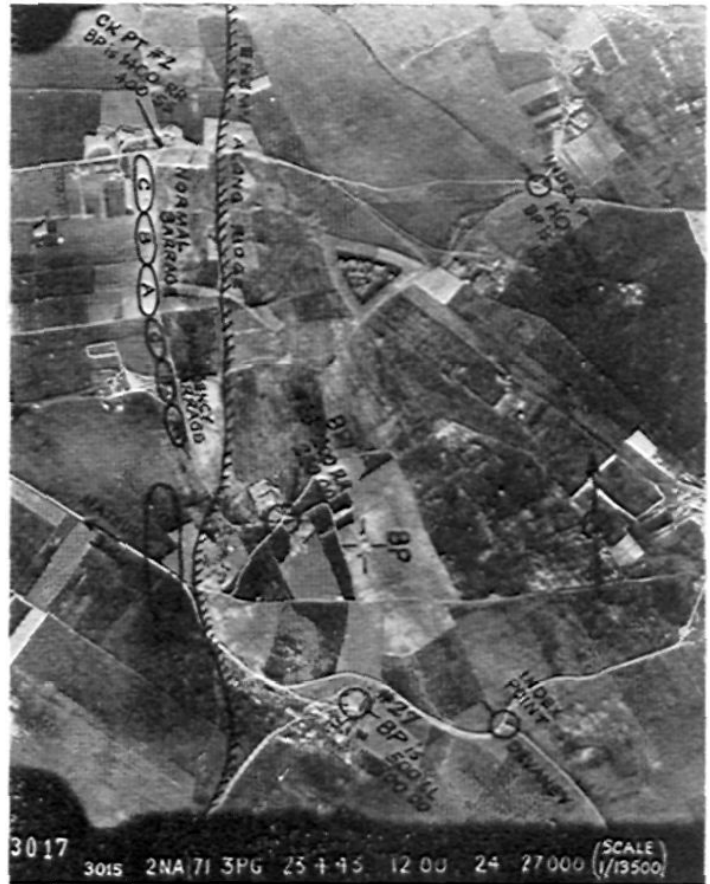


Figure 23. Vertical photo as used by the forward observer

also use an oblique or vertical photo if available (Figs. 22 and 23).

(13) Stays out of the fire fight and gets on the windward flank of the attack.

As time permits, the observer will improve:

(1) Communications. (2) Camouflage. (3) Cover. (4) Comfort. (5) Security.

The observer will use the type of conveyance best suited to the unit with which he is working. If he is working with infantry, often he will be on foot. If he is working with tanks, his transportation may be a tank. A ¼-ton truck is considered the best transportation for forward observation parties by most of the observers in combat.

TRICKS OF THE TRADE FOR THE FORWARD OBSERVER

One of the most important skills in forward observation is map reading.

Use of the compass is doubly important to the FO because he must be able to orient his map and know his own location at all times.

Antipersonnel and antitank mines are

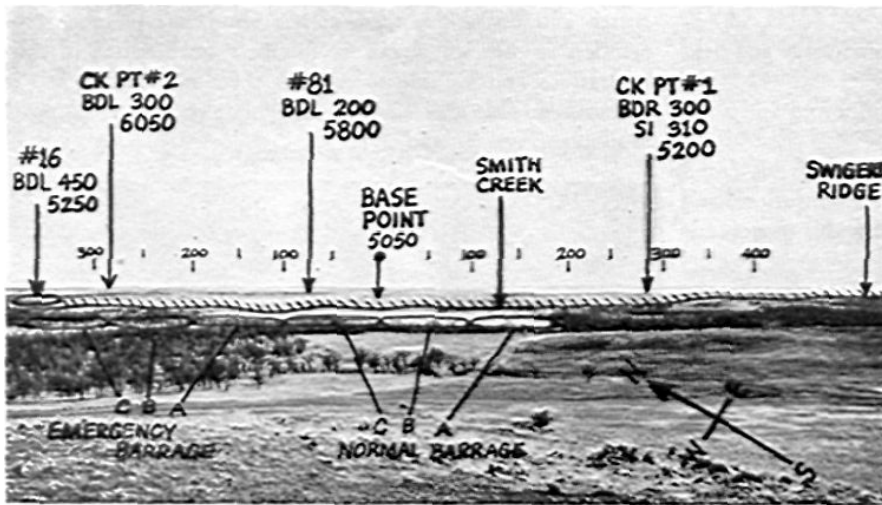


Figure 24. Panoramic photograph as used by battery or battalion observer

a problem confronted by most observers of which they rarely think until they enter combat.

Don't look like a forward observer. Wear your bars and your field glasses inside your jacket, and don't show your map.

A tommy gun and a bag of grenades are very helpful in close combat.

Work out fire plans so you, your section, and the members of the supported unit near you will know just what to do in an emergency. How will we stop an attack here? how will we support an attack there?

Dig your "house" deep, and back under the reverse slope. Keep your equipment, rations, communications, and other vital installations there. Prepare your "office" up above where you can see the enemy, preferably within shooting distance of your "house." Dig a connecting communication trench if possible.

Contact incoming patrols so they can help you by pointing out and even firing on targets they have discovered. Be sure you know when and where patrols go so that they will not be fired upon.

Always know where friendly forward elements are in front of you and to both sides.

Take care when you are using smoke that it does not hinder you and help the enemy.

Don't call for fire for effect unless you are properly adjusted on the target.

Hostile guns which open up on the attacking force, especially AT guns, are usually in the second line of defense. The close-up guns wait for an easy killing shot. Look closely for these close-up guns.

Know how to identify all enemy equipment even though you may see only a portion of it—guns, AT guns, OP equipment, etc.

It is necessary to spend several hours studying the target area before you will see anything. Close scrutiny is vital.

There is one thing to remember about the enemy. When you shoot at them, they will play dead and let you think you have knocked them out.

Prompt and proper treatment of wounds will avoid shock, the real killer on the battlefield. Know where the infantry first aid man can be found.

Train your section to get used to the sound of shells coming in and to duck at the right time.

Don't stop and dig a trench when you should be moving on.

Personal reconnaissance is better than any map in the world for planning forward movement.

Always stay out of the fire fight and don't get too interested in one spot—something may be going on somewhere else.

Extra burlap bags will come in handy in organizing your OP.

Enlist every pair of eyes in your supported unit to observe and relay targets to you.

The exploitation of high ground gives the FO "on top" command of *all he surveys*.

PART III—OTHER TYPES OF OBSERVATION

AIR OBSERVATION

Air observation is used to supplement ground observation; it permits location and adjustment of fire on targets defiladed from ground observers. Air observation missions for field artillery units may be performed by artillery liaison airplanes or by high-performance planes of the Army Air Forces.

ORGANIC FA AIR OBSERVATION

The battalion is equipped with a lightweight, unarmed, and unarmored liaison airplane of slow cruising speed, operated by FA personnel, which is capable of taking off and landing in small unprepared fields or on roads in the vicinity of artillery command posts and firing batteries.

OBSERVATION BY AAF

Medium and heavy battalions sometimes require adjustment

of their fires by observers operating in high-performance aircraft. These missions should be preplanned, and generally will be for registration upon a fixed point (such as a crossroads or bridge) rather than upon a fleeting target of opportunity. The adjustment of artillery fire from high-performance aircraft is the responsibility of the Army Air Forces. Request for such missions should be made to division artillery or corps artillery commanders.

AERIAL PHOTOGRAPHS

Oblique and vertical aerial photographs facilitate artillery intelligence and survey and are used as firing charts (FM 6-40). Overlapping pairs of photographs and right and left strip mosaics facilitate vertical control and the location of targets. Oblique photographs can be taken from liaison planes if the photographic equipment is available; verticals must be obtained by use of high-performance planes. Requests for

photographic missions by high-performance planes should be made to division artillery or corps artillery commanders.

THE OBSERVATION BATTALION

Each corps contains an observation battalion. When divisions are operating alone or in fast-moving operations, observation batteries are often attached to divisions. The observation battalion is an agency for intelligence, survey, and conduct of fire. It is an important means of counterbattery intelligence. Its organization permits attachment of elements to battalions. It is organized to execute flash and sound ranging.

FLASH RANGING

Flash-ranging units should be placed in position early. The time required for survey and installation of the flash-ranging

base will vary with the survey control and the terrain. Establishment of an initial short-base flash OP will require from 30 minutes to an hour. Expanding the initial short-base OP into a standard flash-ranging base will require from 4 to 10 hours.

SOUND RANGING

Sound ranging is difficult or impossible in thunderstorms, very hot days, or a wind of more than 20 m.p.h. Conditions are ideal for sound ranging on a still night, in light rain, or in fog. Survey and installation of the sound-ranging base by approximate methods will require from 1 to 2 hours. For details of the operation of the observation battalion, see FM 6-120.

PART IV—OBSERVATION IN SPECIAL OPERATIONS

IN THE MOUNTAINS

More observers are necessary to insure full coverage of the zone of operations. OPs should be echeloned in altitude as well as in width and depth since observation is often subject to sudden blinding due to fog. The air OP is valuable for flank observation into valleys otherwise defiladed from view. Because of the difficulty of observing fire, smoke is frequently used for the first round. On snow, use of colored smoke may be advantageous.

Difficulties in movement are the paramount problem. The observer must be a cross between a mountain goat and an



Figure 25. Mountain combat conditions

alpine expert (see Fig. 25), as well as be able to load a pack mule with bare essentials. Since firing may be conducted on targets far away, checking the time of flight from "on the way" aids in identifying the rounds fired. Carry extra wire to the OP in case it is necessary to move down on the forward slope to see under the fog or clouds. The most powerful observation instruments available should be used.

IN SNOW AND EXTREME COLD (SEE FM 31-15)

Most of the difficulties are technical rather than tactical. It is necessary to know how to ski, snow shoe, drive dog teams, and

keep warm with as light clothes as possible. Everything must be white when one is working in the snow. Weapons, and especially optical equipment, tend to "freeze up." This can be avoided by meticulous care and cleaning. Weapons should be completely dry. Clean them with glycerine and water or with paraffin. Such equipment should not be exposed to large changes in temperature, such as in a warm room one minute and out in -60° F. the next. Be careful to cover up your tracks and reconnoiter routes carefully. The choice of OPs near habitation is advantageous as personnel can be warm and comfortable between tours of duty. Smoke shell is not efficient in deep snow. Exercise especial care in adjustments. Low temperature affects ammunition so that the trajectories may not be stable and the time shell not always remain accurate.

DURING NIGHT COMBAT

The most important aspect of observation and conduct of fire at night is to have planned for it the day before. Survey, careful daylight reconnaissance, and calibration of the target area by a "zeroed" instrument facilitate night work. When the observers must accompany night patrols or night attacks, map reading and the use of a compass must be second nature. Practice in this is vital because no flashlight may be used and it is very easy to get completely lost. Fires to aid in navigation and for marking phase lines and time intervals are very important. Rocket projectors and flare guns, as well as all other types of pyrotechnics, must be used carefully to prevent giving away your position and the direction of attack. In defensive combat, flare signals must be carefully arranged, but not used unless necessary lest the enemy duplicate your signals and disrupt your fire plans.

IN THE JUNGLE

The jungle has very large trees with dense interlocking foliage, and its undergrowth is massive. Terrain and vegetation in the jungle restrict movement, observation, and to a certain extent the effect of artillery fire. The foliage of the tall trees provides good concealment but it causes bursts in the treetops, which make overhead protection necessary. For the same reason ambushes are effective, and infiltration means close combat and surprise for the observer. There is lack of distinctive landmarks,



Figure 26. A forward observer in the jungle

so a native guide or a compass must be depended upon. Roads are usually only one-man trails which necessitate careful consideration of manpower, time, and space factors in traversing even short distances.

Heavy foliage and the lack of commanding terrain make observation very difficult. Forward observation is almost the only method used and sensing by ear has proven a very workable solution. The air burst adjustment may be used when the foliage obscures bursts from quick and delay fuzes.

The forward observer should accompany the reconnaissance elements and keep his eye open for good OPs, battery positions, and interdiction areas, as well as areas where direct fire may be used. A constant rotation of all officers as FOs will serve to keep many fresh men up in the advanced areas. The air OP is effective in adjusting artillery fire. Observation may be accomplished from boats offshore under many circumstances. All returning patrols should be questioned so as to exploit any findings which may offer likely targets.

Radios, batteries, leather goods, wire, ammunition, and pyrotechnics are greatly affected by dampness and humidity.

Disease-spreading insects make the wearing of headnets and gloves necessary. Early fatigue and the effect of the "noonday sun" must be considered.

Communication in the jungle is one of the biggest problems to the observer. Radio is best suited for the observer, but atmospheric and terrain blocks plus jungle growth prevent good reception and readability. Some improvement in reception has been found by moving sets a few yards or by constructing a long wire antenna up in the trees. Sometimes FO sets must be carried on a stretcher or wagon, or put on a mule's

back. Short operating ranges and jungle conditions restrict the use of radio.

Wire has proved vital for good communication. Trails are necessary to lay wire and maintain it. Enemy night patrols cut wire lines and motor movements break them, therefore it is necessary to suspend them in the trees, reroute them, or bury them.

Pigeon messages have proved their value in certain jungle campaigns.

Dismounted messengers are extensively used with oral (rather than written) messages to prevent enemy capture.

Wigwag, semaphore, and signal lamps (white at night, red in daytime) have been used in jungle communications.

IN THE DESERT

Success in desert combat depends in general on mobility, especially the mobility of fire power. The observer must be prepared to maneuver his fires to keep them just one jump ahead of the supported unit.

Desert terrain and climatic peculiarities present a problem to the uninitiated observer. There is no water, little or no vegetation, lots of sand (some hard crust, some very soft), extreme temperature ranges, and brilliant sunlight. Lack of recognizable landmarks makes navigation very difficult. One must always be on the lookout for flanking and encircling attacks, informing his battalion immediately of any enemy activity he sees. It is very easy to get engaged in the fire fight, but it must be avoided.

A knowledge of compass use (both magnetic and sun) is imperative, as is the use of the vehicle odometer. The oil compass is the best for desert use but may develop inaccuracies in the presence of ore deposits. Two vehicles should always be taken on any long range work. Owing to heat wave distortion, it is extremely difficult to distinguish friend from foe, especially during the middle of the day. Sand and dust storms make observation difficult.

A jeep or armored vehicle is best suited for desert use. The observer should always be on the "windward" flank of the attack and he should make frequent reports on the progress of the battle. Track discipline and camouflage of the "telltale shadow" are very important to the observer.

Radios are good, but certain areas and atmospheric conditions block out communication. Contact sometimes can be reestablished by moving the set a few yards. Wire should be laid whenever it is available and time allows. Pyrotechnics should be handled with care as they may give away your position in the desert.

The air OP is vital to augment observation in the desert.

Most preventive maintenance services are little things. And because they are, there is a tendency to think of them as "not very important." But remember, one little thing always leads to another. One little loose nut, if not attended to, will lead to a breakdown of the assembly, and breakdown of the assembly will cause the whole unit of equipment to be deadlined. One little dry bearing will ruin a wheel. Replacing a wheel is expensive, and it takes time. *If* you have a replacement wheel handy. You may not have, and a vehicle minus one wheel is just an expensive pile of junk. Frequently as many as nine out of ten of the costly, higher echelon maintenance services would be unnecessary if someone had paid attention to the little preventive maintenance services whose neglect caused the need of major repair. So don't pass them up as "not very important." They *are* important—they are *vital!*

Diary of War Events

(As Reported in the American Press: Edited by B. H. W.)

AUGUST, 1944

- 1st Germans throw 75,000 troops against 8th Army in Italy in an attempt to hold Florence.
Allied troops capture 10 miles of coastline in Sansapor area of New Guinea.
- 2nd Turkey severs all diplomatic relations with Germany.
Allied troops capture Tiyan airfield in the center of Guam.
- 3rd Gen. Bradley's troops capture Rennes and push on to the outskirts of Dinan.
About 5,500 Allied planes from Britain and Italy pound robot bases in France.
U.S. troops advance their lines on Guam and Tinian. Kill 13,000 Japs.
- 4th 2,000 U.S. bombers raid Germans' experimental site for secret weapons at Peenemunde, Rostock.
Allied troops in Italy enter Florence.
U.S. Navy ends a 2-day assault on the Bonin and Volcano Islands. Sink or damage 46 Jap ships.
- 5th U.S. tanks smash into Brest, France's 2nd port, at the western end of the Breton Peninsula.
The Allied invasion of France cost America 69,526 casualties—11,026 killed, 52,669 wounded, and 5,831 missing.
Allied planes from Britain and Italy raid northwest Germany and Romania.
Gen. Stilwell's troops capture 2/3 of Waingmaw.
- 6th British Navy sinks all 7 ships of a convoy believed to be evacuating German troops from St. Nazaire.
Allied planes from Britain and Italy continue to smash installations in Germany and in the Rhone Valley of France.
Allied troops in Burma capture the Jap base of Tamu, 47 miles southeast of Imphal.
- 7th U.S. armored spearheads destroy 135 German tanks as the result of a German armored division attack to sever American-held corridor leading from Normandy through Auranches to Brittany.
- 8th Canadian forces in France gain 6 miles toward Falaise, while U.S. forces advance to the Sarthe River, 100 miles from Paris.
Allied troops in northeast India and North Burma kill 42,000 Japs in liquidating 9 divisions.
MacArthur's air forces raid the Hamalahera Island, between New Guinea and the Philippines, destroy 13 Jap planes.
- 9th U.S. troops in France capture the seaport of St. Malo, while others converge on Brest and Lorient.
General Eisenhower moves his headquarters to Normandy.
2,000 Allied heavy bombers from Britain and Italy raid Stuttgart.
Allied troops in the Pacific complete the conquest of Guam.
- 10th President Roosevelt visits Hawaii and confers with Adm. Nimitz and General MacArthur.
Superfortresses of the 20th Bomber Command blast Jap targets at Nagasaki, Kyushu, and Palembang on the island of Sumatra, other planes from the southwest Pacific raid Jap airfields at Davao on Mindanao Island in the Philippines.
- 11th U.S. troops push north and join Canadian-British armies in France.
2,000 Allied bombers raid key targets from southern France to the German and Belgian borders.
U.S. fliers from new bases in the Marianas raid two islands 689 miles from Japan.
- 12th Allied planes make heavy attack on southern France and the Italian Riviera.
U.S. fliers bomb Halmahera Island, south of the Philippines.
- 13th 2 German armies about 100,000 men retreat toward the Seine.
4,000 Allied bombers pound aircraft and armament plants at Brunswick, Russelsheim, Frankfort-on-the-main, and Kiel.
- 14th Allied fortresses from Britain raid chemical plants in Ludwigshafen and Mannheim. Bombers from Italy attack the French Riviera for the 3rd successive day.
- 15th Allied troops from Italy open a 4th front by landing a large force on the shores of Southern France. Establish beachheads with little opposition.
Lt. Gen. George Patton promoted to the permanent rank of Major General.
4,000 Allied planes drop 8,000 tons of bombs on German air depots and fields in the lowlands.
- 16th U.S. 3rd Army advances along 3 roads to Chartres, 44 miles from Paris.
1,000 8th Air Force bombers again raid German airplane and oil industries.
U.S. bombers in the Pacific pound Davao in the Philippines and Halmahera.
U.S. freezes Argentina's gold stock.
- 17th U.S. 3rd Army liberates Chartres, Orleans and Dteux. Continues hasty advances toward Paris.
Allied troops in southern France advance 35 miles inland.
Allied fliers in the Pacific destroy 23 Jap planes in a raid on Halmahera.
Allies drive last Jap soldier out of India.
- 18th U.S. armored troops advance to the Seine River at Mantes, 25 miles from Paris.
Allied troops in southern France advance to within 5 miles of Toulon.
5,000 Allied planes bomb northern France, Belgium, and the Netherlands.
- 19th U.S. tanks advance into the suburbs of Paris.
Allied troops in Southern France push into St. Maximin, 25 miles northeast of Marseille.
1,000 RAF bombers raid Bremen, Germany.
- 20th 7th Army in southern France advances 10 miles to the outskirts of Aix-en-Provence.
U.S. heavy bombers raid Jap home island of Kyushu, destroy 40 Jap planes and lose 4 bombers.
- 21st U.S. 3d Army advances across the Seine River southeast of Paris and establishes a 2nd bridgehead.
- 22nd 8th Army in Italy liberates Florence.
Allied fliers in the Pacific bomb Jap bases of Halmahera, Marcus and Yap.
- 23d French Forces of the interior supported by unarmed civilians liberate Paris.
Romania deserts the Axis and joins the United Nations.
Allied armies continue to roll through France and liberate Marseille, Grenoble, and most of Toulon.
Allied bombers in the Pacific wipe out Jap convoy off the Bonins and hit Davao in the Philippines.
- 24th 1,900 U.S. bombers from Britain and Italy smash oil refineries and airplane plants in Germany and Czechoslovakia.
- 25th Allied troops in southern France capture Cannes.
Allied planes again bomb Czechoslovakia and Germany.
- 26th German resistance in southwestern France ceases with the surrender of 10,000 enemy troops.
Allied fliers in the Pacific bomb 7 Jap-held islands.
- 27th British and Russian bombers attack East Prussia.
Carrier planes of the British Eastern Fleet make a surprise attack on Sumatra.
- 28th U.S. troops in southern France swing west toward Montelimar and trap 15,000 Germans retreating up the Rhone valley. Allied air power from Britain and Italy continue activity on German targets.
- 29th U.S. 3d Army advances to within 50 miles of Belgian border.
Allied fliers in the Pacific bomb Jap naval base on Amboina, below Halmahera and Ceram.
British troops in Burma capture Pinbaw.
- 30th 1,000 U.S. bombers from Britain raid the ports of Kiel and Bremen plus the Pas-de-Calais area.
- 31st Russian troops capture Bucharest, advance to Bulgaria's southern Dobruja border.
Allied fliers in the Pacific destroy Jap destroyer and 4 merchantmen in an attack on Celebes.



For Heroism and Service



2 OAK LEAF CLUSTERS TO DISTINGUISHED SERVICE MEDAL

(Posthumously)

LIEUT. GEN. LESLEY J. McNAIR, USA, served as Chief of Staff, General Headquarters, from 2 Aug 40 to 8 Mar 42. In this capacity he prepared and executed the training program of the ground forces of the Army during the early stages of the unprecedented mobilization of the armed forces of this country. In the accomplishment of this vital mission and in the supervision of the activation of new units following the entry of the United States into the War, he displayed great initiative, foresight and professional ability. Serving as Commanding General of the Army Ground Forces from 9 Mar 42 to 12 July 44, was responsible for the organization and training of all ground combat units of the Army. He converted more than three million men inducted from civilian life into a powerful and aggressive striking force that has proved its superiority over the professional armies of our enemies. The soundness of the principles of training initiated by him, his vast technical knowledge, his broad vision and inspiring leadership have played a major part in the success of our Armies in the field.

DISTINGUISHED SERVICE MEDAL

BRIG. GEN. LEO M. KREBER, for service as Corps Artillery Officer in addition to his duty as Commanding General of the Artillery of a Division in combat against the Japanese forces at Bougainville, Solomon Islands, from 15 Dec 43 to 14 Apr 44. He so effectively organized the fire of all artillery pieces (including those of two divisions, the Corps artillery, and 90-mm antiaircraft guns) for ground targets, that coordinated fire could be placed at any given point in a minimum of time. This concentrated fire power was largely responsible for stopping eight major Japanese assaults on the Corps perimeter, and on each assault prevented Japanese reserves from exploiting their slight penetrations. Counterbattery fires planned and supervised by him quickly neutralized hostile artillery, destroyed the major portion of the Japanese guns and prevented the enemy from causing serious damage to our forces and installations. His performance of duty was consistently characterized by coolness, sound judgment, personal courage, and wise counsel to his Corps Commander. Address, 290 Dunedin Rd., Columbus, Ohio.

BRIG. GEN. CARTER B. MAGRUDER. From 8 Apr 43 to 29 Jul 44, as Director of the Planning Division, Office of the Commanding General, ASF, he prepared logistical plans and policies for the supply support of the Army, both overseas and in the United States. His exceptional professional knowledge, profound logistical acumen and practical common sense were of inestimable value to the Commanding General, Army Service Forces. Home address: 608 N. Lincoln St., Arlington, Va.

LEGION OF MERIT

M/SGT. ALFREDO GRACIA, for service from 3 Jan 41 to 30 Jun 43. When the First Corps Area Reception Center was called upon to equip and clothe incoming inductees, he was assigned the duty of organizing the warehouse and of solving the multiple administrative details. Although limited to inexperienced assistants, he organized his unit with such efficiency that within two days stock sufficient to equip 2,000 recruits was available, and issue began to personnel being processed. Coincident with this work he trained a cadre for the regimental supply office and later a cadre for a temporary recruit

reception center at Camp Edwards, Mass., to bring the 26th Infantry Division to war strength. He initiated many innovations in processing procedure that contributed in large measure to the success of the regimental supply office and the clothing issue warehouse. Address, Dodge Ave., Sackets Harbor, N. Y.

COL. EDWARD C. HANFORD, for services from Nov 40 to Feb 44. As special assistant to the Deputy The Inspector General, he completed successfully with great skill and keen insight many difficult, intricate, and original investigations. As Chief of Investigations Division, Office of The Inspector General, he planned, co-ordinated, and supervised with marked ability and striking success the many investigations directed by the Secretary of War and other officials of the War Department. Throughout his service as a senior inspector general his initiative, sound thinking, and scholarly understanding of military and civil law contributed to the successful accomplishments of the Inspector General's Department. Address, 2110 E. Broad, Columbus, Ohio.

COL. JOE NICKELL, for services as port commander on two large posts in the Western Aleutians from 20 May to 18 Sept 43. During this period he demonstrated outstanding organizational ability, resourcefulness, and devotion to duty in organizing the respective ports and in supervising the out-loading of a large task force. He devised a plan of port organization which contributed materially to the development of advanced bases. Landing at Attu with the leading elements of the American forces, as port commander he demonstrated unusual ability and devotion to duty in organizing the beach and maintaining an even flow of supplies and ammunition from ship to shore, thereby contributing materially to the success of the combat forces and the establishment of the base. In many instances he personally supervised the supply of remote outposts by small craft under hazardous sea conditions and during extremely adverse weather, as well as supervising the security of harbor craft under trying conditions of sea and weather. Address, 904 Nickell Rd., Topeka, Kans.

COL. GEORGE P. PRIVETT, for exceptionally meritorious conduct in the performance of outstanding service in Australia from 11 Nov 42 to 3 Jun 44. Address, 112 Morningside Dr., San Antonio, Tex.

COL. EDWIN A. ZUNDEL, for exceptionally meritorious conduct in the performance of outstanding services in the Southwest Pacific Area from 6 Feb 43 to 4 May 44. Address, 1921 E. Main St., Humboldt, Tenn.

SILVER STAR

PVT. HERSHEL J. McCANTS: A fire broke out in the motor shop of a Tank Destroyer company at Ft. Jackson, S. C., on 25 Apr 44. An M-2 half track caught fire. All of the underpart of the vehicle and the canvas top were in flames which reached and set fire to the ceiling of the building. There was imminent danger that the tank containing 60 gallons of gasoline would ignite and explode. With utter disregard for his own safety and at the risk of his life he jumped into the driver's seat and drove the half track out into the open, thereby saving other vehicles from damage. Address, 512 Lawson Rd., Bakersfield, Calif.

SGT. JACOB M. VALENTINE: Near Yamai, New Guinea, on 19 Feb 44, a rope had been secured across the Mot River to serve as an aid for evacuating wounded from the west bank of the river to safety. When the rope was cut by artillery and machine gun fire he, with an officer, voluntarily secured it at a point farther downstream.

A rope sling was improvised as a means of returning the wounded along the rope. Each time a man was brought back it was necessary for the empty sling to be returned to the west bank of the river. He and the officer alternated in performing this task. The crossing was exposed to sporadic rifle and machine gun fire from an enemy position on a ridge overlooking the river. He risked his life repeatedly, and his courageous action was instrumental in saving the lives of many of the wounded. Address, 1100 Milwaukee Ave., Racine, Wis.

BRONZE STAR MEDAL

S/SGT. JAMES R. GARRICK. On 21 May 44 in New Guinea, while acting as a chief of headquarters section of a FA battery, his adjustments brought fire to bear on enemy guns. By the use of hand signals, in utter disregard of his own safety, he enabled naval craft to fire with greater accuracy. Home address: 509 W. First St., Newberg, N. C.

1ST LT. WILLIAM R. MACKER, for tireless efforts in compilation of vital information regarding supply, evacuation and transportation at Hollandia, Dutch New Guinea, from 22 Apr 44 to 20 May 44. Home address: 629 W. 4th St., Miami, Fla.

1ST LT. HOWARD L. MELVIN took a position in enemy occupied territory and acted as artillery observer with an infantry regiment 15 Jun 44. Home address: 2806 S.W. Greenview Ct., Portland, Ore.

1ST LT. RICHARD H. POPE, JR., for meritorious achievement in connection with military operations against the enemy at Guadalcanal, 9 Jan 43. Home address: Enfield, N. C.

CAPT. GEORGE T. PORTER, JR., for fidelity and great efficiency in the handling and evacuation of a large quantity of 105-mm ammunition to a place of safety while under heavy enemy fire, 30 May 44, in New Guinea. Home address: 1548 N. Harvard Ave., Los Angeles, Calif.

1ST LT. CHARLES W. WOODWARD, JR., for meritorious service in combat from 30 Oct 43 to 30 Dec 43 in Italy. Address: Rockville, Md.

For Action on New Guinea

22 Jun 44:

PVT. HARVEY D. ASHTON, Box 12, Olivia, Minn.

PVT. JACK A. BEEBE, 531 E. 89th Pl., Chicago, Ill.

PVT. HAROLD L. GEORGE, Deering, N. D.

While under constant enemy fire, assisted in keeping communications open between the artillery and infantry.

PVT. WILLIAM F. FARISS, Box 429, Giddings, Tex.

T/4 CLARENCE R. MARTIN, 515 S. Walker, Oklahoma City, Okla.

CPL. CHARLES R. STEPHENS, 235 Cloy St., Warsaw, Ill.

CPL. JAY H. ZIMMER, Ontonagon, Mich.

For advancing through heavy fire to observe enemy positions and with such success that enemy pillboxes and emplacements were silenced.

T/5 RICHARD C. NOEL, Milan, Mo.

PFC. JAMES M. WHEELER, 506 Hamilton Ave., Dayton, Ohio.

For voluntary assistance in the evacuation of wounded under heavy fire from a point on an enemy-held shore.

T/5 ROBERT J. BLIESATH, 121 Watchinson St., Jefferson City, Mo.

PVT. EDWARD BRILL, Box 386, Ogallala, Neb.

T/5 WAYNE A. MURPHY, 11358 Forest Ave., Chicago, Ill.

For assisting in the necessary adjustment of artillery fire and in the evacuation of casualties.

23 Jun 44:

PVT. ORVILLE E. GREINER, 5641 Forest Ave., Kansas City, Mo.

PVT. THEODORE W. LINTHICUM, Box 517, R.F.D. 2, Spring Lake, Mich.

SGT. GEORGE W. McMILLAN, 3707 Rojo Ct., Corpus Christi, Tex.

T/4 LEWIS A. SHEARER, Polk City, Iowa

PFC. MILTON F. UTHE, Aud, Mo.

PFC. TOM WALLACE, 3135 N. Prospect, Oklahoma City, Okla.

While under heavy enemy fire, assisted in maintaining liaison between the Artillery and Infantry.

PVT. PAUL M. BENSON, Lake Rd., Terra Alta, W. Va.

PFC. MILFORD J. BESHEARS, 3446 S. E. Main St., Portland, Ore.

PVT. LESLIE B. HATHAWAY, 716 N. Ottawa, Minneapolis, Kan.

PFC. RUFUS C. HYDE, 508 S. Main St., Mason City, Ill.

PVT. DAVID E. JONES, 630 W. Poplar, Taylorville, Ill.

PFC. HOWARD L. LEACH, Mazon, Ill.

PVT. GERALD T. MAIRE, Star Route, Arcata, Calif.

T/4 ALBERT E. MERTL, 2309 Bellevue Ave., Bettendorf, Iowa

PVT. LEO E. NELSON, R.F.D. 1, Bismarck, N. D.

CPL. HILTON A. NICHOLAS, Saratoga, Tex.

CPL. CHARLES F. PRUDEN, R.F.D., Granby, Mo.

For assistance under heavy fire in the evacuation of the wounded from a point on an enemy-held shore.

24 Jun 44:

2D LT. THERON M. BERRY, 6211 Warwick Ave., Chicago, Ill.

CPL. STANLEY J. COUPOLS, 1722 Elliott Ave., Minneapolis, Minn.

CPL. MYRON E. ISAACSON, 212 Trott Ave., W. Willmar, Minn.

PFC. THADDEUS P. STACHULA, 2666 S. 12th St., Milwaukee, Wis.

For assistance in neutralizing enemy fire and administering first aid to the wounded.

ROLL OF HONOR

LT. RICHARD E. CRAFT, O-366907, Died at Fort Bragg, N. C., 30 Apr 44.

LT. JAMES M. CAVINESS, JR., O-24814, Killed in England, 12 Apr 44.

LT. LEON C. GRAY, O-1167449, Died in the Southwest Pacific Area, 12 Jun 44.

LT. DONALD B. HUNTER, Killed in Texas, 16 Jun 44.

LT. COL. DANIEL F. JONES, O-6479, Killed at Fort Douglas, Utah, 4 Jun 44.

LT. CARL A. KOCH, Killed in action in Italy, 9 May 44.

LT. WILLIAM LAING, Killed in action on Sicily, 11 Jun 44.

LT. ERNEST L. LANDES, Died at Camp Adair, Oregon, 23 Mar 44.

LT. ASHBELL G. McCLUNG, O-421401, Killed in action in Italy, 8 Dec. 43.

COL. DOUGLAS McNAIR, Killed in action on Guam, 6 Aug 44.

MAJ. WM. E. MARTIN, O-370069, Killed in action in Italy, 31 Jan. 44.

LT. COL. THORNTON L. MULLINS, O-299488, Killed in action in France, 6 Jun 44.

CAPT. DONALD N. NIBE, Died in action in Italy, 29 May 44.

LT. MELVIN M. SPRUILL.

MAJ. CARTER S. VADEN, O-389975, Died in action on Hawaii, 10 Mar 44.

BOOK REVIEWS



WATCHING THE WORLD. By Raymond Clapper. Edited by Mrs. Raymond Clapper. 372 pages; photographs, Whittlesey House. \$3.00.

In *Watching the World* Ray Clapper speaks again. After the airplane crash in the Pacific which cost the life of this widely known and respected columnist and radio commentator, his wife combed the record to produce an important book—a continuous picture of the decade from 1934 to 1944.

Introduced by a biographical sketch rich in human interest written by Mrs. Clapper, this is a collection of selected, dated articles and radio scripts grouped around a dozen chapter headings including "Congress," "Democracy," "Roosevelt," "Republican Party," "War." Clapper's point of view, fair and objective, is largely free from personal bias; and his style, while always clear, is often terse, vivid, and challenging. Excellent photographs add interest to this product of wide experience and good common sense—a book which anyone who starts will finish.

In the introduction his close friend and colleague, Ernie Pyle, evaluates both the man and his work: "Occasionally he would state bluntly in print that he had been wrong. But his work was so fully based on hard, factual reporting, and so little on ivory-tower dreaming, that it was bound to be almost always right." F. B.

CUR RIFLES. By Charles Winthrop Sawyer. 404 pages; index; illustrated. Williams Book Store. \$4.00.

Originally published about 1920, this classic has gained a well-deserved new lease on life as a result of the war: new printings were made in 1941, and again this year. In it we find an excellent discussion of flint locks, cap locks, and metallic cartridges, with a tremendous number of specimens illustrated and then described in a running commentary detailing each item shown in a given plate.

Both sporting and military weapons are covered, down to the period of the famous Springfield. Chapters are devoted to rifles and to carbines, to our own and to those used against us. Histories and specialties of many gun makers—both past and present—are recounted. An entire part of the book is devoted to practical home-gunsmithing suggestions.

Altogether this is a splendid addition to any military library or to one's collection concerning small arms.

WAR BELOW ZERO: The Battle for Greenland. By Col. Bern: Balchen, Maj. Corey Ford, and Maj. Oliver La Farge. 127 pages; photos; endpaper map. Houghton Mifflin Co. \$2.00.

Snatches of news about Greenland have appeared occasionally since the war began, but little more. War in that part of the arctic was a hidden war, waged largely in semi-darkness and in extreme cold, dealing with matters of high strategic importance. For, you see, Greenland sets up the weather for the North Atlantic and for Europe, so the power holding it for forecasting purposes has a great advantage over its opponent.

Episodes of this arctic conflict are told in fascinating fashion. The first one, *Greenland Adventure* (by Balchen and Ford), has previously appeared in *Collier's*. *The Long Wait* was told to Maj. La Farge by four survivors of a B-17 that crashed on the ice cap in November, 1942. A "postscript" describes a *Flight East* and *Life on the Greenland Ice Cap*. The authors are a veteran arctic and antarctic flier and two widely and favorably known writers.

AN ARITHMETIC REFRESHER. By A. Hooper. 116 pages; index; illustrated. Henry Holt & Co. \$1.50.

Last year Mr. Hooper published *A Mathematics Refresher*. It proved a godsend to lots of people outside the army as well as to a tremendous number within it. Even more people, however, need either training or refreshing in even more elementary arithmetic. That's where this new book comes in, as its contents make it the logical predecessor to the earlier (but more advanced) book.

One of the great advantages of Mr. Hooper's approach is his consistent use of only *practical* examples. Another, of course, is his simple and straight-forward method of explaining what he's driving at. Step by step he takes up numbers, addition, subtraction, common fractions, decimals, fractions of quantities, and percentages. In the back of the book are answers to the practice problems, along with an index to the whole thing.

Be you an enlisted man working for a rating or for transfer to the FDC, or an officer who is rusty on figuring, or the parent of a child remote from a good school (or any school, for that matter) — in any of these cases you'll find this compact book excellent for your purpose.

WEST POINT. By E. D. J. Waugh. 238 pages; appendix; bibliography; endpaper map. The Macmillan Co. \$2.50.

Our military academy is one of the subjects on which some author seems impelled to write a book every few years. The last one having appeared three or four years ago, apparently it is now time for another account of the birth, growth, development, and general history of the U.S.M.A. It is well, as by careful research and consultation Mrs. Waugh has avoided many of the errors that crept into some earlier (but still, recent) works.

West Point is not only sympathetic. It captures and conveys the spirit of the Corps of Cadets. Their daily routine and course of instruction are sketched. And considerable is said of the work of the Academy and its graduates during this present war. Result: a readable and rounded narrative that is of widespread interest.

EAST BY SOUTHWEST. By Christopher LaFarge. 208 pages. Coward-McCann, Inc. \$2.50.

"Fictional war reporting" is a thumb-nail description of Mr. LaFarge's approach. He is both a creative writer and a trained correspondent, and so was dissatisfied with the brief, bald statements of reporting his trip through the Southwest Pacific islands in the

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spring of '43. Based squarely on his observations and experiences, he has produced in composite the scenes, characters, and events with which he had intimate contact. The result is a group of ten incidents—short stories, if you will—that have the true ring of their actual authenticity, but which by use of the fictional technique are more rounded, comprehensive, and understandable than could be any news despatch attempting to describe them.

THE LAND OF PRESTER JOHN. By Elaine Sanceau. 240 pages; bibliography; maps. Alfred A. Knopf. \$2.75.

Every so often in some chronicle of exploration I have run across a reference to Prester John. Apparently he was some legendary—or historical?—figure in the east, but my history recollections didn't identify him, and busyness ruled out any research. Actually, Prester John was no single individual. That name was generally applied to the successive rulers of that unique Christian State in the midst of Mohammedanism—Ethiopia.

At the end of the Middle Ages strange tales trickled through to Europe, telling of this distant, powerful nation. No one knew just where it was, but there was no doubt of its existence. Nor of that of Prester John.

It was Prince Henry the Navigator, he of the spirit of the Renaissance but living in the end of the Middle Ages, who embarked Portugal on a lengthy search for the land of Prester John. This was truly a crusade, carried out over generations. It was an integral part, rather than a by-product, of the widening of horizons, of the development of a great eastern empire. Though Portugal's power has waned, her inerasable stamp is found throughout the Far East; as far as Malacca her language persists, her place-names survive.

Thus, in telling of the search for Prester John, the author has created a colorful picture of Europe's first sea-borne acquaintance with the East, a saga comparable with Marco Polo's famed account of his overland journey.

THROUGH THE PERILOUS NIGHT. By Joe James Custer. 243 pages; illustrated. The Macmillan Co. \$2.75.

Mr. Custer was a newspaperman, living in Hawaii, when the Japs struck. Quickly he was accredited to the Pacific Fleet and from then on lived with them. *Through the Perilous Night* tells of many of the navy's magnificent actions—the raid on Wake Island, moonlight bombing of Marcus, Doolittle's take-off for Tokyo.

Most of this book, however, is devoted to the Battle of Savo Island, that costly night which nearly turned our Solomons invasion into disaster. Custer was aboard the *Astoria*, one of the four heavy cruisers that were lost (the others: *Quincy* and *Vincennes*, which exploded, and the Australian *Canberra*, which succumbed to Jap torpedoes). His "inside story" is a detailed, blow-by-blow account.

GERMANY: THE LAST PHASE. By Gunnar Pihl. 323 pages. Alfred A. Knopf. \$3.00.

Gunnar Pihl, a Swedish correspondent who served in Germany from 1931 until he was expelled in the summer of 1943, has turned out another inside story about Germany and the war. Inevitably, the book must be compared with *Behind the Steel Wall* by another Swede, Arvid Swedborg, published earlier in the year. Pihl's book is not as well organized or as factual—or perhaps there have been so many of these inside Germany books lately that the story is getting a bit stale. Anyway, Pihl feels that Hitler and his Nazis are on the way out; that the Generals, who have no plans, and Himmler, who can only terrorize, are going to fight for control of the rapidly collapsing home front; and that the war with Germany will soon be over. R. G. M.

A WAR ATLAS FOR AMERICANS. Prepared with assistance of Office of War Information, 84 pages; index; illustrated. Simon & Schuster. In paper, \$1.00; bound in boards, \$2.50.

For a comprehensive, over-all summary of the war's background, course, and general development, I find this book of maps-plus-text one of the clearest to date. It follows a technique that others have previously used, notably in *The War in Maps*, but goes a bit beyond earlier users in some respects. To some readers the greatly increased proportion of text will seem unnecessary, but others will find it a help in tracing the course of events. Use of an unusually large page size permits enlargement of many maps, so that more detail can be shown

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Contents are organized in several sections. The first shows the inter-relationship of all fronts, the remainder cover in considerable detail the Western, Mediterranean, Russian, Asiatic, and Pacific Fronts, and the supply lines that serve them.

The maps themselves are drawn on an orthographic projection. In addition, they contain some elements of the "perspective" type of landscape indication, as recently used so effectively by Raisz (*Atlas of Global Geography*).

TRUMPET TO ARMS. By Bruce Lancaster. 380 pages; endpaper maps. Little, Brown & Co. \$2.75.

Historical novels can serve definitely useful purposes. And they do, when written as interestingly and accurately as is Lancaster's habit. Not deep and not fanciful, *Trumpet to Arms* faithfully follows through the first years of the American revolution, recreates the "feel" of the period, and gives good entertainment to boot. You'll remember this author's *Guns of Burgoyne*. He must have a bit of artillery in his blood, for this latest book describes part of the great job of moving the cannon from Ticonderoga to Dorchester Heights.

THE WHITE FEATHER. By Merritt Parmelee Allen. 196 pages. Longmans, Green & Co. \$2.00.

For younger readers this is a "natural"—history, adventure, war, and the growing up of a young mountaineer. Morgan's Raiders are known mostly as just a name, but Mr. Allen's splendid material and treatment bring that band to life.

ARMY FOOD AND MESSING. 415 pages; index; illustrated. Military Service Publishing Co. \$2.50.

Keeping abreast of current developments, Military Service has again revised this "bible of the kitchen." Mess management and kitchen management; principles and practice of cooking (including a special chapter on dehydrated foods); baking; meats, fish, and poultry; inspection and storage of food supplies; recipes; mess sanitation—all these things are covered in a practical way, based on longterm practical experience.

In this new edition the chapter on baking is completely revised. The approach is simpler, in line with the army's de-emphasis of the QM bakery company and an increasing reliance on the battery kitchen. Rolls, cakes, and the like are increasingly important, so they are given more attention and plain bread somewhat less.

Sections on mess accounting are brought in line with recent changes in the official directives.

And a general overhauling has eliminated some obsolescent portions, to make this new edition more than ever "the complete manual of mess management."

TEN ESCAPE FROM TOJO. By Comdr. Melvyn H. McCoy, USN, and Lt. Col. S. M. Mellnik, USA. 106 pp.; endpaper maps. Farrar & Rinehart. \$1.00.

This is the story of how ten brave men, who were among the 65,000 who surrendered at Bataan and Corregidor, escaped from the horrors of a Jap concentration camp. It gives all the details of the "March of Death," conditions inside the prison camp, the inhuman treatment given the prisoners, and the final breath-taking escape. It should be read by all Americans so that they may know just how our men are paying the price for victory. M. K. W.

WEST TO THE SETTING SUN. By Harvey Chalmers, 2nd. 359 pages; bibliography; endpaper maps. The Macmillan Co. \$4.00.

During our Revolution the very name of Joseph Brant and his band of Mohawks struck dread fear deep into the "rebels" of the Mohawk Valley and neighboring portions of New York. These Indians' raids and depredations may have been only a side issue when compared with the main campaigns, but that was of little satisfaction to those who suffered or were endangered by them. Side issue though it may have seemed at the time, the weight of these allies came perilously near to turning the tide in favor of the British.

Brant was an Indian genius who coupled the white man's weapons with the Indians' tactics. In effect, he developed modern commando methods.

Mr. Chalmers has written an authentic biography, yet one not

entirely drawn from conventional sources. These leave blanks at some points, which have been filled in with what the author thinks Brant would have said or done in the particular circumstances. Success of this welding of factual biography with some aspects of the historical novel is attested by the warm comment of Ethel Brant, great-granddaughter of Joseph; of this book she says, "This is truly Indian."

BOMBERS ACROSS. By Capt. Edgar J. Wynn. 178 pp.; endpaper map; photographs. E. P. Dutton & Co. \$2.50.

This will introduce you to the Air Transport Command, to men whose duties take them all over the globe. Capt. Wynn tells us of his barnstorming in the States, about his own flying school in Syracuse, his enlistment in the RCAF, experiences in the Royal Air Force Ferry Command ferrying bombers across the North Atlantic, his resignation from the RAFFC and joining the Pan-American Air Ferries, his experiences in the TWA flying 4-engine transports to England and Africa, and finally in June, 1943, his commission as captain in the USAAF.

Here are endless untold tales of high adventures related by young airmen who have been ferrying bombers to all parts of the world.

M. K. W.

RAILROAD PANORAMA. By A. C. Kalmbach. 223 pp.; index; photographs. Kalmbach Publishing Co. \$2.75.

Remember your electric train? And how you wanted to be an engineer when you grew up? Well, lots of people have carried their railroad interest and enthusiasm over into their adult lives. They are connoisseurs of locomotives and other equipment. They know how and why trains and schedules are made up. They make pilgrimages over branch lines, where the railroad is reduced to elements much less complicated than the intricacies of big-city yards.

Mr. Kalmbach is one of these enthusiasts. His *Railroad Panorama* is a deftly painted picture of the railroads of America, in 20 scenes (chapters). Locomotives, trains, historical background, records, even electric interurbans—these all have a place. No chronology or catalog, this is indeed a fascinating panorama which gives the "feel" of the sweep and power of progress. 30 fine photographs provide the finishing touch.

ADVENTURES IN SYMPHONIC MUSIC. By Edward Downes; decorations by John O'Hara Cosgrave II. 306 pp.; index. Farrar & Rinchart. \$2.50.

Constantly I'm hearing some music over the air that obviously isn't just a formal composition, but tells a story. Often I can imagine one that "fits" the music, but more often I wish I knew what the composer had had in mind—his music is so definite in spirit that it must be tied in with some special event.

Mr. Downes wrote this book primarily for listeners such as me. From it is clearly seen that all great symphonic music is a reflection of life: political and social upheavals, great loves, religion, humor, and personalities. It becomes plain how music is interwoven with history, literature, and the other arts. And this telling is not in the form of dry and cryptic "program notes." On the contrary, it is a delightful narrative of the composer and a description of his music, with the whole set against the events of the time.

Altogether there are the stories of some 200 musical compositions by 58 different composers, heard often on the radio, in concerts, or on records. In view of the importance of the phonograph, descriptions are confined to recorded works. Written primarily for listeners and next for students, *Adventures in Symphonic Music* should definitely appeal to music lovers of any age.

THE RUSSIAN ARMY. By Walter Kerr. 186 pp.; maps.

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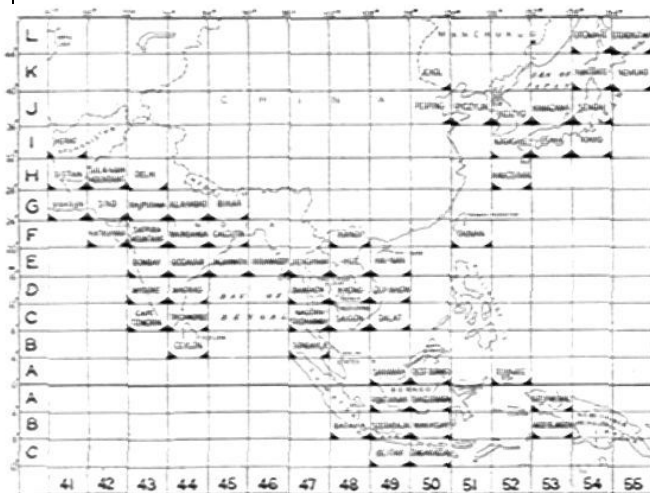
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

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An assistant professor of political science at the University of Wisconsin takes a good look at many facets of German life, organization, and economy.

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THE MARINE CORPS READER. Edited by Col. Clyde H. Metcalf, USMC. 594 pp.; index of authors. G. P. Putnam's Sons. \$3.00.

Col. Metcalf has gone far beyond the *Marine Corps Gazette* (which he edited until recently) in collecting material for this splendidly rounded account of our Marines. He has compiled some of the best writings of such well-known authors as John Hersey and Hanson Baldwin, and such Marine authorities as Gen. Holcomb and Col. Thomason. The book is all-Marine, drawn exclusively from writings of Marines or of correspondents who accompanied them. "Fine writing" was not considered—where a piece was based on first impressions, all the original freshness is retained.

The opening chapter contains orientation in the history and traditions of the Corps. Succeeding ones describe Marine actions and accomplishments through the years—right down to Kwajalein, in fact. Appendices give *The Marines' Hymn* and other interesting material. The book itself is in a handy and compact form, not a tiny "quickie" yet small enough to pack and carry handily. Altogether this is just about the best anthology to appear for a long while.

QUEBEC. By Mazo de la Roche. 203 pp.; index; illustrated. Doubleday, Doran & Co. \$3.50.

Miss de la Roche is best known for her *Jalna* novels. In turning to history she continues her smooth-flowing writing, and focuses attention on one of the hemisphere's most important cities.

From Cartier's landing in 1535, Quebec has almost continuously been a key point. Its citadel was the object of French-British struggles, outgrowths of European conflicts that spread overseas. For two centuries it was the great Canadian seaport; now outstripped by Montreal, it is slowly staging a comeback. As gateway to the West, it was the base for early exploration of much of our country by the *voyageurs* who penetrated the Mississippi valley and the western plains. Throughout most of Quebec's history the Dominion itself was gaining strength for final unification as a great segment of the Commonwealth.

Such events come to life under Miss de la Roche's hand, not as figments of imagination but as exceptionally well told history.

GEOGRAPHY IN HUMAN DESTINY. By Roderick Peattie. 310 pp.; index; illustrated. George W. Stewart. \$3.00.

Although not a brand new book, *Geography in Human Destiny* is of definite importance right now. Cartographers have been busy devising odd projections and presentations to emphasize the regional unity of the world, or at least large sections of it. Mr. Peattie similarly views the broader fields of geography. He writes of our understanding of people as individuals, communities, and nations—and especially how geography and the world's growing knowledge of it affected the lives, fortunes, and outlooks of those people. He cloaks his truths with a casual and entertaining style, but ably shows how different are the characteristics that develop in maritime, mountain, forest, and grassland communities. He integrates manifold activities, and shows the great part played in their development by environment (or geography, if you prefer that term). *Geography in Human Destiny* makes for delightful reading, and at the same time recalls many facts which should be considered when the future fate of the world is being mapped.

THE NAZIS GO UNDERGROUND. By Curt Riess. 201 pp.; index. Doubleday, Doran & Co. \$2.50.

It is always difficult to estimate the value of a book dealing with behind-the-scenes reports of an enemy country. It is particularly difficult when the author reverses the open facts of history (as when he insisted in his *The Self-Betrayed* that Schlieffen has said "Keep the left wing strong"). Perhaps the safest thing to say about this book is that Riess believes the Nazis are planning to win World War III by going underground and forming a world-wide subversive organization

after being defeated in World War II. He bases his belief on unspoken thoughts, private conversations, secret memoranda, and confidential reports of the highest Nazi officials.

R. G. M.

FOREIGN MAPS. By Everett C. Olson and Agnes Whitmarsh. 230 pp.; index; illustrated. Harper & Bros. \$4.00.

This latest volume in Harper's Geoscience Series is unique in its aim to enable one to locate and select maps in any foreign country and to use them accurately and intelligently. Its authors bring to this task a fine background of experience: Dr. Olson is a teacher of cartography in the A.S.T.P. and in the University of Chicago's Institute of Military Studies, and Miss Whitmarsh is librarian of one of the world's largest private map collections.

First is a chapter on U.S. maps, then come discussions of the major problems met in studying foreign maps, language problems, marginal information, details of signs and symbols, scales, measurements, and grid systems. In three particulars *Foreign Maps* is of utmost importance.

Although knowledge of the language of a foreign country is not essential for reading its maps, knowledge of the map vocabulary is. *Foreign Maps* therefore contains glossaries of the important map terms for all languages important for map study in general and where out forces are apt to be fighting in particular. There are 33 of these glossaries, ranging from Annamese to Turkish. In some cases (as Chinese and Japanese) there are given both in characters and in Romanized form.

The chapter on signs and symbols contains invaluable plates showing the standard symbols used on the maps of 12 important foreign countries (alphabetically, from Argentina to Sweden). Especially helpful are the reproductions of enlarged illustrative specimens of 16 foreign maps, 8 in sepia and 8 in four colors.

Especially useful is the final chapter, which considers the characteristics of the maps published by the principal mapping agencies of 39 foreign countries. So too is a reference list to selected texts, manuals, articles, catalogues, and reports, which is included to guide those wanting more detailed information on matters not treated in this book.

Throughout, *Foreign Maps* presupposes a background knowledge of general map reading and of projections. It is therefore free to concentrate on its special field, which it ably does, unhampered and uncluttered by including material irrelevant to its immediate purpose. *Foreign Maps* should be in the personal library of every officer.

THEY WERE THERE, Edited by Curt Riess, 621 pp.; biographical notes; index. G. P. Putnam's Sons. \$5.00.

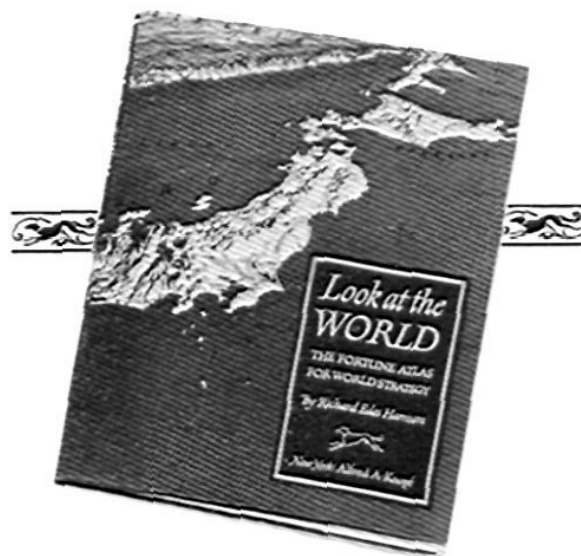
For a lively newsteel of World War II and how it came about, this anthology from the writings of correspondents is quite complete. It is a running account of history during the last fifteen years, covering the Far East and Ethiopia as well as events which have seemed closer to home. Among the 160-odd writers represented are all the familiar names of the great correspondents as well as many less well-known ones. Among them, they cover the arena in colorful fashion.

BLOOD FOR THE EMPEROR. By Walter B. Clausen, 331 pp.; index; endpaper map; illustrations. D. Appleton-Century Co. \$3.00.

This eye-witness, blow-by-blow account of the war in the Pacific from December 7, 1941, is told by officers and men of the Army, Navy, Marines, Air Force, and Associated Press correspondents. It shows our men in action, their heroic exploits, what they think, and how they act in stress of battle. The nature of the Japs, their plan of action, and their fanatical determination for world conquest are also given. M. K. W.

BATTLES—HOW THEY ARE WON. By Mary Elting and Robert T. Weaver; illustrations by Jeanne Bendick. 96 pp.; maps and drawings. Doubleday, Doran & Co. \$2.00.

Youngsters and oldsters alike are probably asking you lots of questions about the principles of strategy and tactics, the whys and wherefores of military operations. In this little book they will certainly find accurate and understandable answers, as this is the clearest book on the subject for the layman that has come our way. Although *Battles—How They Are Won* was written with the "younger generation" in mind, lay readers of any age will gain much from it.



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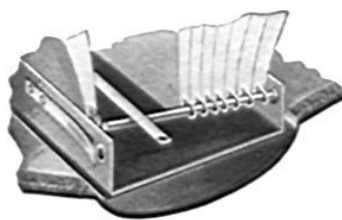
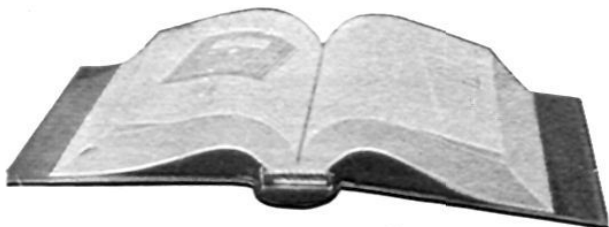
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This approach is most effective, and the high standard of accuracy is notable. *Battles—How They Are Won* deserves wide circulation.

WHAT TO DO WITH GERMANY. By Louis Nizer. 201 pp.; bibliography. Ziff-Davis Publishing Co. \$2.50.

This book will be valuable to any student of Post World War No. 2 Germany, or to anyone interested in it. The author employed a legal-historical approach in his examination of the problem of what to do with Germany after her defeat. He comes to the conclusion that the Germans must be disciplined severely insofar as punishment, restitution, and preventative measures can be firmly handled in the human sphere. In addition, reeducation is primary, but in this case involves application of generous principles.

Specifically, his recommendations with regard to punishment include: (1) Germany's forfeit of national sovereignty until she ceases to be a menace, (2) punishment of individual German war criminals in national and international courts, (3) gathering of data concerning criminals by international commissions, (4) listing of bureaucratic groups of Pan-Germans who officially organized brutality, (5) measures to prevent guilty Germans from reaching safety in neutral countries.

The suggested economic program includes punitive measures, such as removal of war plants and heavy industrial machinery, together with restitution of stolen property and payment of reparations in money, goods, and labor battalions. Furthermore, the economic program would include confiscation of Prussian estates and distribution to German peasants in small parcels, together with immediate food relief and the extension of economic punishment in terms of inclusion of Germany's attitude in international economic plans and control.

An educational program would include the scrapping of the entire peasant educational system of Germany, with international universities controlling German teacher training, curricula, and textbooks. The main purpose of this re-education is to prepare the Germans for democratic self-rule.

The author says, "There is no escape for the responsibility for what we do." All of us are custodians of the future and we have to face the supreme test of our adequacy. A. H. M.

THE CANVASBACK ON A PRAIRIE MARSH. By H. Albert Hochbaum. 169 pp.; appendices; index; illustrated. American Wildlife Institute. \$3.00.

"Al" Hochbaum spent four years on the Delta Marsh, at the foot of Lake Manitoba. His work was one of those "dream jobs" that sportsmen and nature lovers muse over. He devoted his entire time to studying the waterfowl on this most productive of all marshes—from their spring arrival, through courtship antics, the nesting and rearing of a new family, on through the hunting season in the fall.

It is a fascinating story, for Hochbaum is even more intensely interested (and interesting) from the human side than from the scientific. His investigations were not limited to the Canvasback, but he centers his narrative on this king of all ducks and then mentions the variations found in the other kinds. The author shows you all there is to see of waterfowl life. This is one grand book for any sportsman or conservationist.

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