


*The*  
**FIELD ARTILLERY**  
*Journal*



MAY, 1943



# FIELD ARTILLERY GUIDE

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# The Field Artillery Journal

"Today's Field Artillery Journal is tomorrow's training regulations."

MAY, 1943—Vol. 33, No. 5

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ERRATUM NOTE. — In the second column of page 283 of the JOURNAL for April, 1943, the sentence beginning on line 25 should read: "Probably one gun battery per division. . . ."

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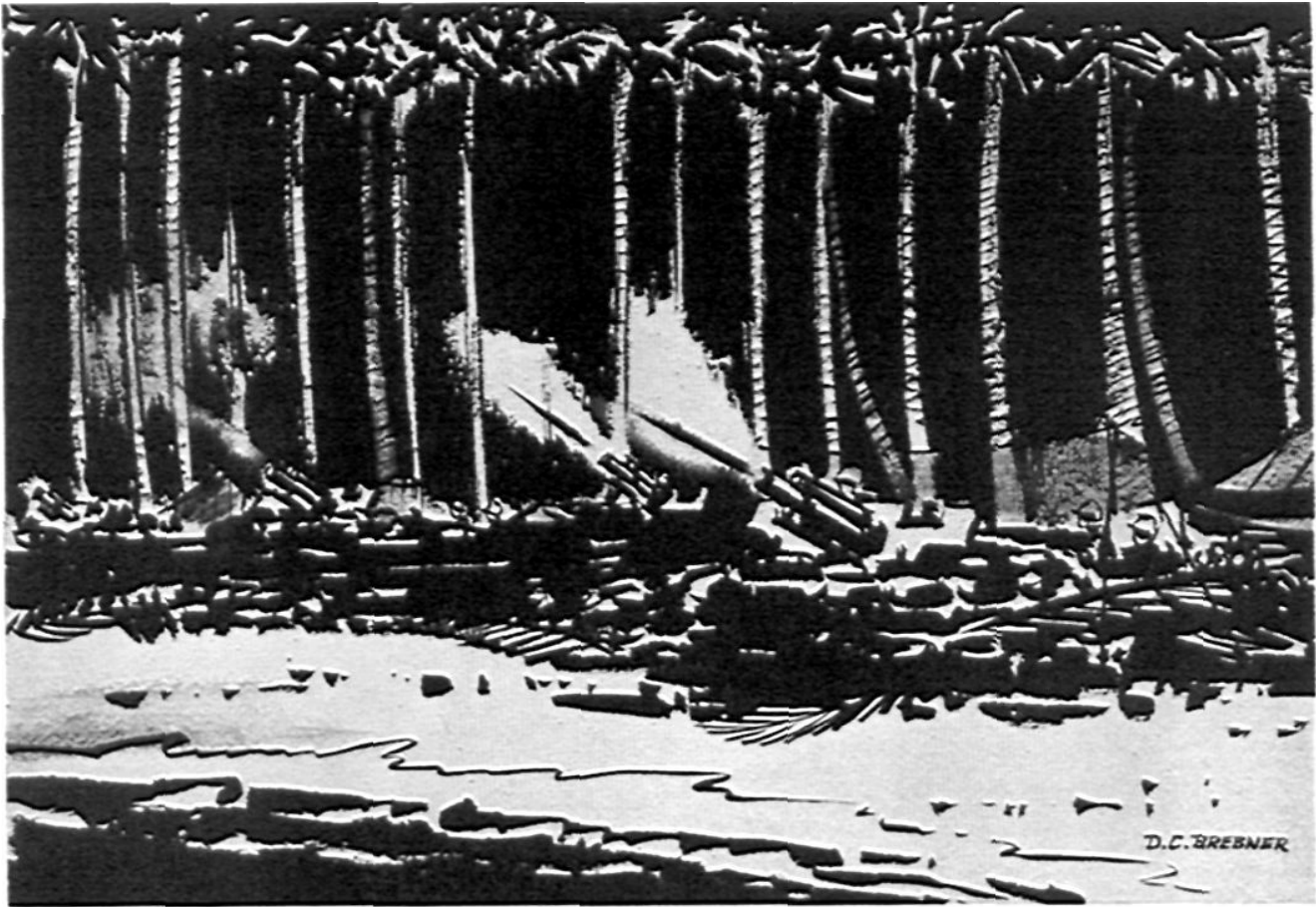
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*A night concentration down  
the shore line, Guadalcanal*

# Survey in Tropical Island Warfare

By Lt. Clifford C. Petersen, FA

A wealth of experience is being gained as our operations in the Southwest Pacific progress, but it will profit few unless passed on to those preparing for active combat. If a story of one officer's problems and joys in field artillery survey on two Pacific islands can give other survey officers a realistic idea of what they may encounter, that story is one that should be told. It is commonly reported that the survey operations in jungles, palm groves of vast extent, and rugged tropical hills are confined to gun position area surveys. To be specific, I was told en route to Guadalcanal that all target areas would be shot in, that the maps available would be used by interpolating between huge K factors, and that I could expect to become a forward observer. Notwithstanding, I contend that the survey officer has a full-time job doing unanticipated things. But first, to consider this subject in logical sequence.

## TERRAIN AND CLIMATIC CONSIDERATIONS

Many of the Southwest Pacific islands appear, from the sea, to be very similar. It is safe to conclude that they are all quite alike in structure, and have spiny, mountainous backbones with few trees but much grass. Digging slit trenches and driving stakes on these hills reveals a very rocky subsoil, undoubtedly the reason for so few trees. Except for the difficulty in trudging and in driving a jeep up these midget mountains, they may

be considered a boon to survey. However, the target area is frequently in thickly wooded valleys like the Matanikau, in stream beds, and in vast palm growths. We are fighting a crafty enemy who knows all about camouflage and concealment, and who is not likely to establish himself in open areas. So we must consider the lowlands, jungles, and swamps as well as the hills. Lines of sight through these places are difficult and there is often a lot of cutting necessary for traverses. Coconut palms make tough chopping and attain great girth, although the orderly groves usually present excellent lines of sight. Falling nuts are a constant menace to the transit, and care in setting up between trees rather than under them is advisable.

Traverses down roads and trails are often feasible. A word of caution is proper here in the case of territory just acquired from the enemy. Many mines have been planted at road shoulders and some vehicles have been lost. A man's weight on a mine will explode it, and a lustily thrust range pole or an embedded tripod leg could do the job too.

The tactics in the drive from Kokumbona to Cape Esperance were to push along the narrow strip of low land between the mountains and the shore. The mountains were too rough for facility in movement, and the beaches too valuable for reinforcement landing and eventual evacuation to permit a large scale enemy exodus to the high ground. Hence, the survey problem was simplified by beach traverses. Many enemy transports which were beached along shore served as valuable landmarks and basepoints. Some we named *Queen Mary*, *Normandie*, or whatever fancy dictated. As our drive reached them it was seen they had legible names, such as *Kyosuo Maru* and *Kingawa Maru*. In contrast to this lowland drive, the Battle of Mt. Austen took place 318 yards above sea level. When these differences in elevation are considered, it is obvious that vertical control is vastly important.

The climate here can be considered a hindrance to survey. The atmosphere is damp and conducive to fungus growth, making instrument maintenance a continuous job. The sudden rain flurries and mists do not help visibility between stations, although patience usually is rewarded with a rapidly clearing sky.

Heat waves bounce the field of view unbelievably and necessitate rechecks of angles even in a hasty survey. The effect of this heat on personnel is severe. An intelligent plan of survey to eliminate unnecessary walking is vitally important.

The precious jeep usually ends up with the survey mission, tables of basic allowances notwithstanding. The weapons carrier and a 6- or 7-man team will not work. A 3- or 4-man party (one jeep load) will get the job done in hills where a weapons carrier is useless.

A two-meal day is almost S.O.P. in the tropics, and this should please survey officers who like a full day's work without interruptions.

#### DIVISION ARTILLERY'S SURVEY FUNCTIONS

A battalion survey officer often finds himself moving rapidly in advance of division artillery control stations. In consequence, he uses some of his own advanced points which were located by an unclosed triangulation, or better yet he uses a partially controlled mosaic. This divergence of division and battalion surveys requires close liaison between the two units. Close contact is necessary so that division artillery can act as a clearing house for all advanced data, and so that, when time for such accurate work is available, more precise data may be given to the battalions.

Division artillery survey has proved invaluable in giving a skeleton of very accurate horizontal and vertical control, and in establishing authoritative origins for coordinates and direction. However, confusion sometimes creeps in when other echelons (such as other divisions or engineer surveyors) pick different origins for coordinates. Such procedure requires that coordinate systems be designated when describing a point, e.g., "Division artillery surveyed coordinates," "364 Map coordinates," or "P-78 Photo coordinates."

A convenient way of establishing a semi-permanent control point, used by this Division's artillery survey section, is to sink an inverted brass shell case into the ground. The primer forms a fine center point for plumbing a transit, and it is non-magnetic. Distinctive paint markings can give the designation and elevation.

To summarize division artillery's survey functions, it is vitally important that it establish a standard grid system for all its battalions. The section must be operative "up front;" it must move rapidly, and utilize personnel from battalion survey sections when assistance is needed.

#### AIR PHOTOS—MOSAICS

One of the most successful projects by our survey section was the preparation of a partially controlled mosaic. We received a double strip of excellent photos taken with a 24" focal length camera at 15,000 feet—approximate scale 1:7500. The overlap was only about 20% because every other photo had been removed before we received them. If we had had the spare photos, inspection by stereovision would have been possible. Experiments were made with the pictures of the rear areas, an average scale was determined on the basis of previous survey, and a large sheet of drawing paper was gridded to this average scale. Then identifiable points on the various photos were plotted on the grid sheet according to the surveyed coordinates. Needles were used to prick through the photo point onto the plotted point, and when the mosaic was inspected it was apparent that all photos joined so closely that we could reconstitute areas to the front on the basis of very few advance points.

We identified two points on each photo, near the center of the overlap, and pinned them in place over the same points on the adjacent photo. With benefit of only a few control points in enemy territory, especially

along the shore, we built up a mosaic of the area to about twice our maximum range, gridded it with division artillery coordinates, and were ready to go. As we advanced we made additional mosaics until we reached the tip of the island. The movement was very rapid, leaving higher echelon survey behind. When we were able to check our control by inspection it showed an error of less than 6 yards per thousand.

Use of this large mosaic was simple. There were no facilities to reproduce it in smaller size for forward observers. This was all a fast-moving situation demanding quick, accurate fire rather than elaborate preparation and refinement. So we utilized some uncontrolled mosaics approximately 6" × 8", giving a set of 3 (covering about 15 miles) to each observer and keeping a set in the F.D.C. Grid lines were neither parallel, perpendicular, nor uniform, but the photos had the redeeming feature that all copies were identical. An observer wanting fire in a particular ravine could find it on his small photo and transmit coordinates to the FDC. The point would be located on the small mosaic, transferred by inspection to the large one, and firing chart coordinates given the HCO.

Numbering of hills has been of great assistance in survey operations as well as to the forward observers. The number system when imprinted on photos, as it was on the small mosaics mentioned above, is much superior to transmitting the numbers by overlays.

In rapid occupation of position, location of base pieces and check points by inspection of our large mosaic proved very accurate. Compass readings taken from the mosaic checked to within a few mils. This made possible accurate fire within a few minutes of going into a position.

This entire operation assumes that photo strips are available, and with the increasing cooperation of air units with the artillery it is probable that photos of all active fronts can be supplied.

#### USE OF CAPTURED INSTRUMENTS

Among the many items captured from the Japanese we found the most interesting to be their fire-control and observing instruments. Of particular use to us was a very handy 75-cm. base range finder, light weight, and useable with or without tripod. It measures from 100 yards to 2,000 yards with very good results, and is useable up to 4,000 yards. We've found it helpful in siting hill-to-hill bases which we anticipate measuring with the stadia rod and transit. A few times our judgment failed us and a trip was made up a hill in vain because it was barely out of stadia range. This newly acquired range finder prevents such wasted effort by telling in advance the approximate length of the base. Other uses may develop, and it's certainly too handy a gadget to discard.

Another invaluable instrument was an anemometer which was given to division artillery's metro section. In absence of one of their own, they were glad to receive this new weather vane and air speed indicator.

The Jap aiming circle is graduated in mils and, in case of loss of one of ours, could serve as a substitute. Its needle is inferior. However, the gears have little back lash, and despite its 3-section-legged tripod which is very heavy, it's quite useful.

A number of celluloid pockets were utilized as photo cases for observers since they fit nicely and were sturdy. The Japs had used them for radio frequency charts.

The Japanese 6-power field glasses we obtained were vastly inferior in quality to even our EE glasses. Canvas cases are an example of their conservation of leather.

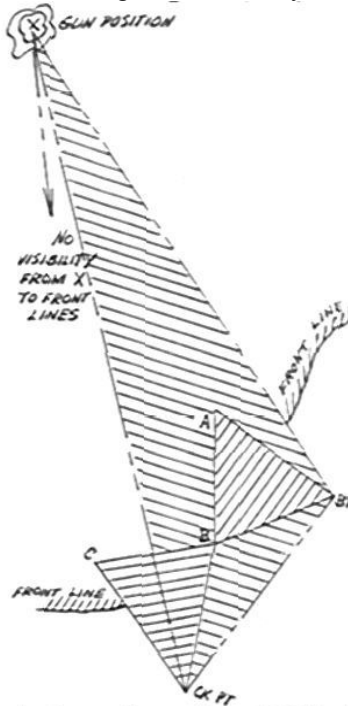
Several 20-power, binocular, observing 'scopes proved to be museum pieces as far as we were concerned. They were ponderous and obviously a nuisance to fast-moving artillery.

An aircraft tracking instrument was interesting. Cylinders and an aluminum chart were covered with parabolic curves. It seemed intricate and will undoubtedly be of more value to Ordnance or someone who can understand it.

The *piece de resistance* of all our captured instruments was a mammoth, 8-foot, coincidence type range finder packed in three huge metal chests. The tripod weighed about 100 pounds, the mount perhaps 250 pounds, and the range finder proper about 700 pounds. Six handles were fastened to the last mentioned chest and it was a real load for six men. We preferred the vest pocket edition first mentioned.

#### TERRAIN PROBLEM

One particular problem we encountered was interesting due to its infrequent occurrence. Our battalion was to fire at a range of 9,000 yards. This was before any



coordinated control was established and we worried only about how to link the guns with the target area. A large hill near the guns commanded a view of the base point and a check-point (widely separated), but there was no suitable base. Time didn't permit a traverse to a friendly ridge up forward, close to the target area; however, we started working up there and found two bases nearly at right angles to each other and having one end in common. Base A-B was used for locating the base-point and base B-C for locating the check-point. However, from no place on this forward ridge could we

see our hill back by the guns. The risky use of an aiming circle needle for direction was our solution in view of the dwindling time. Computation gave us the BP-CkPt side of the triangle BP-CkPt-B and the angle of that triangle at BP. The Y-azimuth of the side BP-CkPt was determined by measuring the Y-azimuth of the base A-B and considering the angles A-B-BP and B-BP-CkPt.

Back again at our neighboring hill we measured the Y-azimuth of X-BP and the angle BP-X-CkPt. The triangle BP-X-CkPt was solved on the basis of side BP-CkPt and the angles of the triangle. This seemed to be the exceptional case where target area and position area were rapidly linked by an apparent base in enemy territory. Initial data for registration were very close to the adjusted data, which was a point in favor of our aiming circle.

#### A FEW SUGGESTIONS

1. In combat the battalion "Survey and Instrument" section has an added job — nearly eclipsing survey in importance — which is frequently neglected in training. This function of running an intelligence office, producing overlays, keeping a Red situation map, compiling S-2 reports, and generally conducting a clearing house for information of the enemy, is "their baby," and it would be well to stress S-2 training before they find the enemy on the front lawn.

2. Have you ever tried taking the VCO with you on a survey? He can profit by a close look at the terrain and from a few panoramic sketches. If oblique photos are available they will help him in his study.

3. TM 5-236, *Survey Tables*, is usually a well-thumbed reference. A cardboard cover, perhaps covered with drawing paper, makes it more serviceable. Also, it's wise to have a spare one on hand.

4. In any active theater there is almost always a large supply of tie rods used to fasten ammunition in cloverleaf packing. These make excellent station markers, can hardly be removed when driven all the way in, and have convenient washers on which one can imprint descriptions or numbers with a metal punch set.

5. Merely to insure yourself against some gross error, an azimuth check (with an aiming circle) of all orienting lines is very convenient and reassuring.

6. A center of impact adjustment frequently is fired out in the sea. If an even coordinate junction is taken for the CI, coordinates of the base pieces known, and Y-azimuths of all orienting lines computed, you'll have your three base

angles with a few minutes' work. The angle between the base line and grid north is easily determined by taking differences of coordinates; and getting the base angle when you know the Y-azimuth of your base line and of the orienting line is child's play.

7. The 1-meter base range finder has proved to be excess bulky baggage in this theater of war. Observation is nearly all forward. Some OPs have been manned for general observation but the equipment is usually a BC 'scope, an oblique photo, and a direction line staked out on the ground. The range finder could nicely be stored with Service Battery in the rear area, provided proper cleaning and care were given it.



*A 105 battery dug in on Guadalcanal*

#### SUMMARY

Observation of the survey and mapping problem on Guadalcanal indicates the importance of the following in furnishing the artillery with accurate and rapid control:

1. Cooperation between the air and artillery forces should be fostered so that air photos can be turned over to division artillery with a minimum delay.

2. Absolute agreement between all mapping and survey units is essential as regards coordinate and direction origin and the mean sea level point. Elimination of conflicting grid systems would be a great help.

3. If the responsibility for original control and the ensuing mosaic were delegated to the field artillery, the result could be achieved quicker. When photo strips are formed into a mosaic at a distant base the results are hasty and the personnel doing the work are unfamiliar with the terrain and lack the opportunity for frequent checks on accuracy.

4. Miniature mosaics supplied to the artillery greatly facilitate the work of forward observers. However, an advantage would be gained if they were controlled and bore the surveyed coordinate system.

# RAPID COMPUTER, MODIFIED

By Capt. Paul Hartman, FA

The mechanical computer for survey traverse described by Major H. E. Bisbort in his article in the February JOURNAL is a valuable addition to the Survey Section's tools, which simplifies and speeds up traverse computations. These computations may be further simplified and speeded up by modifying the mechanical computer so as to eliminate the use of bearing angles.

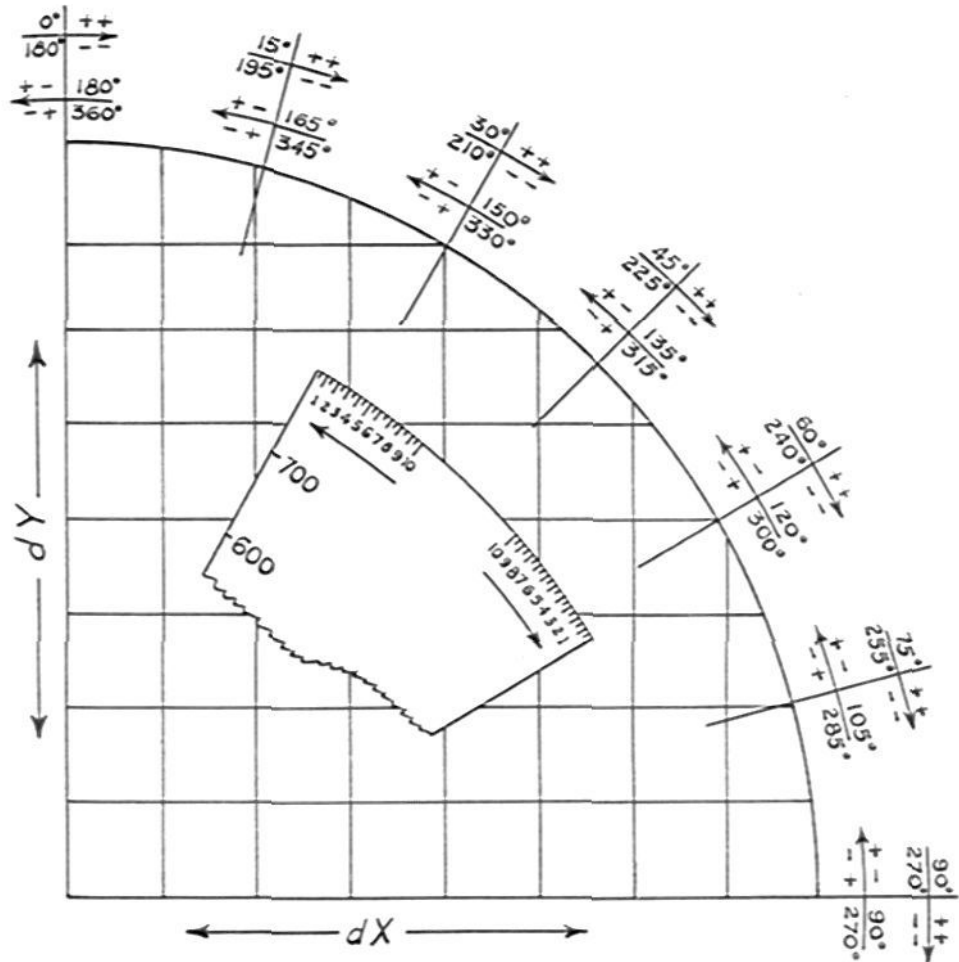
To eliminate the need for bearing angles the circle is graduated to read azimuth directly, as shown in the accompanying sketch. Graduations run clockwise for azimuths from 0° to 90° and from 180° to 270°, counter-clockwise from 90° to 180° and from 270° to 360°. The vernier on the left side of the fan is used for the counter-clockwise graduations; that on the right side for clockwise graduations. In each case the corresponding edge is used to lay off the length of the line. Use of the arrows to indicate the direction of the azimuth scale eliminates the possibility of reading in the wrong direction, i.e., reading 169° for 171°. The arrows on the verniers assure selection of the proper vernier.

dX and dY are always read in the same direction, lessening the possibility of reversing them. Signs of dX and dY are given in that order on the azimuth arc.

Because one edge of the fan is used for "counter-clockwise" azimuths and the other for "clockwise" azimuths, it is not possible to use the doubled (1/1000) scale described by Major Bisbort. However, since we compute dX and dY directly in feet we feel that the doubled scale is not needed. All distances are obtained directly in feet by taping or stadia and no

conversion to yards is made until the total dX and dY are obtained. It is believed that this method is less liable to produce errors since there are fewer steps involved.

The sketch shows the arc divided into 15° divisions, whereas in the full-scale computer 10° divisions are used as the sketch of the vernier would indicate. This change was made merely to prevent the crowded appearance that would result on the small-scale drawing if 10° divisions were shown. On the actual computer the least division on the vernier is ten minutes.



Mechanical Computer

RESCINDED:

TM 6-600, Notes for Field Artillery Replacement Centers, March 19, 1941.



# Two-Point, Two-Position, Two-Station Resection

By Lt. J. E. Bean, Jr., FA

Here is a survey procedure, suitable for battery and battalion details, which has been found to provide a satisfactory chart location of two unlocated but occupied points (as adjacent OPs, etc.) when only two visible terrain features (*A* and *B*) (located on a map or placed on a grid as *a* and *b*) are had. If *a* and *b* are marked at random on a blank sheet the positions to be resected for will be located in relation to *a* and *b* according to the scale set in placing *a* and *b*.

The procedure is illustrated on the accompanying chart.

## PROOF AND EXPLANATION

Two elements must be considered in the proof of this method. One is to show that by sighting along the line *dd'* to the opposite station the chart can be oriented; the second (actually contained in the first) is to show that the two desired map locations (*x* and *y*) are somewhere along the line *dd'*.

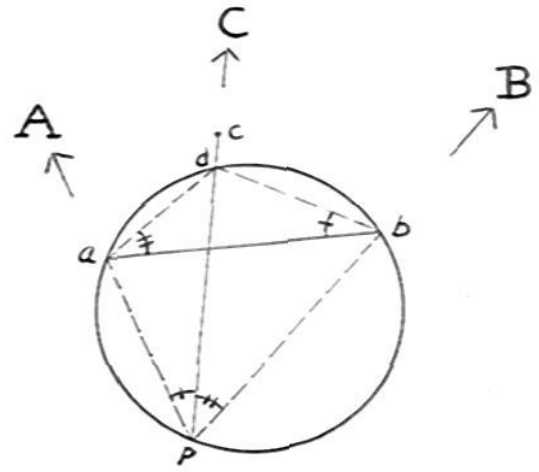
The method itself is essentially a combination of two conventional Bessel Method (three point) operations. As might be suspected then, the proof of this method is found in a thorough analysis of the Bessel Method which, as will be recalled, requires three accurately located map points that are visible on the ground, such that the point at which the operator is standing will not be on a circle circumscribing the three points.

As may be recalled from the Bessel or Italian three point method, the point initially located by the intersection of rays through the sighted signals (*d*) is on the circumference of the same circle circumscribing the occupied point (*p*) and the two sighted signals (*a* and *b*), and is also on the same line as the occupied position and the middle signal (*c*). This fact is essential in the proof of this Two Station resection. The following summary of the Bessel Method is therefore offered to clarify the point.

### THE BESSEL METHOD—*Explanation*

(Capitals are ground points; small letters are the corresponding points on the map or chart. *a*, *b*, and *c* are accurately located on the chart and identified on the ground as *A*, *B*, and *C*.)

1. The plane table is set up at *P*. Sight along *ab* to *B* on the ground and clamp the board. Sight from *a* to *C* and draw a ray.
2. Likewise, at *P*, sight *ba* to *A* and clamp the board. Sight *b* to *C* and draw a ray. This ray will intersect the previously drawn ray at a point *d*.
3. Loosen the board, sight *d* through *c* to *C* on the ground and clamp the board. The board is now oriented.
4. *p* may now be located by resection with rays *Aa* and *Bb*, and found somewhere along the line *dc*.



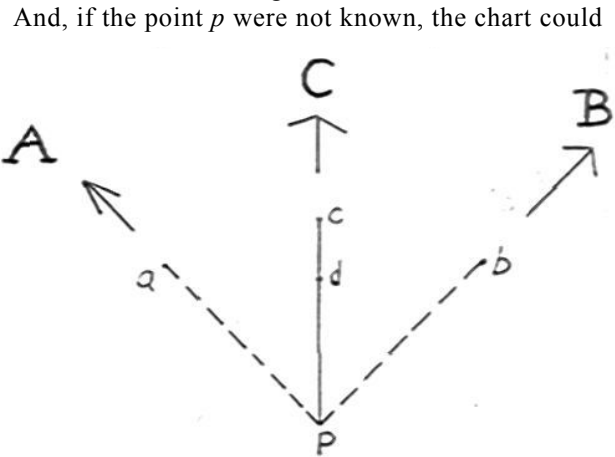
*Proof*

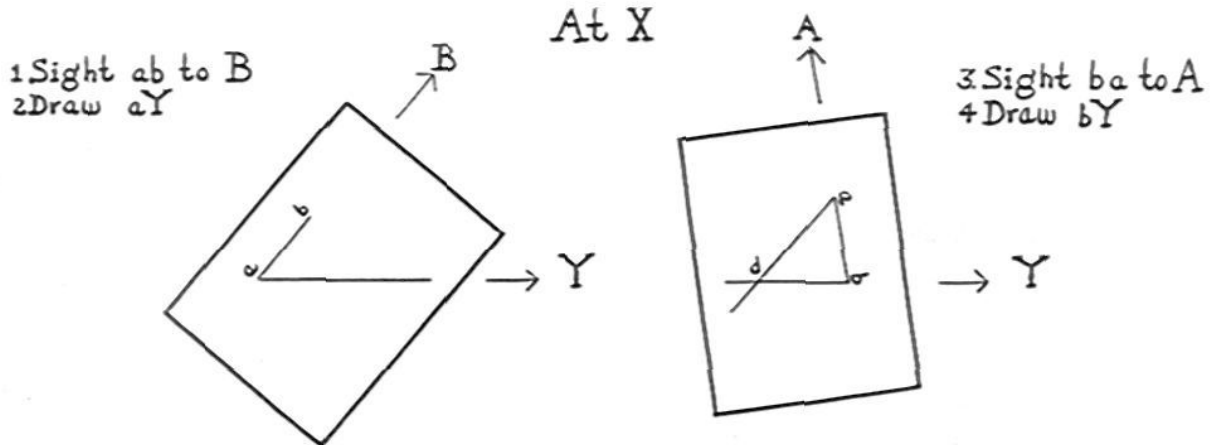
Through points *a*, *b*, and *p* construct a circle. Point *d* must be on a line running through *pc* and must be on the circumference of this circle. Why? The angle *dba* is by construction equal to angle *CPA* on the ground. And *cpa* on the board equals *CPA* on the ground. Now the line *pc* intersects the circumference of the circle at some point, which must be at the intersection of the line *pc* with the ray *ad* (see "1" above) because equal angles within a circle set off equal arcs, and both proceeding from *a* must set off the common arc *ad*.

Likewise, angle *dpb* equals angle *bad*. Both set off the common arc *bd* and therefore the ray *bd* (see "2" above) must intersect line *pc* on the circumference at the point *d*.

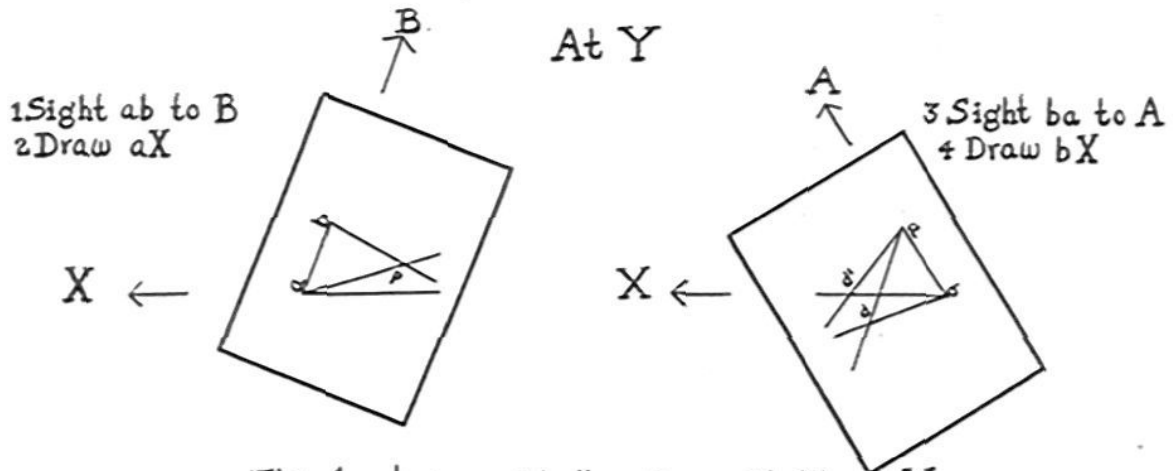
The rays *ad* and *bd*, then, intersect at a point *d* which is on the circumference of the circle constructed through *a*, *b*, and *p*. Also, this point *d* is recognized as being a point on the line *pc*.

Therefore, if *d* and *c* were known, it could be said that *p* would be somewhere along the line *dc*.



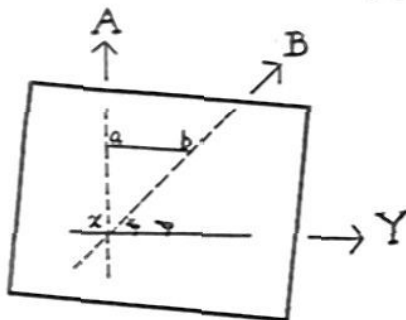


This locates a point d on line with X and Y



This locates a point d' on line with X and Y

At X & Y



Resection to locate x at Station X

- 1 If using two boards, the two stations exchange coordinates and plot d & d'
- 2 Join d & d'. x and y are somewhere along this line
- 3 Sight d'd to Y or d'd' to X which orients the board
- 4 At Station X locate x by the intersection of rays aA and bB on the line d'd. Locate y by similar operation at Station Y

be oriented by sighting along  $ds$  to  $C$  on the ground (here clamp the board).

$p$  could then be located by resection along the line  $dc$ , and this is exactly what was done in the previously stated Bessel procedure. Point  $d$ , then, is on the circumference of the same circle circumscribing the point  $p$  and the two sighted signals,  $a$  and  $b$ , and is also on the same line as the occupied position and the middle signal,  $c$ .

#### THE TWO-POINT, TWO-POSITION, TWO-STATION PROBLEM

It is evident, in regard to the Two-Point, Two-Position, Two-Station method, that the middle signal, when operating at Station X, is Station Y; and, when the board is moved to Station Y, Station Y is then the occupied position and Station X becomes the middle signal.

In moving the board from one station to the other, and in performing Bessel operations "1" and "2" at each, there will be had two points  $d$ . Let  $d$  be the point determined by rays at Station X and  $d'$  the point determined by rays at Station Y.

Now, when  $d$  is determined at Station X,  $d$  must be a point on a line running through the occupied point and the middle signal, now Station X.

Since Stations X and Y are alternately middle signals and occupied positions, the points  $d$  and  $d'$  must specify a line running through Stations X and Y and containing their chart locations  $x$  and  $y$ .

The board may be properly oriented, then, by sighting along the line  $dd'$  from one station to the opposite.

$x$  may now be determined by resection with the board at Station X.

$y$  may now be determined by resection with the board at Station Y.

\* \* \* \* \*

The limitations of this method are in general those of the Bessel Method, except that points  $d$  and  $d'$  must be sufficiently far apart to determine a true line, and the rays specifying  $d$  and  $d'$  must in intersecting produce sufficiently large angles to determine these points accurately.

If in resecting for  $x$  and  $y$  triangles of error are had, they may be solved in the usual manner.

#### SPECIAL NOTES

1. Points  $a$  and  $b$  need not be located on a map but may be arbitrarily chosen. This is an obvious advantage over the Bessel Method which requires three points located on the chart, as in this method the operator can set his own scale.

2. If accurate grids are available it is not necessary to move one board to the opposite station. Two boards may be used and coordinates exchanged.

3. If in moving from one station to the other the distance is paced or taped, the distance between points  $A$  and  $B$ , if desired, can easily be determined.

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#### FILM STRIPS

of interest to artillerymen, which have recently been released, include:

- 4-40—Orientation, Part VIII—Stellar Observations in the Southern Hemisphere
- 5-15—Mines, Part II—Hasty Mine Fields
- 5-23—Same, Part III—Anti-Personnel Mines
- 6-10—Field Fortifications for Field Artillery, Part I—Hasty Fortifications
- 6-11—Same, Part II—Deliberate Fortifications
- 6-12—Same, Part III—Protection Against Mechanized Forces
- 6-13—1st Echelon Maintenance—GMC 2½-Ton 6×6 Truck, Part I—Maintenance Before Operation
- 6-14—Same, Part II—Inspection During Operation
- 6-15—Same, Part III—Inspection After Operation
- 6-16—Same, Part IV—Scheduled Weekly Preventive Maintenance; Emergency Roadside Repairs
- 6-17—Subcaliber Equipment for Field Artillery Weapons, The 37-mm. Gun M1916 (subcaliber)
- 6-18—Field Artillery Weapons (revision of 6-8, *which has been declared obsolete*)
- 7-96—U. S. Carbine, Cal. .30, M1, Part II—Disassembly and Assembly
- 7-98—Same, Part III—Marksmanship, Known Distance Targets
- 9-97—Carbine, Cal. .30, M1
- 10-97—Messing, Part I—In Garrison, Sec. 1—Equipment and Cooking
- 11-7—V . . .—Mail
- 12-3—Military Discipline and Courtesy
- 17-22—Installation of Weapons in Combat Vehicles

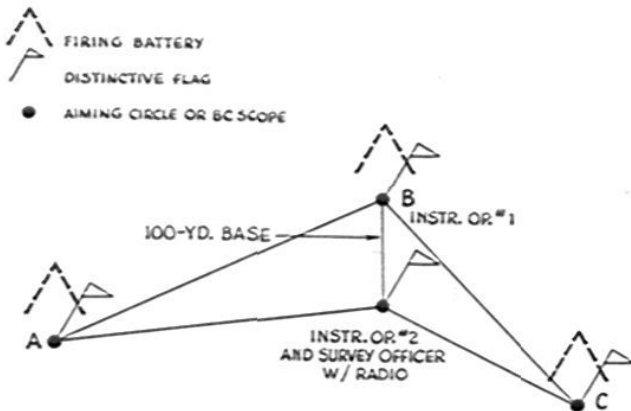
# OPEN-COUNTRY SURVEY

By Lt. J. M. Murdock, FA

1. *Required*—A fast, accurate survey.
2. *Assumed*—That a flag at the Executive Aiming Circle of both flank batteries can be seen from a position *near the center battery*.
3. *Solution*—Lay an Aiming Circle at each battery position parallel to the base line, and plot relative location of all batteries on firing chart.
4. *Example* — Battalion formation (schematic) is as follows:



*1st Step:* Survey Officer lays out a 100-yard orienting line parallel to the general direction of fire behind Baker. An Aiming Circle or BC 'scope is placed at each end of the line. The survey half-track has a tall mast with a flag; it is placed at the rear instrument. Instruments on the orienting line are laid by center battery's Executive Aiming Circle (center battery now laid on base direction), laying forward on battery's initial direction. For speed the Survey Officer is given a radio.



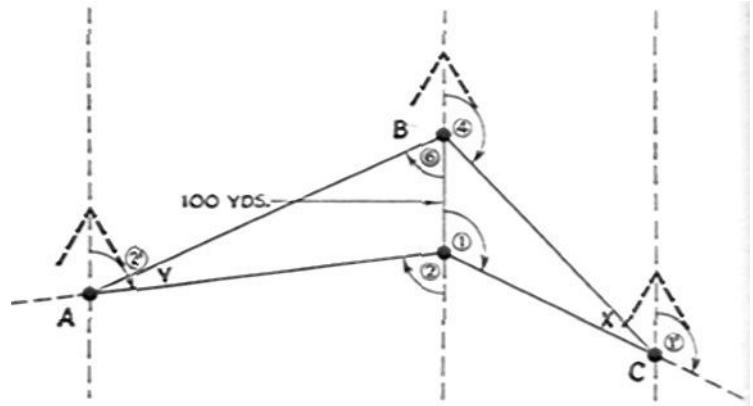
Instrument Operator No. 1 gets as close to the rear of Baker battery as possible without interfering with battery operation.

*2nd Step:* Angle (1) and angle (2) are measured. The Survey Officer immediately transmits them over the Battalion Fire Direction Net to FDC, Affirm, Baker, and Cast Batteries (without waiting to get distances). Affirm and Cast set off these angles on their Executive Aiming Circles and lay back on Survey Officer's flag. Each battery now has an aiming

circle laid parallel to the Base (or Orienting) Line, with which guns may now be laid. If battery is already laid when this data comes in, give computer the base deflection on which guns are laid.

(See Note 1.) All guns in the battalion are now parallel, laid in the base direction or thus computable.

*3rd step:* Instrument Operator No. 1 records angles 4 and 6 on a sketch and takes it to the Survey Officer, who uses this data (with that which he computed at rear aiming circle position) to compute distances to Batteries A and C. This



distance is found by referring to the Short Base Tables. In using the tables, angles (1) and (X) are needed to get the distance (DC) to Cast and angles (5) and (Y) to get the distance (DA) to Affirm. Survey Officer thus has the vertex angle (X or Y) and the angle adjacent to the side desired (1 or 5).

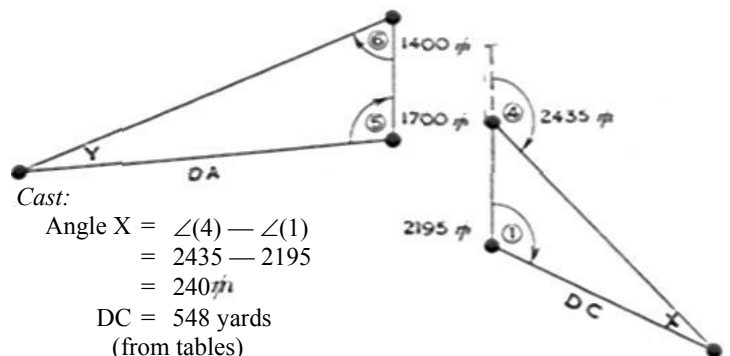
DIAGRAMMATICALLY

*Affirm:*

$$\begin{aligned} \text{Angle } Y &= 3200 - (\angle(5) \text{ plus } \angle(6)) \\ &= 3200 - (1700 \text{ plus } 1400) \\ &= 1000 \\ \therefore DA &= 1001 \text{ yards (from tables)} \end{aligned}$$

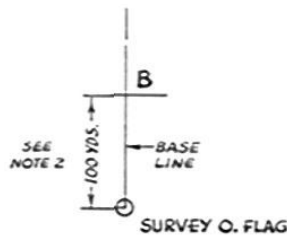
*Cast:*

$$\begin{aligned} \text{Angle } X &= \angle(4) - \angle(1) \\ &= 2435 - 2195 \\ &= 240 \\ DC &= 548 \text{ yards} \\ &\text{(from tables)} \end{aligned}$$



4th Step: Plotting (Scale 1/20,000).

- (1) Before data is received from Survey Officer, this is plotted:
- (2) Survey Officer transmits: NET FROM SURVEY:



- (a) Base Angle: Cast: 2195 mils Base Angle: Affirm: 1700 mils

(All Stations—ROGER)

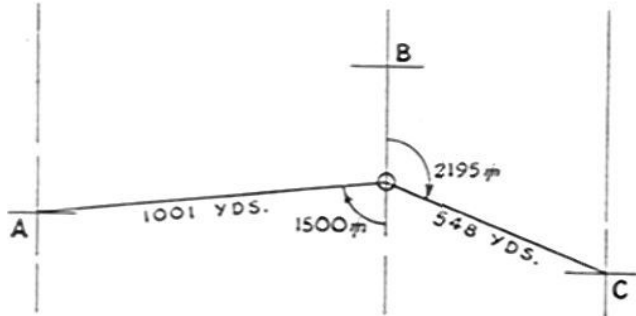
All stations can lay off these rays (in preparation for plotting battery positions) and draw parallel lines.

Later, Survey Officer transmits:

- (b) Distance Cast: 548 yards Distance Affirm: 1001 yards

(All stations—ROGER)

Batteries are now plotted in, and a line is drawn through each battery position parallel to the base line. Targets are plotted with reference to this line.

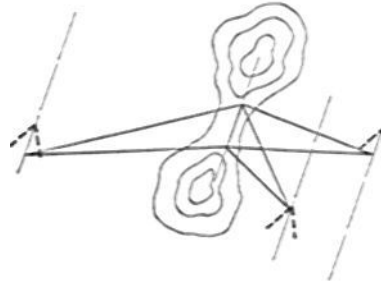


All batteries are now on the firing chart; each reports adjusted data as "Base Deflection Right (left) so much."

Note 1. Targets fired prior to receipt of survey direction may be plotted on chart by determining how much they are right (left) of survey direction. To do this, use an aiming circle with its 0-3200 line parallel to the Orienting Line and measure the deflection to a gun; have that gunner measure the deflection back to the aiming circle; the difference is the amount right (or left) of the survey direction by which the gun was laid.

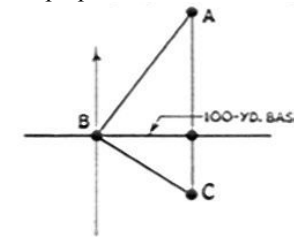
Note 2. If Survey Officer is unable to place his forward Aiming Circle close to Baker guns, a short traverse is run to Baker and its position is sent to FDC, Affirm, and Cast.

Note 3. If a crest intervenes, to keep from slowing up the action the Short Base Line is placed so that the instrument operators can see all three batteries. The Line (100 yards, or less) is run out, aiming circles set up, and angles read. Survey Officer reports what side the center battery is on.



Note 4. It is necessary to change direction of Short Base Line in case batteries are echeloned greatly in depth—it must be perpendicular to the direction of fire in order to properly read angles for entry into short base tables.

This is quicker and surer than having survey officer use trig methods to figure the distances. Base angles are measured and reported to Net in the normal manner.



## AWARDS OF ASSOCIATION MEDALS

Annual recognition is given by the U. S. Field Artillery Association to those R.O.T.C. cadets who best exemplify, in outstanding soldierly characteristics, the high standards of the arm. We extend heartiest congratulations to these young men:

Cadet Sergeant John Sherrard Brittain, Yale University; Dean's list; member freshman lacrosse team, Zeta Psi, Yale Dramat, Book and Snake.

Cadet Lieutenant Colonel Dale E. Butz, Purdue University; member Scabbard and Blade, Alpha Gamma Rho, Sigma Delta Chi (honorary journalistic), Alpha Zeta (honorary agricultural); managing editor, Purdue Experiment School paper.

Cadet Sergeant Major James H. Goatley, Jr., Texas A and M.

Daniel Joseph Perrino, University of Illinois; Connor Cup, 1942; first class gunner; lieutenant, Pershing Rifles; captain, Scabbard and Blade.



John S. Brittain



Dale E. Butz



Northern Tunisia



# 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

## TUNISIA (February 17 to March 19, 1943)

At the beginning of this period the Axis had completed the first phase of an offensive which had started on the 14th at Faid Pass, in central Tunisia. This had secured to the enemy three small towns—Sbeitla, Kasserine, and Fériana; these three places lay in the same valley, and the Americans who had occupied them withdrew to the high ground on its northwest side.

On the same date the British First Army was in north Tunisia, on a front inactive except for normal patrol activity. The British Eighth Army in the south was closing in opposite the Mareth Line held by the enemy and believed to be well fortified. There was no special activity in this sector either.

Allied Headquarters' estimate of the situation was that the enemy's recent offensive had aimed to widen the "corridor" (along the east coast of Tunisia) which united the north and south Axis forces. He was believed to have used about two armored divisions against the Americans, who had had a considerably lesser armored force. These had enabled him to gain a local advantage.

The enemy did not renew his attack on February 18th. He appeared to be consolidating his position, especially around Kasserine. From here the only road in the area worthy of the name extended through the Kasserine Pass and on to Tebessa, a railhead and important road junction about 60 miles away. Reconnaissance indicated that the enemy's artillery was in part being displaced forward by tanks, presumably on account of a shortage of artillery tractors. A raid by French troops in the Pont du Fahs sector secured between 40 and 50 prisoners, and brought out reports that nothing unusual was being prepared in that area. Other reports stated that enemy troops from Gafsa had advanced and occupied (without opposition) Mètlaoui, Tozeur, and Nefta.

On February 19th the Allied line in the Ousselat valley was withdrawn to the western side to conform to the line further south. In the afternoon two small enemy attacks occurred, one near Sbeitla and the other near Kasserine. Each attack was made by a force estimated as about one battalion with a few tanks, and each was supported by artillery fire. Neither attack was pushed hard. Our own

artillery fire disabled a number of hostile tanks and self-propelled guns.

Kasserine Pass was held by American engineer troops. They had planted a mine field in their foreground, which the enemy had not yet reached. American infantry held the hills on both sides of the Pass. The entire position was reported as strongly held. Although the general situation was considered as satisfactory, as a precaution the Allied command ordered British armored troops and infantry moved south, to be concentrated by night of the following day in the vicinity of Thala, in rear of the American left flank.

During that night enemy planes dropped flares over the Kasserine Pass mine field. Patrols then moved in and managed to explode many of the mines. Between 0300 and 0600 the enemy's artillery swept back and forth through the mine field and exploded more mines.

At 0800 on February 20th the enemy commenced an artillery preparation against Kasserine Pass positions. It was very heavy, from 88-mm. and 150-mm. batteries. At this hour the enemy's OPs, on the hills on his side of the valley, had the sun behind them so his visibility was excellent. Later, enemy tanks appeared in front and advanced a certain distance. Under this demonstration two battalions of enemy infantry worked up gulches which were defiladed from the view of the American OPs and slowly infiltrated among the forward American positions, constantly covered by their own artillery. By 1500 the pass had been won.

Enemy armored troops now dashed through the pass, and turning right and left got in rear of the infantry who had been holding the high ground north and south of the pass. This infantry withdrew, but lost heavily in doing so. The enemy followed; by night he was several miles west of the pass, the Americans withdrawing along the road to Tebessa.

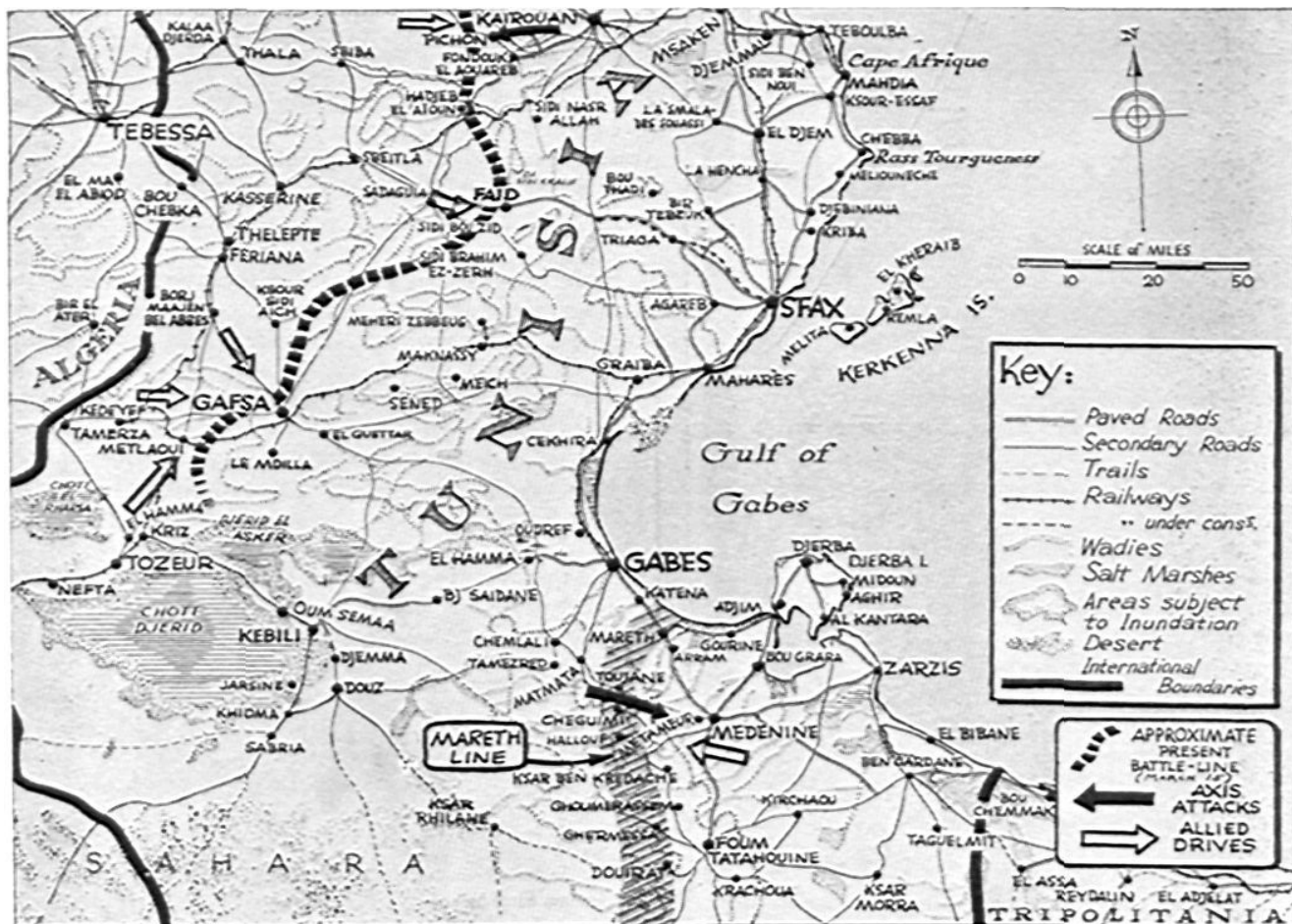
At the end of the day the British reinforcements had assembled in the Thala area and at once formed a line facing south. They received American artillery to support them, having none of their own with them. During the day enemy reconnaissance near Sbiba had been repulsed.

On February 21st the enemy, identified as all German, made two attacks: one to the north toward the British covering Thala, and the other westward toward the Americans covering Tebessa. By moonlight at 0300 the north attack made contact with the British advance posts. This attack was stopped by American artillery fire and British tanks before noon, about 6 miles south of Thala. The Germans renewed their attack during the afternoon, and advanced to within 4 miles of Thala before being stopped again. They lost about 18 tanks out of about 40, mostly from artillery fire, and after dark withdrew.

The attack toward Tebessa was made in two columns, each supported by about 10 tanks. One column advanced astride of the main road; the other was parallel to it but 4 miles to the north. The intervening country being nearly flat, treeless, with only occasional native huts, communication between the two columns was assured. This double attack was brought to a stop by artillery fire after it had advanced 10 miles. It was then counterattacked by American armored troops, supported by their SP batteries and antitank guns. A very confused battle moved back and forth across the flat ground. By afternoon the advantage passed to the Americans and the enemy withdrew. He took positions covering the west exit of Kasserine Pass. Our air force reported destroying 10 enemy trucks during this battle.

Around the west exit of Kasserine Pass fighting continued all through the 22nd. Both sides made thrusts, and neither side had its positions changed materially. Next day the enemy shortened his lines by withdrawing closer to the pass. Early on the 24th the air force reported that night reconnaissance had shown the roads from Kasserine Pass to Kairouan, Sfax, and Gabès full of enemy motor vehicles running with lights on. This was clear indication that the enemy was withdrawing, but not sufficient to determine the direction of his main force. A rear guard of Italian troops held Kasserine Pass during the day, and then in turn withdrew during the night 24/25 February. On the following morning American troops reoccupied the pass. The enemy formally announced in his communiqué that his central Tunisia operation was over; he claimed that he had taken almost 4,000 prisoners and destroyed or captured 23 tanks and 169 armored cars belonging to the Allies. It was granted at Allied Headquarters that the enemy had captured, and would presumably convert to his own use, more tanks and armored vehicles than he had lost.

It soon appeared that the enemy's withdrawal from the Kasserine operation had been with a view of commencing a new operation in north Tunisia, south of the Mediterranean coast. This developed very quickly, starting on February 26th, indicating that the enemy was







able to move troops rapidly from one sector to another. The day opened with rain, wind, and mist; visibility was very bad, air reconnaissance difficult and unsatisfactory. Roads were deep in mud, and movement of motor vehicles off roads was impracticable in many places.

Three operations developed, all at the time believed to be minor ones:

- (1) About 1 battalion of Germans attacked westward from the vicinity of Mateur toward Tabarka;
- (2) About 1 battalion, plus 30 tanks, attacked from vicinity of Mateur southwestward toward Beja;
- (3) About 2 battalions of paratroops (acting as infantry), plus 20 tanks, attacked westward from Bou Arada. A supplementary column attacked in connection with about 1 battalion of infantry, westward toward El Aroussa.

All enemy columns had artillery and air support. All columns were checked after making only slight advances, except (2). This column reached Sidi Nasir, about 15 miles northeast of Beja. The enemy lost 7 tanks, against a reported loss of 1 British tank. About 400 German and Italian prisoners were taken.

On February 27th the enemy renewed all attacks and also attacked around Medjez-el-Bab, held by French troops. All enemy attacks were held, the British making a counterattack in the north which netted them over 300 prisoners. The French also counterattacked and took 150 more prisoners, making a total of 850 in two days.

February 28th the north enemy attack (1) appeared to have 2 infantry battalions in line; this force infiltrated around Sedjenane (held by British troops) in the vicinity of Cape Serrat, but this movement was not believed to be serious. Attack (2) toward Beja had considerable artillery support; although the Allies made eight air attacks against it, it

succeeded in advancing 3 or 4 miles beyond Sidi Nasir. The attack in the south near Bou Arada seemed to have stopped.

A new attack developed. Moving south from the Mateur—Beja road and covered by attack (2), enemy infantry, reported as mounted on native mules and donkeys, moved south and established themselves on the hills overlooking the road Medjez-el-Bab—Beja. Using artillery, they interrupted traffic on this road and commencing the following night enemy patrols planted mines in the road so its use became impracticable. British artillery shelled this force and British attacked it in rain and wind but failed to clear the road.

The enemy renewed his attack on Medjez-el-Bab from both south and east. His east attack penetrated the French lines, but was forced out later. British overthrew the south attack by catching the advancing infantry in a gulch; they then moved against the enemy's flank east of Medjez-el-Bab, which thereupon withdrew.

Light fighting took place during the next two days, the enemy attacking Sedjenane, which he had gradually partly encircled, also toward Beja and around Medjez-el-Bab, again securing local successes. On the 3d more serious attacks developed around Sedjenane, by a force estimated as about a weak battalion plus armor, artillery, and air forces. The enemy (after being repulsed once) reached the edge of Sedjenane, which is just a small village, and stayed there. The other attack toward Beja also gained ground, and the enemy continued to consolidate and build up his positions just north of and parallel to the Medjez-el-Bab—Beja road. Enemy communiqués claimed that this north offensive had, since February 26th, captured 2,110 prisoners, 18 tanks, 50 other armored vehicles, and 37 guns.

On March 4th a new battalion of British infantry counterattacked around Sedjenane and found the enemy within the town. Street fighting followed, resulting in the enemy's ouster. While this fight was in progress, Axis troops circling around cut off another British battalion, which then left its place in line and successfully fought its way back to a new position.

Allied reports for the 5th state that the enemy's offensive was petering out and that there was no danger. The front line on this date ran from Medjez-el-Bab in almost a straight line to Faid Pass (held by enemy), thence southwestwardly to Gafsa (also to enemy). American troops had occupied Sbeitla and Sidi-bou-Zid without opposition. The weather was still rainy and air activity much reduced. About a battalion of the enemy made a minor attack along the road to Beja but failed to gain ground.

On March 6th the enemy renewed his attack on Sedjenane and penetrated into the village. After some bitter fighting the British ordered the place abandoned as not worth the casualties it was costing. By night German troops had advanced 7 miles beyond, the British withdrawing to a position covering Tamera. On the Beja road the enemy also pushed forward and at night was 10 miles from that place.

Weak attacks were made against the Tamera position on the 8th and 10th, apparently for reconnaissance purposes. The enemy made a full attack on March 17th and captured the place, the British withdrawing some 3 miles to the southwest. At this date the enemy had by a series of operations, each small in itself and none attracting any special attention, forced the British left back on the Mediterranean coast for about a 15-mile gain. The north Allied flank now runs from the Mediterranean near the Algerian border, past Beja, to around Medjez-el-Bab, giving a line facing nearly northeast. At Medjez-el-Bab the line turns abruptly south, making an acute angle.

\* \* \*

On February 20th General Sir Harold L. G. Alexander (of the British Army) assumed command of all Allied forces in Tunisia, consisting of:

**in north Tunisia: British  
First Army U. S. II  
Corps French Corps  
in south Tunisia: British  
Eighth Army Fighting  
French Detachment**

General Alexander was to act under the direction of the American General Dwight D. Eisenhower. General Alexander announced "We must stabilize this front and evolve a plan of campaign."

Without discussing at this time the plan of campaign that was evolved, events in connection therewith were as follows.

The front in the north was stabilized as nearly as possible by opposing the enemy without undertaking any major

operations. Temporarily the British Eighth Army was opposite the Mareth Line—which extended from the town and swamp of that name on the Mediterranean coast southward along a line of hills. Constructed by the French, this line consisted of concrete emplacements and pill boxes, with a depth of about 6 miles and along a front of some 40 miles. When the Axis occupied it it had been completely dismantled. However, the Axis had at least three months to reestablish the line.

No operations other than patrol activities occurred in this sector until March 6th, on which day the Axis undertook an operation described quite differently by the two sides. Two thrusts were made by Axis forces: one from the vicinity of Toujane (13 miles southwest from Mareth and about 20 miles from the coast), the other from Wadi Hallouf (12 miles further south). According to Axis accounts these were reconnaissance forces which penetrated the British front and arrived deep within British rear areas. According to British accounts these were attacks intended to defeat the Eighth Army. Both attacks were preceded by a very strong artillery preparation designed to open a gap in the British front line through which armored troops could pass. As nearly as can be determined the artillery preparation did open gaps, and Axis tanks rushed through. According to a General Order of the Eighth Army no attack had been expected, and possibly the Axis secured some initial advantages. According to Axis accounts this operation ended the day it commenced; British accounts state it continued on through the next day. The Axis lost about 40 tanks, while none were lost by the British. All the Axis tanks were Mark IV or older models.

On March 7th Allied Headquarters estimated that the enemy had rushed 300 tanks and the cream of his infantry and artillery to the south, with a view to defeating the Eighth Army. How this estimate was arrived at is not known, since the Eighth Army's orders are clear that there was no advance information as to any enemy offensive. No further enemy attacks developed in this sector.

The American troops were grouped by General Alexander in the south-central part of Tunisia. About the middle of the month they started a movement along the general line Fériana—Gabès. On March 17th the advance elements arrived at Gafsa, which had been occupied by Italian troops. Without offering opposition these withdrew to El Guettar pass. This pass is about 6 miles long, and due to recent heavy rains was boggy and difficult for motor vehicles to traverse. Italians were observed fortifying the entrance. Our troops moved north of this pass, and as this paper closes had on March 20th arrived near Maknassy, still without meeting opposition.

\* \* \*

According to a report from Sweden, on February 24th Marshal Rommel assumed command of all Axis troops in Tunisia, including those of Colonel General von Arnim around Bizerte and Tunis. Swedish reports have not been very reliable, but this one is probably true as it

would be the sensible thing for the Axis to do. The assumption of command probably occurred earlier than the date given. It seems certain that there is but one Axis command in Tunisia, under a single commander, and that Axis troops move rather freely from one sector to another. At least one of Marshal Rommel's Panzer Divisions which served in Egypt has been in north Tunisia, and the disposition of Axis troops appears to change frequently.

According to reports from Allied Headquarters the Axis has been reinforcing its troops in Tunisia steadily, which would preclude the idea that it intends to evacuate that country or that it considers its position therein as utterly hopeless. Damage is being done to Axis ships sailing from Italian ports to Tunis, but convoys are still operating. Loss of ships is estimated as from 25% to 35%, but these figures are doubtful. Much traffic now moves in motor barges, which are convoyed by naval and air forces. The distance from Italy is short, making it possible to stay in port during stormy weather, and barges are relatively quickly replaced. Personnel move chiefly by air; there is some loss here too, although apparently not a serious one.

On its part the Axis more or less regularly attacks Allied convoys going to or from Tripoli on the east and Algeria on the west. In one month the claims are that 5 transports

were sunk in or near Algerian ports, and 3 off Tripoli; several others were stated to have been damaged. Assuming that these reports might be correct, the number of ships lost would not seriously inconvenience Allied supplies.

Allied air attacks are constant by both day and night. Special attention has been given to bombing the harbors of Palermo and Naples, the two main Axis bases. Damage has been caused, and in some cases a considerable number of casualties occurred. British planes based on Malta and American and British planes from Tripoli take part in raids, as well as planes from Tunisia and Algeria. Lately much attention has been given to attacking railroads in south Italy and Sicily, with special regard to disabling locomotives. This is the same policy as is being followed in other theaters of operation. Both sides bomb each other's airdromes in or near Tunisia. In general air activity is increasing.

Axis artillery in Tunisia seems to be increasing, and to be relatively stronger in comparison to infantry strengths than in the American service. It is reported as being very accurate, and unfortunately very efficient. Good reports have been received as to the results obtained from American 105-mm. and 155-mm. batteries.

## COMING INVASION OF EUROPE

On January 24th the President of the United States and the Prime Minister of Great Britain, with the chiefs of their ground, air, and sea staffs, concluded a 10-day conference held at Casablanca, Morocco. A statement issued at the close of the conference has since been supplemented by speeches delivered by Mr. Churchill in London on February 11 and by Mr. Roosevelt in Washington on the 12th.

From these it appears that the conference determined the part to be played by the Americans and the British in conducting the war during the balance of 1943. As Mr. Churchill later explained that the staffs (in both London and Washington) were hard at work developing the details of the conclusions reached, the latter were doubtless the result of the ten days' deliberations and not a mere approval of plans previously drawn.

Russia, although it had been invited, was not represented at this conference. It is therefore reasonably certain that the conference made no plans as to the conduct of the war in Russia, other than to assure that supplies would be sent in quantities both practicable and desirable. To enable this to be done, plans were made to suppress the submarine nuisance—which unfortunately still takes a certain toll of ships, cargoes, and especially of trained seamen. It is known that the enemy is building submarines at what seems to be a constantly accelerating rate and is maintaining important bases for

them in west Europe and in the Mediterranean. The measures to be taken to reduce losses include air attacks on ports where submarines are built, air attacks against their bases, and naval protection for the direct covering of convoys.

The conference also decided to make the major war effort this year against Germany; apparently only secondary attacks are to be made against Japan until Germany has been overcome. The attack against Germany will be by an invasion of Europe. President Roosevelt announced that at least one invasion would be against South Europe, with North Africa as a base, and that other invasions would also occur. Driving Axis forces from Tunisia would be a preliminary operation, to clear all of North Africa of the enemy and enable convoys to move freely the entire length of the Mediterranean Sea.

The presence of the enemy in Tunisia does interfere with east-west traffic along the Mediterranean. It is not, however, absolutely essential that this enemy fortress be reduced before an invasion of South Europe is commenced. From bases in Algeria it would be possible to invade South Europe west of Italy (including the large islands west of Italy), regardless of whether or not the enemy held Tunisia. Similarly, Europe east of Italy could be invaded from newly acquired bases at Tripoli, Bengazi, and other points, in spite of enemy forces in Tunisia. If, therefore, Tunisia holds out for an unexpected

length of time, the invasion or invasions may proceed anyway.

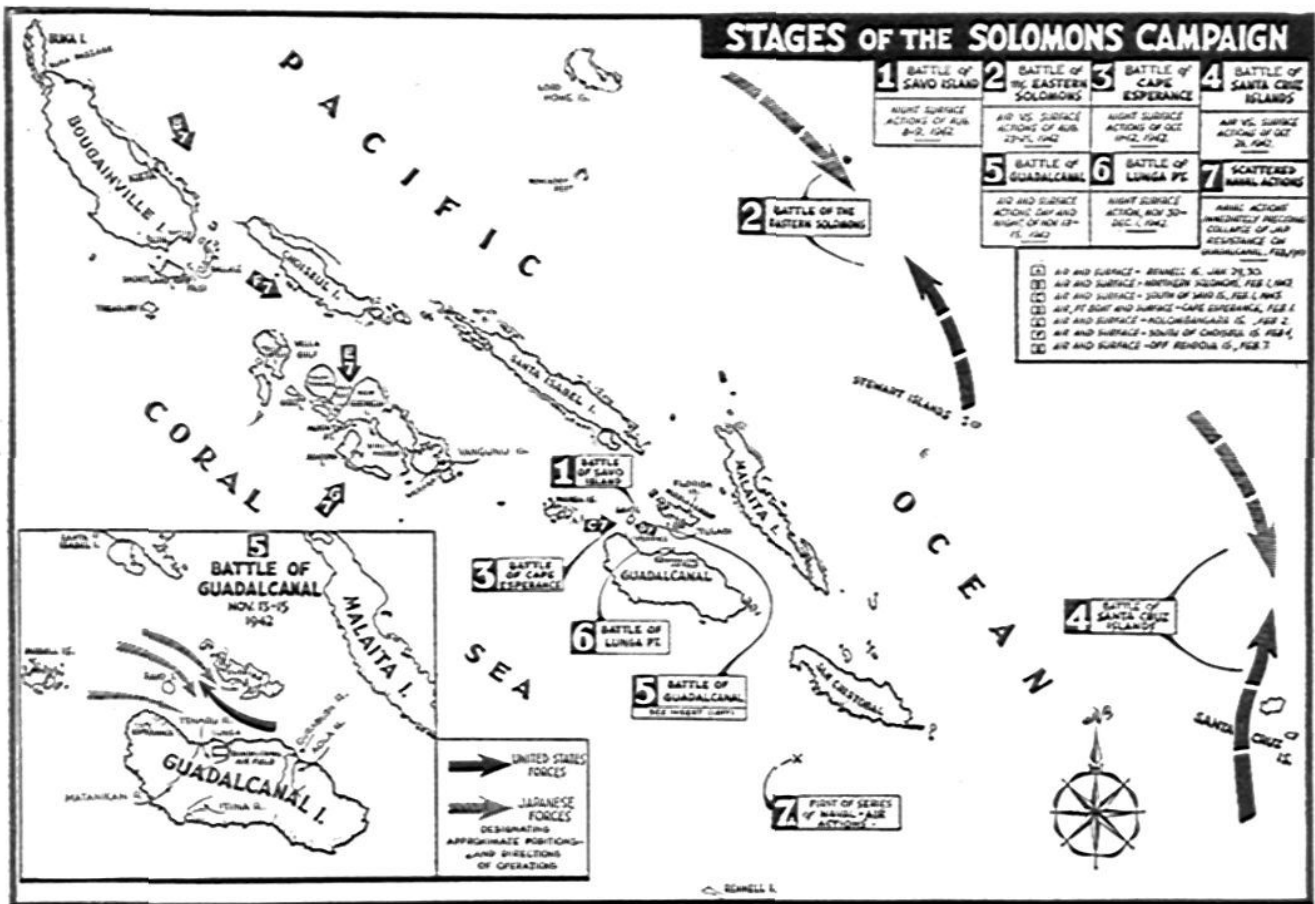
It would facilitate invasions of southeast Europe if Turkey should actively join the United Nations. This would make the Dardanelles available to the Allies, and also open an inestimably valuable all-water route to South Russia.

In West Europe, there is Norway in the north. Norway is of great value to Germany: it affords bases for submarines and air forces which attack convoys en route to and from North Russia. Capture of Norway would safeguard this line of supply and cut off at least part of the iron ore traffic which, originating in Sweden, moves to Germany via Narvik. The Germans are constructing both a road and a railroad to Narvik, but latest information is that when winter stopped construction work neither was completed and would not be until autumn of 1943. In the meantime Narvik is partly isolated from German forces in south Norway. Some copper and nickel, considerable lumber, and a large amount of fish goes from Norway to Germany. These would all be lost if Norway was occupied by the Allies. With Norway back within the United Nations fold it is very possible that Sweden, which is now nearly surrounded by the Axis, might join the United Nations. This would certainly cut off the important ore traffic to Germany, and would open a direct route to Finland and to North Russia.

An invasion of Denmark would give access to the Baltic Sea, and also enable Sweden to be reached. Denmark is connected to Germany by a peninsula only about 40 miles wide, so an invasion force would have only this length of front to protect.

There are numerous possibilities for the invasion of France and the Low Countries. Available evidence indicates that the inhabitants of these countries are overwhelmingly in favor of the United Nations and can be counted upon to actively assist our troops if they once land. Against this advantage the enemy has had a long time to prepare his defense of the coast line. And back of the coast he has an excellent system of roads and railroads to enable rapid concentration of troops. Any invasion of this coast would not for some time materially interfere with the enemy's economical situation, and he would be able to fight a rear guard action over ground which was non-German.

The strategical situation, and the declarations of President Roosevelt and of Mr. Churchill, indicate that during 1943 there will be several invasions of Europe at the same time, at locations which are naturally secret. The winter season in North Africa ends in February, and in West Europe when March goes out. Invasions can be made in any kind of weather, but favorable weather helps materially—and this will be generally prevalent from April 1st until next October.



# SOUTHWEST PACIFIC (February 20 to March 20, 1943)

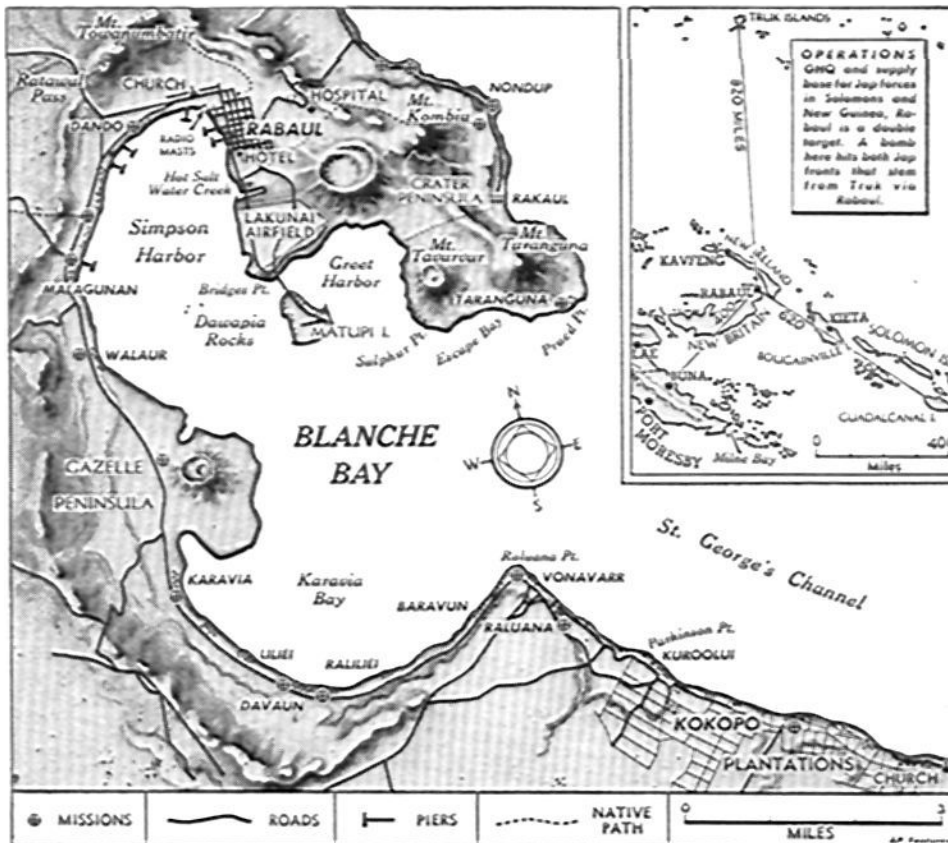
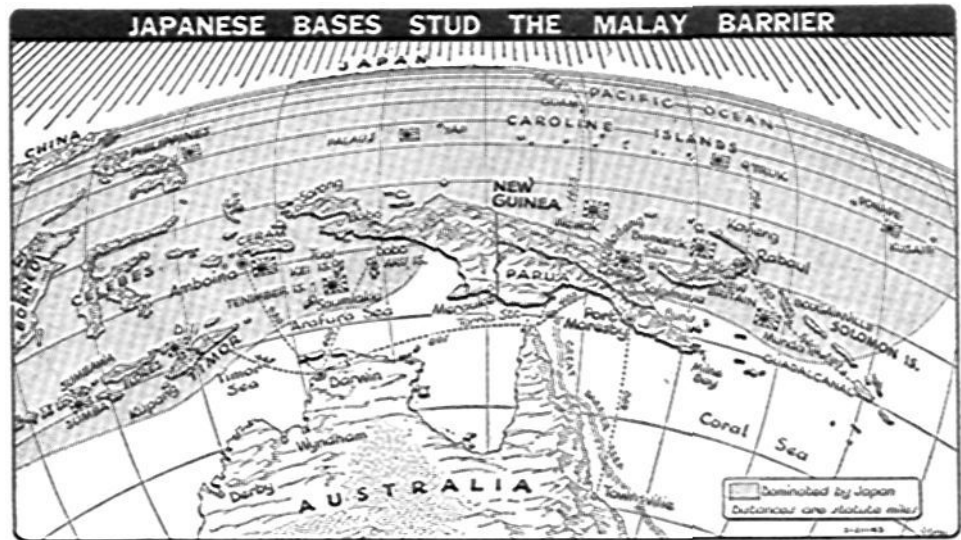
No land operations of importance have occurred. Minor operations are taking place in north New Guinea, where American and Australian forces (following their successful ending of the campaign against Buna) are advancing toward Northeast New Guinea. Several patrol encounters have occurred.

During the three days 2 to 4 March, an enemy convoy en route westward from New Britain was attacked by an Allied force of 136 planes. The convoy was understood to be transporting parts of the Japanese 20th and 51st Divisions, plus some service troops. The entire convoy, reported as 12 warships as escort and 12 transports, is reported as sunk. All life boats and rafts were subsequently sunk, and of 50-odd survivors reported as reaching land all were killed except 5 known to have escaped. Jap troop loss is estimated as 15,000 men. In securing this result the report states that 226 tons of bombs were used, making 80

hits and 63 misses. The enemy had 150 planes, of which 102 were reported as shot down. Allied losses were 1 bomber and 3 fighters, plus a considerable number of planes damaged but which returned to their bases.

From the foregoing report it appears that approximately 56% of bombs dropped were hits. For 24 targets, an average of nearly 3½ hits per target were made. From the tonnage given, the average bomb weight was 1½ tons, making slightly over 5 tons dropped on each target, on an average. The Japanese have only admitted the loss of 3 ships and 6 planes in this battle.

Numerous reports seem to prove that the enemy has been steadily increasing his strength in the string of islands extending from Timor via Amboina and New Guinea to New Britain and the Solomons. New airfields, wharves, and buildings indicate increased garrisons. Numerous transport arrivals and departures, exceeding what would seem to be necessary for simple supply purposes, have been observed, particularly at Amboina and New Britain. Enemy air activity has increased since the end of February and many raiding parties have visited Allied bases (including Port Darwin and Guadalcanal) at much more frequent intervals.



The purpose of this increased enemy activity is not known. Australia has been worried, fearing that these preparations presage an attack upon her. Australia is aware of the decision made at Casablanca last January, that the initial mission of the united American and British forces is the overthrow of Germany. This would preclude any march to Tokio at this time. Australia is in full sympathy with the announced program but feels that more forces should be sent to the southwest Pacific.

A Japanese invasion of Australia with the object of conquering that country would be most difficult. The north part of Australia has only a few scattered settlements, none of them important except as affording air bases to the Allies to protect themselves and to further a march toward Tokio whenever it occurs. It would be possible for the Japanese to attempt to occupy these air bases, but there is no real information that she intends to do so.

Japanese air and submarine activity has extended east of Australia to the American naval and air base at Espiritu Santo Island, in the New Hebrides. This may be a precautionary measure. The same may be said as regards the increased enemy activity in the central Solomons, where new and enlarged bases have been growing.

Against these enemy movements a very active Allied system of air attacks has been in progress. The enemy's posts are visited frequently and bombed most heavily. Rabaul, which appears to be his main base in New Britain, is attacked almost nightly. Japanese bases in the Solomons are attacked practically daily, and often several times a day. There is no corresponding Japanese air activity and the losses of American and Australian planes have been so small as to be almost negligible. The enemy is being very closely watched, and it would seem to be impracticable for him to initiate any major expedition without ample notice being had in advance.

## SOUTHEAST ASIA

For some months a British force has occupied the ridge line east of the Mayu River and west of the Kaladan River, from above Rathedaung to the sea. The Mayu River enters the Indian Ocean at the town of Akyab, on a peninsula on its left bank; this peninsula has been wholly in Japanese hands.

About March 5th Japanese troops commenced to infiltrate around the left of the British position, about 20 miles north of Rathedaung. Heavy fighting started on the 8th and continued at intervals until the 14th, when the British curved back their left. The Japanese renewed their attacks on the next three days, extending the active front to a point about 12 miles north from Rathedaung. This resulted in a further British adjustment on the 17th. Fighting is still continuing in this area.

In north Burma British guerrillas have been active. A Japanese expedition moved north from Myitkyina against them on February 21st and operations continued until

March 16th. According to British reports the guerrillas disbanded before this force and reassembled after it left. Their activities are limited to small harassing expeditions.

American and British air forces based on India are very active over Burma. Special attention has been paid to destroying railroad communications by attacking bridges and locomotives, with secondary consideration to road and river traffic. Since the fighting started around Rathedaung these raids have diminished, the air forces being engaged in aiding the ground troops and attacking villages known to be occupied by the enemy. There has been considerably less Japanese air activity, and no enemy raids of importance.

The American air force based on Chungking has aided in operations by raids on the south end of the Burma Road and over Indo-China. This too pays special attention to disrupting the enemy's lines of communication.

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### HAVE YOU TRIED

using high-angle fire (above 800<sup>m</sup>) for greater *effect*, not just to reach behind masks? Experiments show that with "normal" fire (angle of impact of 300-odd mils) as much as 20% of the weight of the shell remains in the crater—a dead loss. On the other hand, when high-angle fire is used at the same range only 0.4% of the shell's weight stays in the crater! Of course, time of flight is increased considerably when high-angle fire is used and other vagaries are introduced, but in some cases this may be of comparatively little importance compared with the greater effectiveness of the burst.

# If Ordered to the Armored Force

By Col. W. F. Millice, FA

A great many OCS graduates (as well as older officers) reporting to the Armored Force for the first time have a faulty conception of the Field Artillery in the Armored Force. Among their beliefs are:

- (1) Crossed guns on collars are changed to tanks.
- (2) You shoot when you see the whites of their eyes.
- (3) Armored Artillery fires battalion concentrations at 35 miles per hour (even faster before rubber conservation).
- (4) In short, 100% change.

In order to dispel the above ideas as well as others not mentioned, the following notes are given in a desire to assist the new Field Artillery Armored Raider.

Armored Artillery enlisted men wear red piping on their caps. Batteries carry red guidons. Officers wear the conventional crossed cannons similar to all Field Artillery, except that the number is omitted from the upper crotch.

The three prime requisites of Field Artillery, since the days of Hannibal's catapults, have always been Fire Power, Mobility, and Communication. Armored Artillery merely magnifies each of these basic requisites.

Fire power of each Armored Artillery unit is over 50% larger than that of other Field Artillery units, the battery employing six 105-mm. howitzers. Because of the mission to support tanks and motorized infantry, more small arms and close defense weapons are found in Armored Field Artillery—less protection can be expected from the supported troops. Over 95% of the fire delivered will probably be indirect from defiladed positions. In short, the only change for each Armored Artillery man is the greater fire power he must direct.

In supporting tanks and motorized infantry, the Artillery must have mobility. This does not include peeps and jeeps with wings and propellers. It does include vehicles capable of great cross-country mobility, able to change position rapidly. Self-propelled artillery is the logical answer. This artillery offers close support to the advancing tanks and their ground-holding, entrucked foot-soldiers. Continuous support is offered by usual Field Artillery forward observers and liaison methods, the only difference being more frequent changes of position by both observer and battery because of the mobility of the supported troops.

For the information of the uninitiated tank battles are a combination of fire and movement with many repetitions of the sequence *stop, shoot, and move*. And this movement is at only a very small fraction of 35 mph. Most artillerymen have fired at moving targets and noted the difficulties of such fire; add to this a movement of the gun,

and even the uninitiated can see why self-propelled artillery and tanks stop to fire at all targets more than a foot from the muzzle. Ammunition weighs too much to waste it in doing the spring plowing.

Who said the Armored Artillery used no surveys or observed fire charts? Certainly both are used — and probably to a greater extent than by other artillery. Methods involving hours to build up such surveys are *not* used, however. The frequent changes of position do not give instrument details three or four hours of daylight "the day before." Each battalion may occupy five or more positions tomorrow. The tanks you support have not yet chased the enemy from these five positions, and the enemy now occupying them do not welcome survey parties in daylight the day before. Rapid survey methods are the answer, in order that accurate support of several six-gun batteries can assist the Tanker forward *now*. The Tanker can not dig fox holes for his tank, and when he needs help it is now and in volume, not next week or in small quantities. The basic fundamental in mobility is now, was, and ever shall be training of drivers in maintenance, operation, and capabilities of their vehicles.

Armored Artillery communications must be keyed to the mobility and fire power outlined above. Since mobility keeps the artillery S-3 map changing so rapidly, all pins (as well as red and blue pencils) are mounted on rollers. Radio communication is therefore, of necessity, more used than in other artillery. Wire, visual, and runner (both mounted and dismounted) are not neglected, however, because the message must go through as every artilleryman well knows.

It is hoped the foregoing will help dispel some of the embryonic Armored Artilleryman's erroneous mental cerebrations. S.O.P. for all artillery is to use all fire power, mobility, and communications by sound methods. S.O.P. for Armored Artillery is the use of *all* fire power (plus), mobility (plus), and communications (plus) by any and all sound methods.

If you are ordered to a newly organized armored unit you and all artillerymen so assigned are eligible as instructors in basic artillery subjects in gunnery schools operated for tankers. Good, well rounded artillerymen take these additional duties in their stride. These instructors, in preparation, restudy their fundamentals and learn a few new commands to replace such age-old artillery commands as *Fall out One* (FM 23-7, par. 72).

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*If ordered anywhere give us your change of address!*

# SEPARATOR FOR SEMI-FIXED SHELL

By Capt. Eugene W. DeMoore, FA

When the executive of a 105-mm. battery receives a command for other than Charge 7, two cannoneers per section start to wrestle. Not with each other, but with a round of ammunition. One at the base of the cartridge case and the other on the projectile, they pull and tug, wrestle and sweat. Projectiles get pulled off-center and jam. Cartridge cases are deformed so their projectiles either won't go in again or fit too loosely. In any case, from 3 to 5 minutes are generally needed for separation of projectile from case, removal of unneeded powder

increments, and reassembly of the round. And the situation is even worse in cramped quarters, as in the M7 SP 105.

All this hurly-burly can be eliminated by use of a quite simple device. The one here described is now being processed for patent purposes—but of course the patent laws permit any person to duplicate *for his own use* any patented article, the restriction being only that he must not sell his copy, or rent it, or in any way make a profit on it. Besides which, I'd be glad to have any and all outfits make use of this one. It really works.



Figure 1

In essence, this shell separator is a stand reminiscent of the umbrella stands formerly found by the front door of most homes. (See Fig. 1.) Its base has a circular depression (lower guide ring) the size of the rim of a 105-mm. shell casing. In use, the base of the shell stands in this cup just as the umbrella tip dropped into the bottom of the old stand, except that here the fit is much snuggier. Movable clamps affixed to the base hold the casing in place (see Figs. 2 and 3); these might be termed the hold-down yoke.

Behind the depression, a column 20 $\frac{1}{4}$ " high is attached to the base. To its top is attached an upper guide ring, a

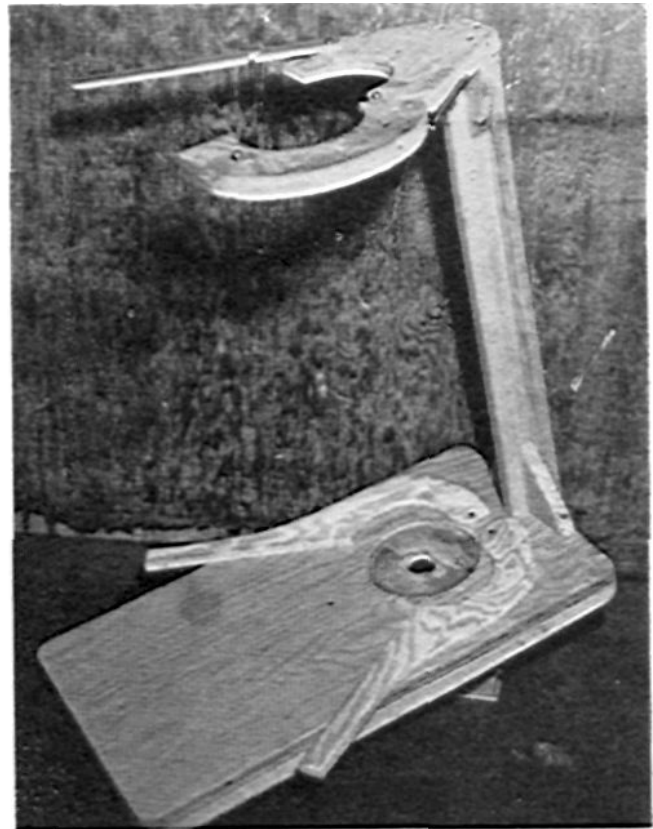


Figure 2

collar which opens (Fig. 2) to receive the projectile between its bourelet and rotating band (Fig. 3). When closed there is only a minimum of clearance for the projectile. A simple lever latches the collar closed: attached to the fixed segment, it has a notch which engages on a protruding nail or screw on the hinged segment.

To pull the shell from its case a claw of spring steel or a puller of wire engages the indentations on either side of the fuze (Figs. 4 and 5). A strong, straight pull can thus be exerted: the cartridge case is held rigidly in place by the segments



Figure 3





Figure 4

clamped over its rim, and eccentric motion of the complete round is prevented by the upper guide ring's allowing only enough play for the projectile to be freely withdrawn. With the projectile removed, the operator needs but a moment to dispose of unwanted powder increments. The cartridge case has of course remained in its single position during this process. The upper guide ring is as effective in centering the projectile back into its case as it was initially; again the umbrella stand analogy holds true.

With the round reassembled, the operator kicks to one side the extension on one (either one) segment of the hold-down yoke, thereby freeing the round's base to remove it from the shell separator. A slight touch with his knee on the locking lever of the upper guide ring releases the spring (on the opposite side of this guide ring), which pops wide open the hinged portion of this upper assembly.

Time?—30 seconds for one man, as against 3 to 5 minutes for two men. Besides which the time is constant

and predictable, as well as short. Equally important, no damage is done to any portion of the complete round.

If your man gets a bit tired, the projectile can be removed from the upper guide ring and set on the base while he removes increments. This of course means replacing it within the ring and reclosing the jaws before reassembling the complete round, but the loss of time is negligible—especially when you consider what delays we have been tolerating.

If you find 30 seconds too long, however, put your extra man back on this job. Time will be cut to only 10 or 12 seconds, which is faster than that "next command" can be handled.

If you like, put a stout hinge on the column. When thus collapsed this shell separator can readily be strapped on the trail, where ample space is available.



Figure 5

TRAINING FILMS

of interest to artillerymen, recently released, include:

|   | <i>Approximate<br/>Running Time</i> |
|---|-------------------------------------|
| 5- 645—Camouflage, Part I—Individual Concealment .....                        | 10 min.                             |
| 5- 646—Same, Part II—Camouflage of Bivouac Areas .....                        | 11 min.                             |
| 5- 648—Same, Part IV—Use of Artificial Materials .....                        | 13 min.                             |
| 5- 649—Same, Part V—Camouflage Principles .....                               | 10 min.                             |
| 5- 954—Enemy Booby Traps .....  | 30 min.                             |
| 6-1098—Signal Communication in the 105-mm. Howitzer Battalion—Part III .....  | ...                                 |
| 10-1104—The M1937 Field Range, Part I—Range Equipment and the Fire Unit ..... | 20 min.                             |
| 10-1105—Same, Part II—Cleaning and Maintenance .....                          | 20 min.                             |
| 21-1025—Curiosity Killed a Cat .....  | ...                                 |
| 21-1026—On Your Toes .....  | ...                                 |
| 21-1027—Latrinograms .....  | ...                                 |
| 21-1029—On Your Own .....   | ...                                 |

# CURVED TRAJECTORY SUB-CALIBER

By Col. Cuyler L. Clark, FA

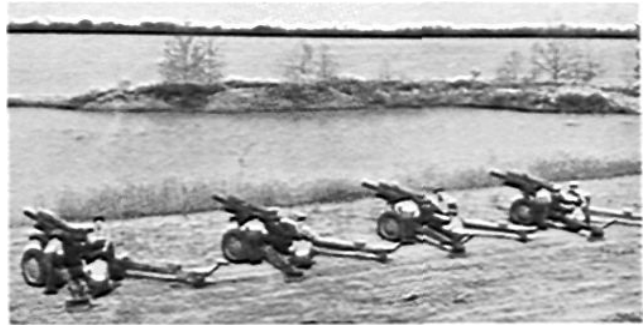
Intensive experiments with sub-caliber firing have led to the following conclusions:

A. To obtain a suitable "burst" with a small caliber weapon the target must be on a body of water, and

B. Considering effective range, similarity of trajectory with that of a howitzer, and visibility of the "burst," the most suitable weapon is a .45-cal. pistol rather than a rifle.

On smooth water the splash of the pistol bullet is clearly visible to around 1,400 yards, and up to about 800 yards on water which is not quite so smooth. Highly realistic 4-gun problems, both axial and lateral, can be fired by using a 5-yard interval between pieces and using  $c/4$  as the factor.

The greatest benefit from such sub-caliber firing, however, is from the training of gunners in direct fire. Proficiency in direct laying can be obtained only by a large expenditure of ammunition and it is also an advantage to train as many gunners at a time as possible. The bank of either a lake or a river makes an ideal site, and .45-cal. ammunition is comparatively plentiful and relatively inexpensive. A decent current makes possible the use of moving targets as described on page 363 of the JOURNAL for May, 1942.



RANGE TABLE .45-CAL. SUBCALIBER

| RANGE<br>Yards | ELEV.<br>° | $\frac{1}{4}c$<br>° | DRIFT<br>Left | RANGE<br>Yards | ELEV.<br>° | $\frac{1}{4}c$<br>° | DRIFT<br>Left |
|----------------|------------|---------------------|---------------|----------------|------------|---------------------|---------------|
| 300            | 34         | 2                   | 1             | 875            | 132        | 6                   | 19            |
| 325            | 37         | 2                   | 1             | 900            | 137        | 6                   | 20            |
| 350            | 39         | 2                   | 2             | 925            | 143        | 6                   | 21            |
| 375            | 42         | 3                   | 2             | 950            | 149        | 6                   | 22            |
| 400            | 44         | 3                   | 3             | 975            | 155        | 6                   | 23            |
| 425            | 47         | 3                   | 3             | 1000           | 161        | 7                   | 24            |
| 450            | 50         | 3                   | 4             | 1025           | 167        | 7                   | 24            |
| 475            | 53         | 4                   | 5             | 1050           | 174        | 7                   | 25            |
| 500            | 57         | 4                   | 6             | 1075           | 180        | 7                   | 26            |
| 525            | 61         | 4                   | 6             | 1100           | 187        | 7                   | 27            |
| 550            | 65         | 4                   | 7             | 1125           | 193        | 7                   | 27            |
| 575            | 69         | 5                   | 8             | 1150           | 200        | 7                   | 28            |
| 600            | 73         | 5                   | 9             | 1175           | 207        | 7                   | 29            |
| 625            | 78         | 5                   | 9             | 1200           | 214        | 7                   | 30            |
| 650            | 83         | 5                   | 10            | 1225           | 221        | 7                   | 31            |
| 675            | 88         | 5                   | 11            | 1250           | 228        | 7                   | 32            |
| 700            | 92         | 5                   | 12            | 1275           | 235        | 7                   | 33            |
| 725            | 97         | 5                   | 13            | 1300           | 241        | 7                   | 34            |
| 750            | 103        | 5                   | 14            | 1325           | 248        | 7                   | 34            |
| 775            | 108        | 6                   | 15            | 1350           | 256        | 7                   | 35            |
| 800            | 114        | 6                   | 16            | 1375           | 264        | 8                   | 36            |
| 825            | 120        | 6                   | 17            | 1400           | 271        | 8                   | 37            |
| 850            | 126        | 6                   | 18            | 1425           | 278        | 8                   | 37            |
| 875            | 132        | 6                   | 19            | 1450           | 286        | 8                   | 38            |

# PRACTICAL APPLICATION OF RICOCHET FIRE

By Maj. John S. Hughes, FA

For some time ricochet bursts have been observed by field artillerymen, but in general they were allowed to go unnoticed. Every so often at service practice someone would mention "the last round was a ricochet" or something of a like nature. They were passed up just that casually. No serious effort was made to investigate the properties of ricochet bursts, what causes them, how they are obtained, and the *practical application of ricochet fire to combat targets*.

A ricochet is a burst produced in the air by a projectile which has struck the ground, *bounced* and then exploded.

Ricochet action is likely to occur with the delay fuze. For the 105-mm. howitzer this is the point detonating fuze, M48, set for delay action; with the 155-mm. howitzer this is the point detonating fuze, M51, set for delay action.

What causes a ricochet? The two predominating factors are (1) the delay action in the fuze and (2) the relatively small angle of impact with the ground.

All rounds tend to turn upward in their line of flight when they strike the ground. This is illustrated in Figure 1. The round may or may not burst above ground depending on the angle of impact.

Current Field Artillery Board reports indicate that in

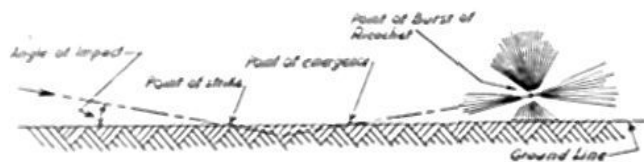


Figure 1.—Path of ricocheting projectile. (Vertical section view.)

general on firm terrain all rounds with delay fuze will ricochet when the angle of impact is 180 mils or less. Seventy-five per cent of the rounds will ricochet with angles of impact up to or about 260 mils. Fifty per cent of the rounds will ricochet with angles of impact up to probably 330 mils.

The delay fuze action permits the projectile to pass the point of strike (Fig. 1), be deflected upward, and burst above the ground. The M48 and M51 fuzes when set for delay have .05 second delay action which is initiated at the point of strike—the projectile bursts .05 second later. Current development projects include a delay fuze with longer delay action so that the round may travel farther (both horizontally and vertically) before bursting. Such ricochets should be even more effective than those produced by the present .05 second fuze.

The distance that the projectile travels horizontally and vertically from the point of strike is a function of the angle

of impact, composition of the soil, length of fuze delay action, and the terminal velocity, shape, and weight of the projectile.

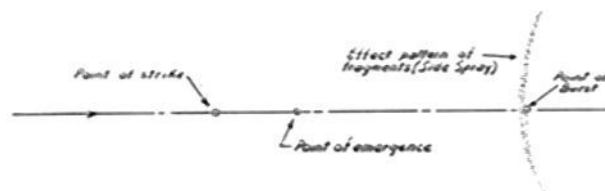


Figure 2.—Effect of ricochet burst (plan view).

The effect pattern of a ricochet is illustrated in Figure 2. Note that the effect pattern is not a straight line, but rather an arc concave in the direction of fire. The lower the point of burst is to the ground, the more nearly this arc approximates a straight line.

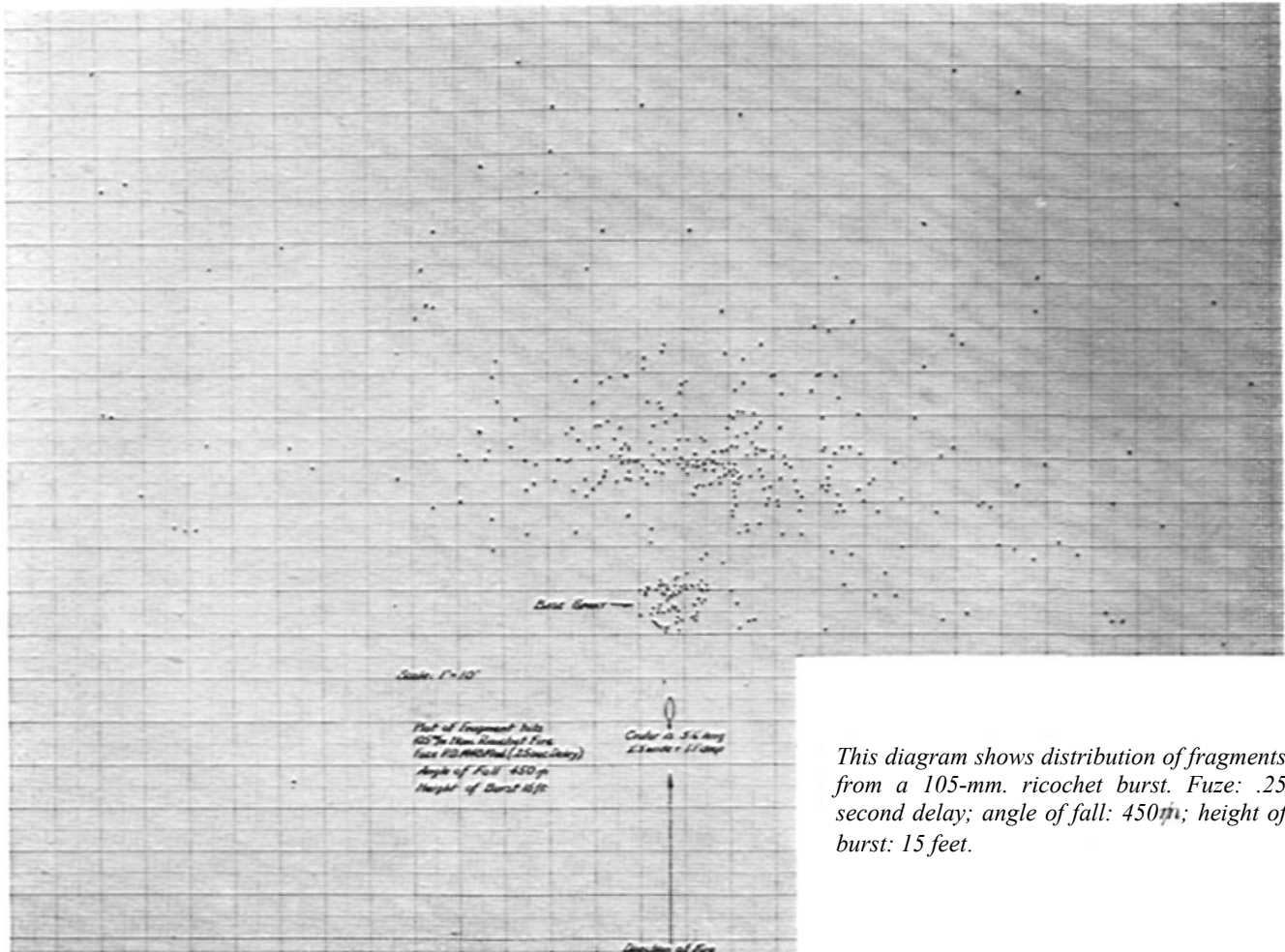
With the M48 fuze set for .05 second delay action with the 105-mm. howitzer, Shell M1, the length of the pattern generally varies from 10 to 30 yards laterally. This value cannot be predicted with any degree of accuracy as it is affected by many variables, such as height of burst, angle of impact, exact time functioning of the fuze, etc.

The effect pattern may or may not be perpendicular to the direction of fire. In general, rounds are deflected to the right in striking the ground in as many cases as they are not deflected. In some cases they are deflected to the left.

A round fired with a delay fuze will do one of two things: (1) ricochet, or (2) penetrate the ground and burst beneath the ground surface. This action of bursting in the ground is termed *mine action*.

Mine action results from delay fuze action and large angle of impact (larger than will permit ricochets). The delay fuze action will not permit the round to burst at the point of strike as does a round armed with super-quick fuze. The large angle of impact prevents the round from emerging from the ground, since it will penetrate more deeply and consequently has to travel a greater distance before emerging. Fragments from a mine action round generally remain in the ground and are not effective against personnel targets.

In general, there are two types of ricochet bursts: (1) those which explode close above the ground and (2) those which occasionally ricochet high into the air or a great distance beyond the target. Ricochets which are high in the air or travel considerably beyond the target have very little or no useful effect, and should not be considered as ricochets. The usable ricochet is the one which bursts relatively close to the ground.



This diagram shows distribution of fragments from a 105-mm. ricochet burst. Fuze: .25 second delay; angle of fall: 450°; height of burst: 15 feet.

Some difficulty may be experienced in distinguishing a ricochet round from a mine-action round. A round fired with a delay fuze which gives the appearance of a super-quick burst IS a ricochet. A true ricochet has a distinct flash of explosion which is quite visible. The smoke is dense, black, and heavy as compared to a mine-action burst. There is little dirt and dust intermingled with the smoke at the time of bursting. With a mine-action round the smoke is grey and dirty, having considerable dirt and dust mixed in it. Referring to Figure 2, the side spray from a ricochet is visible and is useful in identifying rounds as ricochets. A ricochet produces a distinct sharp crack upon explosion, while the report from a mine-action round is muffled and dull in sound.

Air bursts are more effective against enemy personnel, both entrenched and in the open, than impact bursts. Since ricochet fire is an effective and simple means of obtaining air bursts, ricochets should always be sought in preference to impact bursts. To obtain ricochets the delay fuze must be employed. Therefore, in all percussion fire against combat targets, adjustment should be started with delay fuze. During adjustment the observer should notice whether or not ricochets are being obtained. If 50% or more of the rounds are useable ricochets, use of this type of fire is

justified and should be continued in fire for effect. Fire for effect is placed within the range bracket as established by ricochets during adjustment.

If during adjustment less than 50% of the rounds are useable ricochets, the fuze should be changed to super-quick and fire for effect placed on the target. It is not practical to change from delay to superquick fuze until the adjustment has been completed. Only after adjustment can the observer tell if sufficient ricochets will be obtained during fire for effect. The only positive method of knowing whether or not useable ricochets will be obtained in sufficient quantity is by firing. Slope of fall, angle of impact, nature of the ground, charge, range, etc., all give indications as to the possibility of obtaining ricochets but the only certain proof is firing. This was recently demonstrated by firing at Fort Sill, using the 155-mm. howitzer firing charge 5. At a range of 2,500 yards on flat terrain no ricochets resulted. The angle of impact was such that all rounds should have ricocheted. On the other hand, firing at a range of 5,000 yards against a forward slope of hard ground, all the rounds ricocheted. In the latter case, considering the angle of impact, mine action should have resulted, but the underlying



*.15 second delay fuze; height of burst: 24 feet*



*.10 second delay fuze; height of burst: 18 feet*



*.05 second delay fuze; height of burst: 8 feet*

*Ricochet effect appears clearly in this series of photos. In each case the 105-mm. howitzer was fired with Charge 6 at 4,000 yards, giving an angle of fall of 194 $^{\circ}$ . Point of impact, point of burst, and effect are clearly seen.*

rock was so close to the surface that the projectiles bounced.

In conducting fire against combat targets, a battery commander should begin adjustment with delay fuze. Upon completion of adjustment the fuze should be changed to superquick if such a change is indicated.

The forward observer should know what fuze is being used on adjustment. This may be taken care of by making it S.O.P. that *all* fire against combat targets be

started with the delay fuze. Upon completion of the adjustment and before giving the sensing *Fire for Effect*, the forward observer should make a sensing of either *Ricochet* or *Mine Action*. If the sensing *Mine Action* is made, the fire-direction center should change from delay fuze to superquick fuze before going to fire for effect. Sensings for individual salvos should not be made since no change in fuze should be made until the adjustment is complete.

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Says the Vice-President of a large corporation: "Several years ago I entered subscriptions for a number of the service journals. I did so both because of a keen interest in such matters and as a means of keeping informed. May I say that your publication has been much the most interesting and helpful—not to mention readable."

# WHEN REGISTERING

By Lt. Col. Abbott H. Burns, FA

A short time ago a certain Battalion S-3 had the problem of putting on a demonstration of massing the fire of a 105-mm. howitzer battalion using time fire with corrections determined by a high burst adjustment using one piece. The battalion was using a wide angle photograph for a firing chart, measuring ranges and angles with an old celluloid range deflection fan and computing firing data with home-made graphical firing tables. Since the officer conducting the problem was very anxious to have the best possible data, he plotted the center of his high burst adjustment using a 12" protractor, and determined his adjusted base deflection shift using this same protractor and a steel straight edge. Then he computed his corrector from the fuze setting column in the regular published firing table FT 105-H-3. Finally he used a different wide angle photograph for his registration than he used for his firing chart. It can easily be pointed out that in his anxiety for accuracy, the officer firing the problem actually introduced unnecessary errors.

Many field artillerymen think of registration as a means for correcting for errors introduced by weather and materiel. As a matter of fact, registration should be used to correct for *ALL* possible sources of error. One source of error is survey; another is the distortion of the map which is to be used; a third is non-standard weather conditions; a fourth is the instrument used in measuring data from the map; and a fifth, the firing table itself. The officer firing the problem mentioned above was afraid of the accuracy of his crude range deflection fan and his crude graphical firing tables, so he did not use them for the registration. Since he failed to use (in determining the registration corrections) the instruments which he was going to use in firing concentrations, he did not take into

account the corrections required for both his range deflection fan and his graphical firing table. Also, since he used a different photo for registration than he used for firing concentrations, he took a chance on the scale of the photo being different and the location of the batteries and face print on the registration photo being different from the location on the firing chart. Fortunately, in this case, at the particular ranges at which the registration and concentrations were fired, both the range deflection fan and the graphical firing tables were quite accurate, and the photos were so carefully prepared that the demonstration was quite a success.

The importance of using the identical equipment for the registration that it is intended to use for firing concentrations, in order that all chances of error may be compensated for, cannot be over-emphasized. Thus, if a range deflection fan which has a "K" of minus 15 yards per thousand is being used, and the range as read with a steel straight edge is 7,000 yards, the range deflection fan would show the adjusted range to be 7,105 yards. Assume that the registration range were measured with the straight edge. The graphical firing table would be set with the adjusted elevation under 7,000 yards. Now assume that a concentration is to be fired at registration range. Naturally, the concentration range as measured with the range deflection fan will be 7,100 yards, and the elevation read from the graphical firing table corresponding to this range will be 1-c too great, and the concentration will be fired 100 yards over. On the other hand, had the registration range been measured with the range deflection fan, the graphical firing table setting of the adjusted elevation under 7,100 would correct for the error in the range deflection fan and the concentration should be fired on the button.

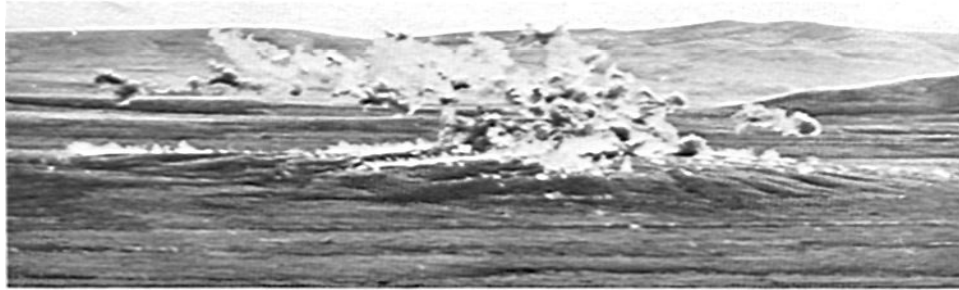
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## FUZES FOR HOME-MADE BOMBS

usually have a black-powder train, the same as is used in Bangalore torpedoes, firecrackers, and much commercial blasting. Miners have long known of the dangers of a "flash" burning of such fuzes. This is usually caused by looseness of the powder grains, which leaves an air space to act as a flue for too-quick ignition—with disastrous results unless quick action is taken.

In many cases we can use a solution developed by miners. Before lighting the fuze, put a sharp knife within easy reach of the hand in which you'll hold the match. With the other hand grasp the fuze about a foot from its free end. Light the fuze. If it quickly gets warm or hot where you are holding it, you know the flame is racing through to cause a premature explosion. But you do have time to grab the knife and cut the fuze between flame and explosive, even though there isn't time to take safe distance by throwing the bomb (or grenade) or by running from it.

# NOTES ON GUNNERY



*Time shell*

By Col. E. B. Gjelsteen, FA

Supply and transportation difficulties render the conservation of ammunition a problem of prime importance both in zones of operations and training areas. It is, therefore, with a view toward conserving ammunition supply that the following expedients are offered.

## QUICK PRECISION REGISTRATION

This method can be used in establishing an observed fire chart, and is particularly applicable when ammunition must be conserved and time is pressing. The procedure is as follows:

*a.* If the trial elevation is determined by a target hit, this is considered the adjusted elevation.

*b.* Where the trial elevation is secured by splitting a 1-*c* bracket, two rounds are fired at the trial elevation. The following examples show three possible cases, assuming  $c = 8$ .

| <i>Commands</i> | <i>Sensings</i> | <i>Case 1<br/>Remarks</i>   |
|-----------------|-----------------|---|
| 130             | +               | (Over limit of 1- <i>c</i> bracket.)  |
| 122             | -               | (Short limit of 1- <i>c</i> bracket.)   |
| 2 Rds, 126      | +               |   |
|                 | -               | (Since mixed sensings result from 2 rounds fired at trial elevation, 126 is now considered the adjusted elevation.)                               |
|                 |                 | <i>Case 2</i>   |
| 130             | +               | (Over limit of 1- <i>c</i> bracket.)  |
| 122             | -               | (Short limit of 1- <i>c</i> bracket.)   |
| 2 Rds, 126      | +               |   |
|                 | +               | (Since both rounds fired at trial elevations are over, fire one more round at short limit of bracket.)  |
| 1 Rd            |                 |   |
| 122             | -               | (Having verified the short limit at 122, the adjusted elevation is considered to be 124—halfway between the short limit and the trial elevation.) |
|                 |                 | <i>Case 3</i>   |
| 130             | +               | (Over limit of 1- <i>c</i> bracket.)  |
| 122             | -               | (Short limit of 1- <i>c</i> bracket.)   |
| 2 Rds, 126      | +               |   |
|                 | +               | (Both rounds are over at trial elevation; fire one more round at short limit.)  |
| 1 Rd            |                 |   |
| 122             | +               | (Since this elevation gave a short and an over, 122 is the adjusted elevation.)   |

## ONE VOLLEY REGISTRATION BY AIR OBSERVER

This method is applicable when the firing chart is a map or photomap, and when flat wooded terrain renders terrestrial observation of the target area impossible. It is assumed that the position area survey has been completed and the batteries have been laid on the base line by survey methods, taking direction from a line in the position area.

Since registration will have to be accomplished by aerial observation, a suitable terrain feature, such as a cross-road or road junction, is selected as a check point. When the battalion is laid on the check point, the air observer, having identified the target, commands "Fire." The battalion fires one volley, which is sensed by the air observer as "So much" right (left) and "So much" short (over). From this sensing the fire direction center can compute the deflection correction and the K (or setting of the graphical firing table). This method is applicable also to a battery volley.

## ADJUSTMENT WITH INTERIOR PIECES

Ammunition can be conserved by using the interior pieces rather than all pieces of the battery during adjustment. These two pieces are handled exactly the same as are four pieces: the sheaf is centered on the adjusting point. Experience has indicated that one gun is not enough for adjustment, but that four are not necessary. Two are sufficient, are easier and quicker to adjust than four, and the adjustment is completed in a shorter space of time. On completion of the adjustment the flank pieces come in in their proper places in the sheaf at the command "BATTERY (SO MANY) ROUNDS." This method of adjustment can be started with the command "NO. 2 AND 3, RIGHT," for the designation of pieces to fire and method of fire. If desired, the command "CENTER" to designate number 2 and 3 can be adopted. The adjustment by interior pieces is suitable for forward observation methods as well as for

axial-lateral methods. The use of all pieces of the battery to indicate a 100-yard sheaf is of little importance since forward observers should adjust by bracket methods—that is, reporting errors so as to secure brackets.

#### METHODS OF "CONSTRUCTING" ROUNDS AT SERVICE PRACTICE

Ammunition shortage has necessitated some changes of procedure. In general, wasted rounds can be saved by "constructive" rounds. The examples that follow show some of the situations which occur where a quick analysis and action by a competent instructor will save ammunition that would otherwise be wasted.

##### *Precision Problems*

*a.* In an axial precision problem with an  $r/R$  factor of .8 the student senses a round fired at elevation 100 as "Doubtful, 30 left." He then commands "Left 25, 100." The instructor signals the operator, who sends to the battery "Left 25," but not the elevation of "100." The instructor makes a quick calculation as to where the round would land and then tells the student, "That round is on the way; it lands 60 mils left of the target and is not sensible for range." The student senses "Doubtful, 60 left," commands "Right 50, 100," and the problem proceeds without the loss of the round that would have resulted from a deflection shift in the wrong direction.

*b.* In an axial precision problem with  $c = 4$  and  $r/R = .8$  the student senses a round at elevation 100 as "Doubtful, 10 right." The instructor is able to sense the round as short. The student commands "Left 8, 100." The instructor signals the operator, then tells the student, "That round is on the way and lands between you and the target." The student senses "Short," commands "116," and the problem proceeds without the loss of a round fired because an obvious sensing off the OT line was not made by the student.

*c.* In an axial precision problem the student fails to see the first round. The instructor sees the round, however, and when the student gives a command the instructor signals the operator and tells the student where the round lands. The student then gives a sensing and makes the change prescribed for the sensing, and the problem continues. In this connection it is best not to permit the student to continue giving commands in cases where he fails to see more than two consecutive rounds.

##### *Bracket Fire*

The above methods of saving ammunition by constructive rounds are applicable to bracket fire as well as precision fire.

##### *Fire for Effect*

The following examples illustrate how constructive rounds can be employed during fire for effect.

*a.* In a small-T precision problem, with the guns on the left,  $c = 4$ ,  $s = 6$ , the student (having secured a  $1-c$  bracket) commands "Left 3, Three rounds, 92" to go into fire for effect. The instructor signals the telephone operator "One round, 92." The round lands and the student senses "Short, Deflection short." The instructor tells the student, "The second round is on the way and lands to the right of the target." The student senses "Over, Deflection doubtful." The instructor tells the student, "The third round is on the way and lands between you and the target." The student senses "Short, Deflection short" and commands "Left 3, 92." The instructor allows one round to be fired as a result of this command, and (after the sensing by the student) the fifth and sixth rounds are constructed. If there have been constructive rounds, the student is given the number of overs and shorts he has obtained so that he can compute the adjusted elevation and the next command.

*b.* In an axial bracket problem with  $c = 5$ , the student commands, "Battery one round, 140," with an apparent bracket of 135-145. The instructor, however, believes 135 to be a good center elevation. He signals the operator and tells the student "on the way." The student commands "145." The instructor signals the operator and tells the student, "140 lands beyond the target." The student senses "over" and the instructor says "145 is on the way." The student commands "135," which is sent to the battery. The instructor tells the student "145 lands beyond the target" and the student senses "Over." The student is permitted to see 135, sense it, and if a change of bracket is necessitated by 135 being "range correct" or "over," to give the next command of 130. The wasting of two volleys to prove the critical elevation of 135 has been eliminated, and the student has had the opportunity to save the fire for effect.

##### FIRE DIRECTION EXPEDIENTS

When the present fire direction technique was written the sheaf was formed by converging on No. 1 and then opening to form an open sheaf. This necessitated centering the sheaf, since No. 1 was of necessity the base piece.

Since the sheaf is now formed by opening from a parallel sheaf, one of the interior pieces can be used as the base piece and sheaf centering can be eliminated. To apply this method the center of the battery is surveyed in. The interior piece nearest the center is the base piece. Openings to form the open sheaf are made on the other interior piece. This will form a sheaf which is already centered on the target. Designation of the base piece is by the battery executive. He chooses as the base piece the one nearest the center of the battery and notifies the battery commander and the fire direction center. If the battery commander or fire direction center desire to register before they receive the battery executive's designation of the base piece they can use the term "base piece" in the designation of pieces to fire.

In the light battalion, which usually fires at ranges between 2,000 and 6,000 yards, deflection difference can be



eliminated by forming an open sheaf at mid-range and recording base deflection with this sheaf. Since the front of a battery will usually be greater than 50 yards and will usually approximate 100 yards, this method will give the requisite accuracy for ranges within about 2,000 yards of the range at which the open sheaf was formed.

#### NOTES ON FORWARD OBSERVATION

Bracket methods are as applicable to forward observation methods as they are to axial-lateral methods. Experience indicates that the observer who quickly establishes a bracket usually secures his adjustment in three salvos or less. On the other hand, the observer who tries to estimate the exact error and thus approaches the target from one direction rarely secures his adjustment in five salvos and very often fails entirely.

The forward observer does not attempt to estimate the exact amount of the error. He reports the error which will cause the salvo to fall on the opposite side of the target both for deflection and range. Often the initial bracket can be established in a single salvo by considering the base point, check point, or concentration used in the designation as one limit of the bracket. Thus, if the base point is to the right and short of the target the forward observer should report errors large enough to cause the salvo to fall to the left and over the target. Now a proportional split of this bracket can be made.

Thus, if in the initial designation of the target the observer reported the base point as being 600 right and the first salvo landed to the left of the target, but closer to the target than the base point, the error of this first salvo should be reported as 200 (100) left, rather than 300 left. The same is applicable for the range element of the sensing.

In any schedule of service practice, forward observation should follow small-T. The deflection shifts to keep the salvo on line is handled by moving the same number of s's in deflection as the range is changed by c's. It is easier for the beginner to keep his deflection and range coordinated in small-T firing than it is for him to realize how much of the error is deflection and how much is range in forward observation. In forward observation the observer must keep in mind that a range change causes an apparent deflection change. He is better able to realize this and to act on it if he has fired small-T before attempting forward observation.

The observer who quickly brackets the target not only secures his adjustment in the minimum number of salvos, but he is sure that he has secured a proper adjustment when he calls for fire for effect. On the other hand, the observer who approaches the target from one side only not only requires more salvos in getting an adjustment but when he calls for fire for effect he may or may not have the proper adjustment and thus he is jeopardizing the lives of the infantrymen who are counting on his adjustment.

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#### ONCE IN A LIFETIME!

Our battery (155-how.) was having a night occupation. We were to lay by base angle. The scout corporal had set up his aiming circle, during the waning moments of daylight, over the place mark. No. 1's position had been located by a stake which had been surveyed in.

When we arrived at the position with the guns, darkness was complete. After seeing that the guns were having no difficulty in coming in I went over to the aiming circle, set off the base angle, turned to the orienting line (which was indicated by stakes with narrow slitted lights attached), and then swung to No. 1 gun and proceeded to lay it. The gunner corporal had his sight identified by a small light. I read him the deflection, he repeated it, and after a moment's delay called check.

As soon as the other three guns were laid I went over to No. 1 to see how a 155 howitzer had been laid in such a hurry. To my amazement I discovered that the gun had gone into position, taken my reading, and been laid without its crew lifting its trail or taking a single turn of the traversing handwheel! Since we were not to fire until after daylight, there was an opportunity to check the laying again in the morning; the difference of one mil was no doubt due to the fact that we had had to use artificial light in the night laying—or perhaps to our being in the Southern Hemisphere?

—LT. LAWRENCE M. HIGGINS, FA

# Shell, Semi-Fixed, Smoke, B.E., 105-mm., M84\*

Two factors contributed to the adoption of the M84 base-ejection type of smoke shell in place of the M60 smoke shells. The first was the failure of the M60 to satisfy the requirements of the using arms for screening smoke producers, the second was the successful development and use of the base-ejection type by the British in their 25-pounder gun.

The general effect of the M60 smoke shell, with its super-quick type of impact fuze and a burster charge of high explosive to disperse the chemical agent, is to create a large cloud of dense white smoke, most of which (due to the heat evolved) rises so rapidly that only a small percentage of the total remains to produce screening effect. This tendency to form a mushroom-shaped pillar of smoke is obviously unsatisfactory.

The British developed a base-ejection type of smoke shell similar to the ordinary star shell (illuminating projectile). It is fitted with a time fuze and with a small black powder charge in the nose of the shell. The smoke elements are burning candles which are ejected from the base of the shell during its flight, through action of the time fuze. These candles continue burning for a period of over one minute after reaching the ground.

It is found that there is only negligible loss of accuracy in laying down a smoke screen when the time fuze is used, as in the M84, compared to when the superquick point-detonating fuze is used, as in the M60. When the candle units are ejected from the base of the shell there is only a small loss in velocity, and the units continue substantially along the trajectory and fall only slightly short of the shell body. Thus, whether the burst is high in the air or close to the ground, the points of impact of the candles are not greatly affected.

## DESCRIPTION

The complete round of smoke shell, M84, is of the semifixed type of ammunition, with the cartridge case a free fit around the shell. The round weighs 41.94 pounds and measures 30.49 inches in length.

Cartridge case, M14, Type I, is a standard component of this round of ammunition. The steel case, M14B1, Type I, is substitute standard.

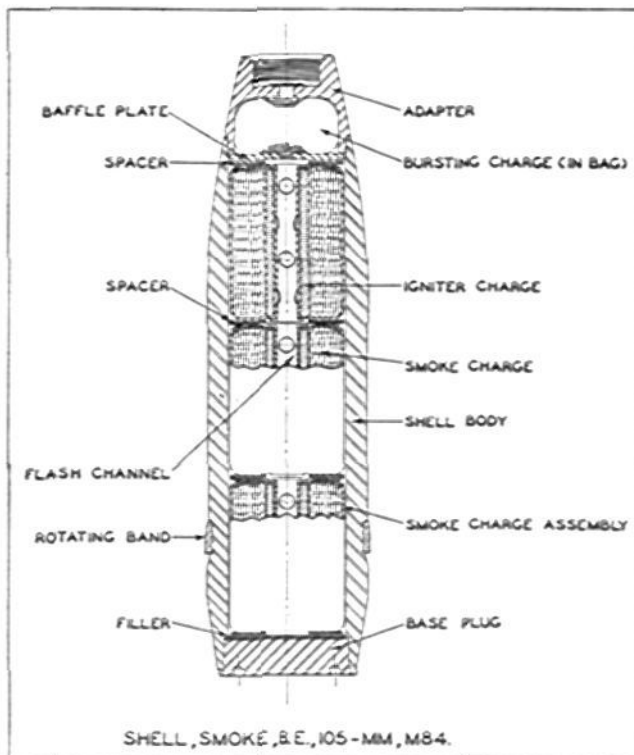
The primer, percussion, 100-grain, M1B1A2, is the standard primer used with the M84 round; 100-grain percussion primer, M1A2, may be used as an alternative.

The propelling charge used in this round of ammunition is the same as that prescribed for the M1 high-explosive round and for the M60 chemical shell. Its total weight is approximately 3.04 pounds, the FNH smokeless powder being divided into a base charge and six increments.

\*The information given here is extracted from a forthcoming revised edition of OS 9-20, and is republished from *The Ordnance Sergeant* with permission.

As the shell is loaded into the cannon it weighs approximately 32.87 pounds and measures approximately 18.75 inches in length. In contour and general appearance the M84 smoke shell is about the same as the M1 and M60 shells. Its components and functioning, however, are quite different.

The body is made from cold-drawn steel tubing, the inside walls being left straight and the outside contour given an ogival radius of 25.5 inches. The shell is also



provided with a boattail base. Its rotating band, like those on the M1 and M60 shells, is 0.81 inches wide with its rearward edge 3.08 inches from the base. Just forward of the rotating band the body is stamped to show the lot number of the shell, initials or symbol of the manufacturer, caliber and designation of the shell, and the year of manufacture. Inside walls of the shell are painted with acid-proof black paint before loading.

A steel plug 3.165 inches in diameter closes the base of the shell. This plug, screwed hand-tight, is held by three threads. A copper gasket of the same diameter fits in front of the plug to provide a moisture-proof seal.

The nose of the shell is extended two inches by an adapter which screws in hand-tight and staked. This is made of cold-drawn steel, and is tapped on the inside to receive the fuze.

Just below the fuze, and connected to it by a short flash channel, is a burster charge consisting of 0.14 pound of army black powder. This charge is held in a

powder bag made of cotton cartridge cloth, the outside of which is stenciled with identifying marking reading "BLACK POWDER," ".14 LB.," "GR. A-3," "LOT 1234," on four separate lines.

Below the burster charge is a steel baffle plate approximately 0.12 inches thick with a 0.10-inch hole in the center. This plate is designed to allow the flash from the burster charge to pass down the flash tube and at the same time to be forced rearward by the burster charge detonation, thus expelling the smoke charge out of the base of the shell. Behind the baffle plate is a spacer made of commercial binders board 0.09 inches thick. This spacer has a 1.1-inch wide hole in the center so that the flash tube will be clear.

Three smoke assemblies, separated from each other and from the base plug by spacers identical with the one described above, comprise the main charge of the shell. Each of these smoke assemblies is doughnut-shaped in that the containers have a hole down the center to allow clearance for the flash tube. Bottom and sides of the canister are made of a continuous sheet of steel. The top consists of a steel disk which is inserted after the canister is loaded; it is held in place when the sides of the assembly are crimped over.

Each smoke assembly weighs approximately 2.50 pounds. The steel container holds the smoke charge which may be either HC mixture or a British composition. The British agent is considered standard, while the HC mixture (hexachlorethane-zinc mixture) is substitute standard. Inside the smoke mixture, and surrounding the flash tube, is an igniting charge of EC blank powder. The igniting charge is separated from the smoke charge by a layer of paper. The steel flash tube, extending from the baffle plate to the base plug, is perforated with vents in order to insure deflagration of the igniting charges in each of the smoke assemblies.

When the round is loaded into the gun, the time- and superquick-fuze, M54, may be set to detonate for any time

up to 25 seconds. When the desired time has elapsed and the fuze functions, the flash is picked up by the black-powder burster charge. The flame passes through the small vent in the baffle plate and sets off the igniter charge in each of the three smoke assemblies. Simultaneously the force of the explosion of the burster charge forces the baffle plate toward the rear, and with it the three smoke assemblies and the base plug. Thus the entire charge is ejected from the base of the shell, and the three assemblies are left to land by themselves, like smoke candles.

#### MARKING

Smoke shell, M84, may be identified by its marking on the surface of the shell itself and by the stenciling and marking on the base of the cartridge case.

The entire shell, except the rotating band and the fuze, is painted with blue-gray paint, thus providing both a rust-preventive coat and a means of rapid identification. This blue-gray color indicates that the shell is loaded with a chemical filler, while the single yellow band circumscribed around the shell just below the bourrelet and the yellow lettering verify the fact that the chemical agent is a smoke-producer. The lettering on the shell is stenciled between the bourrelet and the rotating band, and includes the following data: "—SMOKE," "105 H," "SHELL M84"; the lot number of the loaded shell is stenciled below the rotating band, where it is hidden by the neck of the cartridge case when the complete round is assembled.

The base of the cartridge case has the following information stenciled in black: ammunition lot number, and the type and designation of the round (i.e., "SHELL, M84"). Additional data is stamped into the metal; caliber and designation of the cartridge case (i.e., "105-MM, M14, Type I"), cartridge case lot number, initials or symbol of its manufacturer, and the year of its manufacture.

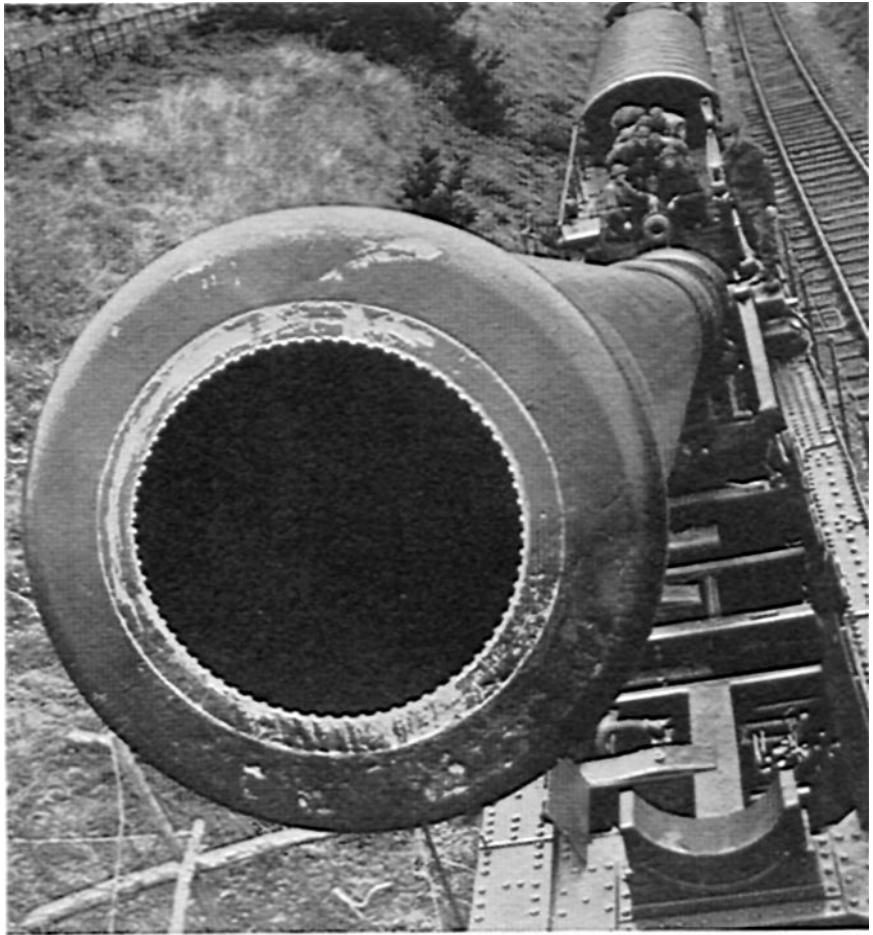
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### FIELD ARTILLERY GUIDE—*What they say about it:*

"The Artillery Guide was certainly a welcomed book. I believe I have read every page and I must say it is a must book for all young and old Artillery officers."—1ST LT., FA

"Having received my Field Artillery Guide and going thoroughly through it I find that a gold mine of information is condensed between its covers. No more poring over a couple dozen manuals to find what you want. It just 'ain't' being done in the Field Artillery now by the people in the know who possess one of the manuals."—1ST SGT., FA

*So small is the isle that Britain's railway guns are purely defensive. This weapon in Southeast England is nicknamed the "Boche Buster."*



*Conclusion of*

# THE NEW TACTICS

By Col. Conrad H. Lanza

## THE DEFENSIVE

Tactics for the defensive have not changed except as to technical conditions. Use of land mines to cover the foreground is now general: these are used literally by the tens of thousands. Sand in North Africa and snow and mud in Russia have facilitated the concealing of the mines, which if properly placed will prevent a tank attack from crossing the mine field. It may be necessary for the attackers to undertake preliminary operations to capture a forward mine field before a main position can be reached. It is essential that the location of the mine field be kept unknown to the enemy: if he knows where it is he can open a passage by exploding the mines by shell fire. Mines have their main value where the terrain permits wide latitude in selecting a field for them.

Tank obstacles are common. Antitank ditches are in Russia replaced in winter by antitank walls of snow and ice. Neither has been very effective. Such obstacles are

hard to conceal from air photographing. The enemy usually knows in advance where the obstacle is, selects some place to cross it, and provides the necessary engineer troops and materiel to quickly open a passage through it.

Russian reports on their offensives of November and December, 1942, comment on their artillery rolling back enemy attacks one after another. South of Stalingrad, in the first half of December the Russians remained on the defensive, exhausting the enemy by repulsing (mainly by artillery fire) his daily attacks. The Russians then, at the proper moment, passed to the offensive.

On December 23d, 1942, Allied troops captured a hill 6 miles northeast of Medjez-el-Bab, in Tunisia; it was given up five days later because of casualties from Axis artillery fire. On January 5th, 1943, British troops in Tunisia seized another hill about 15 miles west of Mateur; this was given up within 24 hours, for the same reasons as before. It is sometimes better for the defenders

to allow the enemy to seize advanced positions and then drive him out by artillery fire than to defend the position statically.

The Axis defensive position on the Don contained about 5 to 6 batteries per kilometer; these were totally insufficient, for the prepared positions went down within a few hours. Opposite Leningrad, against the Russian attack of January, 1943, the density of guns was slightly greater, being about 6½ batteries (or 26 guns) per kilometer; this also was insufficient.

As in the first World war, the present tendency is to increase the amount of artillery for the defensive as well as for the offensive. Hard experience on the battlefield has forced this change.

#### ARMORED FORCES

Armored forces, although built around tanks, in this war include artillery (largely self-propelled vehicles), armored cars, motorized infantry, and such other arms and service as the nature of the operations require. Tanks are increasing in size, weight, and speed in an effort to overcome the increasing power of antitank weapons. They are also increasing in numbers.

Armored troops now habitually form the spearheads of offensives. They may be used for turning movements around an enemy's flanks or for penetration through his front. Armored vehicles are vulnerable to artillery fire, and like all motor vehicles are immobilized by any engine or transmission trouble; consequently, tanks (and other armored vehicles) habitually avoid engagements with hostile artillery or enemy tanks. An exception is when one side has tanks which are materially superior to those of the enemy. Thus, at the battle

of El Alamein (in Egypt) the British had the latest models of American tanks, which had more speed, thicker armor, and heavier guns than those of the Axis. The British also had superior numbers of tanks, about in proportion of 3 to 2. The British could afford a tank battle, and in this instance wiped out nearly 75% of the enemy's armor.

In Russia, armored troops have been used to dash through gaps blown in a hostile line by artillery fire, with a view of reaching the enemy's rear areas as quickly as possible. According to circumstances, they mushroom out. They may turn and attack the enemy's pierced line from the rear, or they may raid rear areas, destroying supplies and communications and making it impracticable for the enemy to maintain his organization. Russian armored forces now have a considerable amount of artillery, with which they can overcome centers of resistance (such as defended villages) by an intense bombardment. The mission of the armored vehicles is to clear the ground to secure the required artillery positions.

Armored troops in battle operate far in advance of their main forces. The further forward they go, the better their chance of disrupting the enemy's resistance. Except for ammunition, which must be supplied to them, they seek to live off the country from seized and captured supplies. These armored troops are accompanied by air forces, responsible for locating the enemy in time to give sufficient notice to armored force commanders to enable them to judge whether to attack or to by-pass. Ammunition for forward armored forces is habitually delivered by air.

Armored troops in battle may encounter hostile armored forces. These may come from any direction, as battle zones may extend up to 50 miles in depth. Careful air and ground reconnaissance must be maintained in all directions.

Artillery, command posts, etc., must be ready at all times for all-around local defense against armored troops, artillery fire, or infantry.

Armored attacks which are impracticable by day may be possible by night. Armored troops must be ready both receive and to deliver night attacks. Motorized infantry accompanies armored forces as a material and important element. The tendency is to armor the trucks, to permit the infantry to attack quickly under artillery and air cover. Speed in action—caused by quick decisions and rapid obedience to orders—is essential to the success of armored troops. The general direction of an attack is designated by the high command; the commander of the armored forces selects the particular routes. He considers the ultimate objective of the campaign, the resistance to be expected, and the probability of most quickly being able to open lines of communication for the main forces following.



*In the desert, flash defilade can rarely be found. Twenty-five pounders did their job at all hours nonetheless. Gun crews had to rely for protection solely upon dug-in emplacements plus sandbags—concealment was out of the question.*

The rapidity of movement of armored and motorized forces is so great that the undivided attention of ground and air observers is required to keep track of the positions of one's own troops as well as of those of the enemy. Care must also be taken to avoid mistaking friendly units for the enemy, or vice versa. It is customary for captured tanks to be immediately manned by one's own troops as replacements for disabled or destroyed tanks; this leads to combat vehicles of enemy models being within our lines and our own make of tanks being at times within the enemy's hands. Captured combat vehicles appropriated to own use are marked with flags to show to which side they belong, but as these are hard to distinguish at a distance or in certain lights, sometimes enemy (or enemy-occupied) tanks are not fired on due to uncertainty as to who is operating them.

In Russia it has been found that in winter, snow sleds equipped with an airplane motor are of great value to forward forces. When all other types of vehicles have bogged in the deep snow, motor sleds can dash over the country at speeds up to a mile a minute. They are available for tactical, administrative, and supply purposes, and are appropriately equipped in accordance with their mission. Tactical snow sleds have armor and carry machine guns, infantry mortars, or infantry cannon. In attacks they may be towed a certain distance by tanks, whose bulk will furnish protection against hostile fire. Or they may aid the tanks by flank attacks made possible by their extreme speed. They are most valuable for patrol activities and messenger service.

There is a divergence of opinion as to the vulnerability of armored forces to air attack. British reports from Africa indicate that armored forces when deployed and in motion sustain but slight losses when attacked from the air. Losses in camp are avoided by parking vehicles at such great intervals as to make bombing unprofitable. On the other hand, German reports have commented on the efficacy of their air attacks against Russian tank attacks—so this question is still debatable.

#### ARTILLERY

Both in Russia and in Africa, fronts become stabilized from time to time. It has been found necessary to use artillery as the primary weapon to break through such fronts. To accomplish this, the quantity of artillery has been steadily increasing in an endeavor to have more than the enemy and to be able to overpower front lines by shell fire within the space of a few hours.

According to British reports, the number of guns used in the battles around El Alamein, in October-November,

1942, was greater than had ever before been used in Africa. The quick breakthrough attained in these battles was attributed to the artillery's having been able to practically destroy the hostile front line. The Russians report that they too greatly increased their artillery, and they also attribute to their efficient artillery preparation their breaking through strongly-defended lines.

The British have not published the number of guns they used, but some Russian data is available. The Russian figures have increased with each offensive. For the attack near Leningrad in January, 1943, a correspondent of the



Moscow papers reports the Russian guns stood wheel to wheel along the entire front of attack. If we assume that this means that the guns were about 10 meters on centers, this would give 100 guns or so per kilometer—which was about the density for major offensives in 1918. In the latter case the batteries were not wheel to wheel, but were dispersed in depth over a distance of several kilometers. The Moscow correspondent, however, states that the batteries were in several waves, one behind the other, which would give at least 200 guns per kilometer of front and perhaps much more. With this quantity of artillery it is not surprising that fronts strongly prepared for defense have been overwhelmed within a few hours, the defenders killed or demoralized by a tremendous volume of shelling.

Lengths of artillery preparation vary. Occasionally the British in Africa have used 6-hour preparations, but more customarily have had 4-hour preparations. They habitually have been fired at night and ended at daybreak, when the ground troops moved forward to attack. Russian artillery preparations appear to be mostly by day, starting at daybreak and continuing until the OPs report that the enemy's front line is ready for assault. For example, at the forcing of the Don River in December, 1942, the Russian artillery continued to fire until the OPs reported that the enemy had been seen fleeing and

that the advance of ground troops was now possible. At Leningrad, in January, 1943, the artillery preparation started at 0910, daylight for that season and latitude, and continued until 1130, when the OPs reported that it was safe to advance. From an artillery standpoint daylight fire is preferable, but it does result in a comparatively late ground attack; the Russians have apparently decided that this is the better way.

Some British batteries in Africa had as many as 27 targets to cover in the same artillery preparation, or about one every 12 minutes. As the preparation was fired at night, there was no observation; this system will work if the coordinates of the targets are known—practicable in Africa where the country was open desert—and when it is reasonably certain the target can not move away prior to being fired on. In a country (such as Russia) which in places has much cover and extensive woods, zone fire against areas containing targets is frequently necessary; this requires much more ammunition, but this must be supplied if battles are to be won.

After the artillery preparation is completed, the subsequent phase depends on the tactical situation. In Egypt, in some cases infantry advanced and attacked the enemy's front, or armored forces advanced (on lanes previously selected) to pierce deep into enemy rear areas. At the battle of the Don engineers crossed first, then laid light timber on the ice over which armored troops crossed; infantry followed later. At Leningrad engineers also crossed first. The opposite side of the river consisted of steep bluffs, giving a defiladed space at the base in which to work; bridgeheads were secured within 10 minutes. The artillery then crossed in advance of other troops, the guns being hauled up the bluffs by means of ropes and established in what had been the enemy's lines. Then came the infantry, now assured of close support from its artillery. Either artillery, infantry, or armored troops may advance first immediately following the completion of the artillery preparation, depending upon the tactical situation. There can be no standard method.

When armored forces or infantry move forward, their artillery goes with them. If their batteries participated in the artillery preparation, these batteries must be so located and so released as to be able to move forward without delay at the proper time. Batteries must have the same mobility as the troops to which they are attached; for armored forces, self-propelled mounts are most suitable; for infantry, motorized artillery is primarily indicated.

Artillery preparations requiring demolition of trench systems and of the usual military obstacles are based on calibers of around 150-mm. and 240-mm. These calibers are the smallest that will accomplish the necessary destruction without firing an excessive number of rounds. These types of pieces are being used in Russia and were also used by the Japanese against Bataan and Corregidor, where they caused much more damage than the frequent

bombings from the air. The Russians are using these calibers to accompany forward forces, to enable them to overcome islands of resistance quickly; by employing this type of artillery with plenty of ammunition, it has been found that German hedgehogs (which formerly held out for weeks or months blocking lines of communication) have been captured within a few days.

OPs are absolutely necessary for batteries operating with armored forces by day. In no other way can track be kept of a rapidly changing situation. The BC is primarily responsible for establishing his OP, and normally does it himself by using an armored car equipped with radio and going wherever he can best observe. He must watch for enemy forces attacking his guns or other troops from flanks and rear or from several directions at once. He must be prepared to move his guns from one place to another, as the combat changes, and do so in such manner as to avoid hostile observation from air or ground. Above all he must maintain contact with his own troops and with their missions, which will change frequently and rapidly.

The importance of counterbattery is indicated by Russian reports, which state that 80% of their casualties were from artillery fire as against only 10% from infantry weapons. Casualties from air activities were low. One Russian report gives 170 enemy batteries silenced out of 220 noted during one offensive, but it is not clear that all 170 batteries were silenced at the same time, or were permanently silenced. It will be necessary to have more complete reports to determine recent results. From the high percentage of casualties caused by the artillery, and the growing strength of this arm, counterbattery will increase in importance.

In battle, artillery data and other battle messages are habitually sent in the clear. The enemy may occasionally obtain a bit of information this way, but this is a minor matter compared to the avoidance of delays in encoding and decoding messages. Usually, if the enemy does overhear messages sent by radio, there is little he can do about it before the action contemplated by the message has been completed.

#### INFANTRY

The infantry's role has changed. It no longer necessarily leads in attacks—its primary mission is now to exploit gains made by the artillery or by armored forces. It occupies terrain prepared by the artillery, consolidates positions, and follows the forward armored forces where with its artillery it reduces enemy troops by-passed by the forward troops and garrisons routes of supply.

Even when infantry is not in the lead its role is still indispensable. It must be available to back up forward armored forces, and aid them by attacking enemy troops within their field of action. In terrain where armored troops can not operate, infantry as before leads the attack. In northern Russia, where extensive forest and swamps abound, infantry and not armored troops head the attacking force.

Night attacks are now common. For these infantry is essential. Some are surprise attacks, made without artillery support; others may be preceded by artillery fire. A night attack may succeed a day attack which failed to reach its objective. In this case the night attack may be in successive waves. If it too fails to reach the objective, it is succeeded at daybreak by another day attack. The Russians have used this wave system frequently, with a view to exhausting the enemy when other means failed to obtain a victory.

Infantry mortars are increasing in number. New types are appearing. With curved fire, long ranges, large explosive charges, they are deadly and one of the most effective weapons of the day. Still, the machine gun remains as the main infantry weapon.

Marching infantry on foot is decreasing. It is too slow. As a consequence, the number of trucks in forward areas is remarkable. In November, 1942, the British Eighth Army in North Africa was using 110,000 trucks for all purposes. Correspondingly large numbers of trucks are in use by both sides in Russia. They require much road space, are hard to conceal from the air, and cause considerable supply difficulties in their maintenance. But they can not be dispensed with, and they are the main means of bringing infantry quickly to wherever it may be needed. It is not unusual to lose 2,000 or more trucks a day during a campaign, so replacements are a real problem.

#### AIR FORCES

Of all changes in the new tactics, those pertaining to the air force are the greatest. It is now an arm, and a service, of great power and importance. As an arm it participates in battles in aid of the ground forces, and furnishes them with reconnaissance. As a service it transports supplies and personnel to great distances within a minimum time. As air forces are tied to airfields, the possession of these has now become a primary objective in war and entire campaigns may be fought to secure desirable fields.

Within its range artillery can, regardless of weather, place a greater weight of shells more accurately on a target than can planes. Thus at Sevastopol, in June, 1942, the greatest destruction of the city was from artillery fire. Where artillery is not available planes can, subject to certain weather conditions, cause great destruction by bombing. Accuracy of the bombing varies with the opposition presented.

Bombing of cities has not thus far completely caused a cessation of activities. It has been found impracticable to close the ports along the English Channel or the North Sea notwithstanding repeated and severe bombing by both sides. Destruction has been wrought and great damage

inflicted without having been able to cause the enemy to abandon the place attacked.

For bombing distant places the air force has no rival. If the target is a material one, spectacular damage may be caused in a minimum time. Against personnel in the open, bombing has not been so successful, if troops have had time to dig trenches.

The Germans have used air forces to intervene in ground battles. At the end of 1942 they depended upon their air force to act as a general reserve to oppose major enemy attacks. The results have not justified this use. The German air forces did intervene promptly to oppose the Russian offensives, but in no case have they been able to stop them. When the Germans were on the offensive and had sufficient ground forces to take care of themselves, the supporting air force was invaluable, as it was able to fly ahead, set enemy depots on fire, destroy bridges, railheads, etc., and generally assist in confusing and interfering with enemy activities. When later the Germans were on the defensive and had insufficient ground forces to meet an oncoming superior enemy, the air force was unable to rectify the situation.

It would seem that the air force is of the greatest value to ground forces tactically for reconnaissance, and for certain battle engagements. It does not replace ground forces, who must be in sufficient strength to carry out their missions.

#### CONCLUSIONS

New tactics have arisen in this war. Based upon new weapons and new methods, material changes have occurred. Changes already made will not remain static; they will continue to change, and must be constantly watched for and noted.

Due to motorization and to use of planes for transport, it is now possible to pass over seas, mountains, and other terrestrial obstacles almost as if they did not exist. This results in campaigns in unexpected places, on little or no notice. If both sides are approximately matched the decision appears to rest on the ground troops, who will fight each other to a decision.

Campaigns in restricted theaters of operations *may* be short. Those in extended theaters are liable to be long, divided into intervals of stabilization and periods of open warfare. In open warfare, events move rapidly and cover much territory; this requires rapid planning and action, and efficient supply and replacement services.

The current tendency is to increase the air force to secure better tactical and transport service. Among the ground troops, artillery and ammunition for artillery are more and more necessary for winning those battles which alone will bring final victory.

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#### KITCHENS VS. CAMOUFLAGE

Remember, ration tins and mess kits have quite a shine. Glitter from even the "eating tools" may be picked up by a hostile OP. Medicos say violent exercise during a meal is hard on the digestion, so be sure the mess line is thoroughly defiled from all enemy positions!



# Aerial Conduct of Field Artillery Fire



By Capt. Walter D. Atkins  
and Capt. Birney Imes, AC

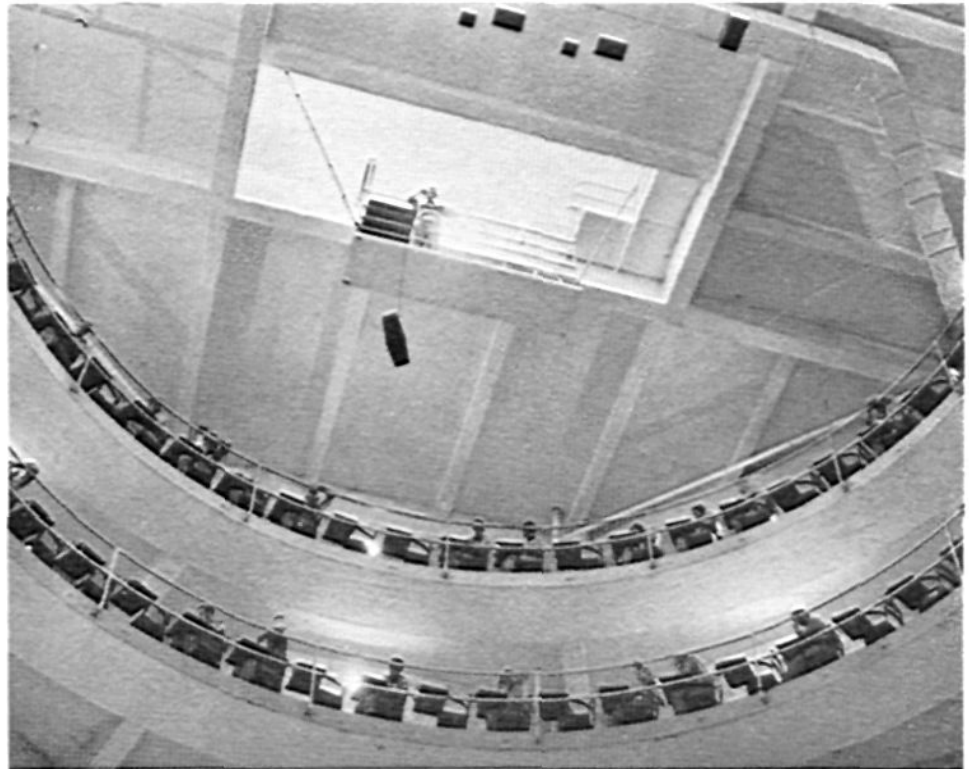
Now that liaison type aircraft have become organic equipment for field artillery units, it naturally follows that there will be a considerable amount of artillery shooting done from the air by the line organizations in training with, of course, the almost insurmountable obstacle of no ammunition. We do it very successfully (in training) with *no* ammunition. In our Aerial Observation School we have laid considerable stress on aerial conduct of field artillery fire, using high performance aircraft. The same methods, however, can be used with airplanes of liaison type.

Naturally we believe that our Field Artillery School and Field Artillery Board are the masters of the art of shooting, so we take their methods and teachings and follow them as closely as possible, laying particular emphasis on TM 6-210 as to both radio procedure and the actual conduct of the problem itself. Theory has caused us no trouble at all—we have simply "followed the book." The trouble, as mentioned above, has been with the practical side of shooting, but we have two answers.

In a building some 80 feet high we have a miniature range. Its target area is a diorama about 50 feet in diameter, on the floor. The terrain represented is painted on sections of beaver board and joined together. Observers sit in a circle in two balconies, the lower one about 50 feet high, the upper about 20 feet higher. The instructor stands on a platform suspended over the diorama about 10 feet above the second balcony.

Communication is by a public address system controlled upstairs. "Shooting" is accomplished by flashlight bulbs installed on the map or diorama, also controlled upstairs from a series of panels which are indexed with a toggle switch for each light. The scale of the diorama simulates an elevation of about 3,000 feet elevation for the first balcony, and around 4,000 feet for the second; the terrain represented is equivalent to about 3,000 yards in diameter. Any type problem can be fired in this "mock up," and we can give an observer exactly what he calls for. For targets we use bridges, concentration areas, RJs, and gun positions. This idea, perhaps less elaborate but similar, could be devised for dry runs or stationary practice shoots by any artillery unit.

For actual firing practice we use a puff range approximately





700 yards square. The firing is done by a man holding a pole 9 feet long with a receptacle on the end for a powder charge (1 pound of powder). This charge is ignited by means of a .22 cap placed on the bottom side of the powder holder and ignited by a hammer with a spring and lanyard attached, similar to but much smaller than the hammer on a French 75.

Control is effected by first laying the range off in 100-yard squares. Each intersection is marked by a large, numbered stake. The ground crew is told to go to Station No. 10, for example, to fire 2 rounds with 100 yards between bursts. It is like moving checkers—we can move the men from station to station, thereby giving the observer exactly what he asks for so long as he stays on the range. From the size of the range and the normal shifts to be made, it can be seen that transportation for the ground crew is necessary. For critique purposes an exact log is kept of where the shots were fired, by marking on a mimeographed representation of the range just where each round "hit."

Targets can be anything you want. We use square white panels—one panel for precision targets and four for bracket adjustment problems. For CIs we fire one round

and let the observer either move it or request fire for effect. We have the observer report the coordinates of the CI.

A map of the range is necessary; we use a single vertical taken at 4,000 feet. An air-ground radio can be set up right on the range and the men working the range can be controlled from this station.

We put 5 airplanes in the air at one time (borrowing from the FAS). An observer is individually called on to fire a problem. The other observers follow the problem and copy a log which is turned in at the end of the period. At the conclusion of each problem another observer is called on to fire, etc. Type problems are never assigned before take-off, so the student must be prepared for anything. In this way all students receive practical practice in radio as well as in shooting.

All of the equipment used in our practice is issue ordnance equipment. Nomenclature is: Outfit, Smoke Bomb, Pole Type, Complete, L-6; Charge, Smoke Puff, White, R-7; Cap, Percussion Smoke A-8826, R-7; Nipple, Percussion, Cap 6-H.

It is our belief that any organization interested will find this a very satisfactory method of augmenting the training of aerial shooting. The whole layout can be set up in a day and be used on the next.




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#### THE JOURNAL GETS THROUGH

In renewing his membership, a Marine field officer writes:

"I have enjoyed the JOURNAL immensely during the past year, and having been in the field since the outbreak of hostilities I have kept abreast of the situation, being in the artillery, through the instructive articles published in the JOURNAL. Things are changing so fast that quite often the JOURNAL is the Field Manual employed in my organization."

# O'REILLY'S CONE TO HELL

By COL. GERALD E. GRIFFIN

Moderato

1. O'-Reil-ly was a sol-dierman, the pride of Bat-ry B, In  
2. O'-Reil-ly hit the bot-tle af - ter six years up the pole; He  
3. O'-Reil-ly swiped a blan - ket and shoved it up, I hear; He  
4. They'll try him by court mar - tial; he'll nev - er get a chance To

all the bloom-ing out - fit, no bet-ter man than he; The rank-ing du-ty non - com, he  
blew him-self at Ca-sey's place, and then went in the hole. He drank with all the rook - ies, and  
shoved it for a dol-lar and in - vest-ed that in beer. He licked a cof-fee cool - er be-  
tell them how his moth-er died, or some such song and dance. He'll soon be down in Comp-ny A a -

know his busi-ness well; But since he's tum-bled down the pole O'-Reil-ly's gone to hell:  
shoved his face as well. The whole out-fit is on the bum. O'-Reil-ly's gone to hell.  
cause he said he'd tell. He's ten days ab-sent with-out leave. O'-Reil-ly's gone to hell.  
sleep-ing in a cell, A big red "P" stamped on his back. O'-Reil-ly's gone to hell!

CHORUS

O'-Reil-ly's gone to hell, since down the pole he fell; He drank up all the bug-juice the whis-ky man would sell. They

ran him in the mill, They've got him in there still, His bob-tail's com-ing back by mail, O'-Reil-ly's gone to hell.

D.C.

# LITTLE MISTER MARKER

By Capt. Robert D. Edgren, FA



You may not believe in dreams—but at least you don't believe in having 'em interrupted at 0300 by some bewildered mugg standing on your chest, yelling "C Battery! C Battery! C Battery!" The fact that you're slumbering in the middle of A Battery won't help your disposition any. After you have politely directed the soldier on his way, in a voice made unnaturally gruff by the night air, you lie back again, rub your chest, and reflect:

"Mebbe it was my fault. I should have loaded those markets so that they would come into the area in their OWN trucks. Then the guides would've directed them to the right battery location and they wouldn't be stumbling around hunting for it."

The marker's job begins on a page in the RO's notebook. The thrilling story of the RO and his notebook goes something like this:

Suppose our battalion has received two days' warning before its march from Algiers to Philippeville. The battalion commander isn't familiar with the road and hasn't time to look at it. He sends the reconnaissance officer to find the best route.

The RO gets his maps and goes out on the road. He jots down in his notebook, among other things, information about turns and intersections. He estimates how many can be marked with signs, and how many by men.



He's trying to save men. But he can't do without 'em because he hasn't a sign that'll run out in the road and stop cross-traffic.

When he returns and goes into a huddle with the S-3, the two of them figure out how many markers will be needed. If the battalion commander agrees with their figuring, the march order may include something like this:

"The traffic escort detail, under the command of Captain Williams, will be formed by 0900 on the Boulevard Carnot headed southeast with the lead vehicle at the Rue Constantine. The following men and vehicles will be sent to Captain Williams:

HQ Battery: 1 NCO, 8 men, two ¾-ton trucks with drivers.  
A, B, and C Batteries: each, 8 men, one ¾-ton truck with driver."

The battery commanders who get this order now have the job of carrying it out, and they can tackle it in one of two ways.



1. *Hurry-up situation.* The advance party must form as soon as the march order is given. In this case the BC may take a messenger with him when he goes to hear the march order.

If the battalion commander will let his BC's send their messengers when he has finished the part of the order concerning the advance party, the messengers can send the men and trucks forward early. The advance party, including our route markers, will be forming while the rest of the march order is being given.

2. *When time is not so important.* The BC's will hear the entire march order through. Then they'll go to their batteries and have the first sergeants send up the route marking detail. Once the detail is on the way, the BC's will begin their battery march orders.

Notice that whichever way it was done, the men for the route marking job didn't hear anything about the situation or mission.

Better not overlook that. Naturally the men who are to guide the battalion along the way should know what they are trying to do and where they are going. The reconnaissance officer will tell them—along with the pioneers and quartering party—about the situation and mission. Captain Williams, who was made traffic escort officer by the march order, will then give the route markers their special instructions. If he does this before starting, he won't have to hold a tete-a-tete with each man before posting him at a crossroad. Conversation is pleasant—but the colonel's won't be, if he runs into the tail of the advance party.

Captain Williams tells his men

(1) How to mark the route.

**If they're green, he reminds them of the alert way to stand: one arm clearly pointing the way, the other used to caution drivers, if that's necessary. At night they may hold a blackout-guarded flashlight to illuminate the directing arm.**

(2) If the march is time-controlled, how to pass back the time.

The control officer will shout, or write and hand out, the time as he passes the marker. The marker should shout—or show—this time to the head of each march unit following, without being asked. On request, he should repeat it to any officer.

Some control officers like to write the time on a placard. They believe the time can be read from a moving vehicle better than it can be heard. But placards aren't T/BA and you might find yourself on some big South Sea Island without 'em. Also, they can't be seen at night without lighting.

The value of passing back the time is that the heads of march units know (from the march order) how many minutes behind the control car they should be. They can tell from the marker's time whether they're early or late.

(3) Captain Williams tells his markers that they will be numbered when they are posted along the road. This later enables the NCO to keep count and not miss anyone.

Markers should shout (they're good at shouting by this time) their numbers without being asked. It saves time . . . and the NCO's voice.

(4) Special instructions, if any.

Captain Williams is now ready to load up the party. And if this problem stumps him, he can think back over the alphabet. All he needs to know is his ABC.

The principle is this: each marker should arrive at the bivouac in the truck from his own battery. Then he won't be stepping on people, interrupting dreams, and raising hell.

The truck from his own battery must be the one ahead of him in the column. It is the one which will be emptied and left beside the road just before he's posted. And as we'll see in a moment, 'tis the one which the pickup NCO at the tail of the column will use to bring him in.

Just to be sure that the markers from A are preceded by A Battery's truck, the markers from B are preceded by B's truck, and so on, let's arrange those trucks alphabetically:

(This party will move off toward the left.)

A      B      C      HQ      HQ

Leave the A Battery truck empty; it's the one we will first leave behind to pick up markers. Now, alongside the others, let's arrange our markers like this:

A      B      C      HQ

Each group stands by a truck: the group from A Battery beside B's truck, B Battery group beside C's truck, and so on back.

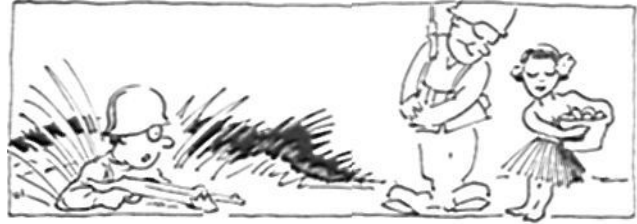
Order the markers to climb in.

Put the NCO and Captain Williams in A's truck and your party is ready to move.

At the first place requiring a marker, Capt. Williams stops the A Battery truck and tells the driver to mark the intersection. The NCO has the truck driven off the road and concealed, while Capt. Williams climbs into the plush-lined Pullman from B Battery.

In order to keep from running out of markers, he's economical. He doesn't leave men where the road plainly goes straight ahead, because the drivers have been told not to turn off unless they're directed to.

But he marks the forks, railroad crossings, fords, one-way bridges, and places where a man in time will save 600.



In a combat area he may post two men at a time: one is concealed in the bushes, protecting the other with his carbine.

Whenever Captain Williams empties a truck he leaves it, concealed beside the road; its driver is used as a marker. Capt. Williams clammers into the following truck and goes on.

He could make a lot of mistakes, so he'll think carefully every time he puts out a man.

Let me illustrate.

On one hurry-up march, the RO had the only map. It was marked. He was to follow the blue line.

So he said to the traffic escort officer: "I'll find the way. When I think you'll need a marker, I'll stop. You put out a man."

They started. All went well for ten miles. Then the RO got lost.

"Driver," he said, "stop here. I want to look around."

He studied the map carefully, and in the meantime the traffic escort officer put out a marker. The RO started up again. Oops! Still lost.

Stopped again. Another marker out.

Then he found the route and went along. The two markers who had been tossed out on a straight stretch of road had no instructions. Being energetic, they looked around. One found a puddle. It was two inches deep.

"Looks foolish," he mumbled, "but this must be dangerous. The column should go around to the left of it."

So he waved the control car around the puddle. Then HQ Battery. Everyone took his directions as a matter of course.

This built up his confidence. He became more dramatic. A Battery approached; the others had gone out of sight.

He pointed to the left. A Battery obediently turned off the road, down an old pair of ruts made years before by a rambling farmer. The marker was so engrossed in the oncoming trucks that he paid no attention to the ones that had gone by—until too late.

It was pitch dark. He tried to run after them, and fell. He shouted, and they didn't hear.

About that time B Battery roared along and the marker let them go down the right road. Pretty soon the motor officer came along at the tail of the column. The marker was so discouraged that he wasn't giving any signal at all.

When a marker gives no signal, look out. Must be trouble somewhere. So the M.O. cried, "Which way?"

There was no answer but a vague waving of arms.

"Which way did the others go?"

"Well, sir — some of 'em went this way — and some of 'em went THAT way."

Those who turned off the road wound up at a deadend fence three miles away. They finally made their way cross-country and by back roads to the bivouac.

\* \* \*

Markers have a hard job at night. If they pay enough attention to their marking, they get run over. If they wave a white handkerchief in self-defense, the drivers don't know which way to turn. Their best helpmeet is a flashlight, which they're often not allowed to use.

In this dilemma it helps to shout directions, simply, like this: "Turn right!" The driver can hear those two words as he comes up. They don't confuse him. But not all markers will give directions simply.

We once put out a man who hunted around in the dark to see just how the land lay. He was ingenious. He slid his feet along the ground and located two small bumps just before the turn.

So to each driver he said: "After the second bump, turn right."

Twenty trucks went by without a mistake.

The twenty-first crossed the intersection and dived into a ditch.

The driver wrote an accident report. Here's his explanation: "Route marker said to turn right after second bump. Second bump was six feet deep."

\* \* \*

At night a route marker is safer wearing something white around his chest. Undershirt outside, for instance. If he washes his undershirt occasionally, it'll reflect more light than a handkerchief. And it'll leave his hands free for signalling. The driver can often follow hand signals if he has already located the marker from a distance.

Another handy dodge is to put white paper on a dark patch of road as a guide, and to tell the drivers to straddle it with the truck. This will help them find the safer ruts on a muddy road in the dark. Another aid for a lonely marker is a blackout flashlight in a box which shields it from air observation. It will help guide trucks through a difficult spot.

\* \* \*

Now, to get back to the business of picking up our markers, let's assume they came through the darkness alive and safe. The pickup NCO will come along and gather them up.

He begins his job when the tail of the column reaches him. He spots the trail car and pulls A Battery's empty truck into the column just ahead of it.

Aha! Is that *your* demoniac laughter as you say, "How can he see the trail car in the dark?" Hmm. Well, it's a cinch the Motor Officer (or his driver) in the trail car will see the marker standing in the road, with the NCO nearby. Why not stop and tell them it's time to move along?

It's a team, this NCO-and-Motor Officer combination.

The Motor Officer can have repairs made on the marker pickup truck, if it should ever need them. And the pickup NCO will look out for the Motor Officer in case the trail car has trouble. The NCO should not just dart ahead and pick up the markers. Many a Motor Officer's eyes have been dimmed by trying to follow a column into camp along wheeltracks seen faintly by the glow of the dim and distant stars.

As the pickup truck comes along, the markers greet it with eerie yips of delight and, if prodded, their numbers. The NCO may not be able to get 'em to yell out their numbers before climbing in unless careful attention is paid to this detail in training.

He started out with A's truck. Remember? He picked up the first men who were posted. They were A Battery men, so they'll come into camp in a fitting equipage.

He'll then come to an empty truck (yep! B's) and will send the truckload from A on forward, to pass the column during halts and rejoin the advance party if the march order and driving conditions allow it.

This is to cover one of those embarrassing slipups. Suppose the RO has figured wrong and the advance party is fresh out of markers?

The traffic escort officer may use the pioneering party and even the quartering party, if no other men are handy. He will be delighted to have another truckload of markers come forward. (Of course this will ball up your beautiful arrangement for getting everyone to the bivouac in his own truck, and everybody will be mad all 'round. But that's better than not getting there at all, eh?)

In any case, the quartering party may need help. The markers will always come in handy if they can rejoin the advance group.

To get back to the NCO again, he climbs into B's truck and picks up B's markers.

Every time he comes to another empty pickup truck he gets into it and sends the full truck ahead.

When he comes to the bivouac area with his last truck, he should find Captain Williams and check to see that he got all the markers that were put out. Captain Williams can then report at the CP that all the marker trucks and men are in.

Meanwhile, the quartering party guides have sent each truckload of markers to the right battery. But . . . hey! wait a minute, you say. S'pose there were some extra men that weren't used to mark the road? What about them, hmm?

Well, any extras would probably be from the last group, Headquarters Battery. And they rode in a Headquarters Battery truck all the way, so even they arrived in the right vehicle.



## A "FROG" AT FORT SILL (Conclusion)

By Lt. Charles H. Taquey, FA

By the tenth week you are ready for tactics. Only three weeks of them; three weeks to assimilate the fundamentals of military art—rather, to learn a new way of life. The Warrior's way of life.

Up to now you have dealt with separate techniques: how to handle a gun, make a traverse, inspect a car. Now you must "think a situation," find in an instant the proper use of each technique at your disposal and of each man under your command, for the fulfillment of your mission. You must live your mission in such a way that you will never be surprised by any change of situation, that you will find a way of turning to your advantage even the most unfavorable circumstances. Ultimately, you will be introduced to the fundamental responsibility of Command: making decisions for others. As an enlisted man you have had a valuable experience of military life, but an unconscious one. You were doing what you were told to do. Now you have to think what to tell them to do.

First the school teaches you to fit mentally your own branch of the service in its proper place among the others. You must be proud of it, but remember that infantry in modern battle is more than ever the Queen. Ultimate success depends on how you support that Queen and maintain liaison with her (*Honi soit qui mal y pense*). Your brilliant infantry instructor will tell you, with all the necessary emphasis, that the aim of any military operation is a doughboy on the enemy position, with a rifle in his hands and a bayonet at the end of it.

As an artilleryman, your mission will always be to support the infantry. The techniques you know will be your tools to that end. After having learned the "how to do it" you will learn the "when, where, and what-for." Tactics will become a part of your life; you will open your eyes on the terrain, on and off duty look for positions, collect the necessary information—yes, you will always be more or less an intelligence agent. You will keep record of every available bit of information on notes or on sketches, maps, and photomaps you have been taught how to read.

You make acquaintance with the other arms which help you or against which you have to organize a defense. You start a lasting relationship with military administration and

its indispensable neighbors, logistics, transportation, supply, army organization. You are directed to give some thought to the "Conscience of the Army," the Court Martial and the fearsome apparel of the Articles of War. Supreme consecration of your new duties, you receive instruction in combat orders.

But tactics are a way of life that the book alone cannot give to you. The practice only creates habits, reflexes, ready to be used when the opportunity occurs. It also makes you realize your ignorance better than any gig or any U. It makes your mind more permeable to future injections of theory. RSOP's afford such a practice. You will like them more or less according to your knowledge of the job assigned to you. If you do not know, everything will be for you like a bad show. If you do know, if you direct your attention to what happens around you, if you keep on the ball, if you are your own critic, you will enjoy your RSOP more than a dance with your best girl—well, almost as much, anyway.

A final feature marks your weeks in tactics: demonstrations of infantry and artillery in the attack, artillery in the defense, air support, antitank operations. You will have something there that many a German *Von* would give his eyeball for. Once and maybe for all time you will have seen from the best OP the broad picture, the one historians always talk about but nobody sees in the fog of war.

That is all. You have graduated, you have bought your uniform with trousers pink or dark, and your overcoat short or long. You have got your assignment; you have been treated to a few orientation talks by your Tactical Officer, to some music and a speech by some distinguished guest. You have shaken hands with the General and received a big bundle of papers. You know that you are assuming a heavy responsibility and that you are not starting on a party of fun. Still, you are probably more happy than at any other time in your entire life. Even old routiers are, and you throw your hat with no little enthusiasm. Now you do not have anything else to do than to start working hard and learning without being told.

\* \* \* \* \*

Enough with this lucky fellow. He has got his bars,

so let him enjoy a few days' delay en route (in the interest of the public service) with the girl back home. Soon enough will responsibilities befall him.

But what of the man who is now going to Fort Sill to face the ordeal previously described? The public who pays the expenses is interested in his success. It is a fact that many fail. What is the solution? In the opinion of the writer the solution depends entirely on the Candidates. The Unit Commander who segregates them, the Boards of Officers that designate them are not gold diggers supposed to bring to the surface hidden "officer material." The job of the Unit Commanders and Boards is simply to determine that each Candidate is willing to become an Officer because he seeks



responsibility, and *not* because of "the personal advantages attached to the job"; that he is adaptable enough to assimilate without trouble the basic knowledge involved. A man selected in that fashion may well become an officer, but he will become one only at the price of personal effort, of thinking of his job individually, of acquiring the basic qualifications by himself. This means nothing more than the ability to develop the logical consequences of love of responsibility and adaptability.

Since a clear perception of what he needs should help him to acquire it, the Candidate or prospective Candidate should keep asking himself the following questions:

1. AM I THE MOST COURAGEOUS? It does not mean that I should feel less fear, but that I should be more able than any other to *overcome* any fear of a physical or a moral nature. Do I feel any panic when faced by a job slightly complicated or new to me?

2. AM I THE MOST SKILLED? Of course I do not have to know the book verbatim, but:

a. I must be able to acquire quickly, memorize definitely, and repeat with authority the basic mechanisms of my trade—such as giving calisthenics, laying the battery, and adjusting fire by various methods.

b. I must have a knack for references, and always be able to locate quickly any data pertaining to a given question.

c. I must have an instructor's ability, make a habit of

thinking in advance what I shall explain, and find the way of interesting people in what I explain.

These two fundamental requirements are also the easier to fulfill; as to the harder ones that follow, they may be achieved and will in fact be achieved only by practice in the most trivial encounters of your daily life.

3. AM I THE MOST ADAPTABLE? Do I have prejudices? Do I lack understanding, do I always want to have the last word? do I stick uncompromisingly to my habits?—if I do, I must change because the essence of a military situation is fluidity. I must be able not only to absorb a teaching and to be indoctrinated by it, but also to apply it to changing circumstances and changing individuals. Slit trenches should not always be dug in the same manner. To command others requires above all an aptitude of putting oneself in their place and knowing by intuition what they feel. Intuition does not exist without pliability of mind.

4. DO I HAVE COMMON SENSE? Of course I think that I have plenty! But I should not be so certain. How many times does it occur that, of two solutions, the stupid one presents itself first to my mind?

5. CAN I TRULY APPRECIATE ANY SITUATION, PRESENT OR FUTURE? This requires a great deal of knowledge, and even more

imagination. It means first that you have always to know—where you are, why you are there, and what will be your next move. You are no more a soldier who can allow himself to relax and indulge in the delights of the "don't know." You must know where are your men, where is the next outfit, where are headquarters, where is the infantry. And if you have not been informed you have to ask—and if you do not get an answer, you must guess. That is not all; you have at all times to make an estimate of the situation; to calculate the influence of terrain, forces in contact, air support, weather, etc., on the operations. How to get accustomed to it? By experience only. If you have no mission from higher HQ you can assign yourself a mission for the day or the week. This is a very good habit to form; it is said to be compulsory in the German army. It obliges you to find out where you stand and what you are aiming at. As an officer, this is what you will have to do all the time.

The preceding paragraphs apply to all Officer Candidates. Each branch of the service has its special requirements. Here are a few pointers that may be of use to Ft. Sill's prospective students.

I. MAKE YOUR MIND FREE BY DEALING IN ADVANCE WITH A FEW SIDELINES. Even if you have had artillery experience, these sidelines will still give you some trouble; if not, it is absolutely required that you master them in advance, to make your



mind open to a new discipline. Try to come to school in top physical shape. At Sill you will not have any fixed schedule for physical training, and the lack of it combined with 12 hours of study a day will drive your nerves to the breaking point most of the time. If you do not have the courage to run each day 2 or 3 miles double time on your own, to settle them, better learn the stuff in advance.

Another point, if you cannot count mentally or do not understand how gun-sight and aiming-circle work together:

*a.* Every time you do not have anything particular in your mind, add and subtract mentally numbers from 2 to 32, from numbers up to 350; multiply 10, 20, 30, 40, and 50 by 1/2, 1/3, 1.2, 1.5. Having done this for some time, you will face the first service practice with security and poise, and deliver an adjustment that will force the admiration of everyone (provided that you know your procedure and open your eyes).

*b.* To convey to you the principle of the sight, the school furnishes you with cardboard figures. Get hold of one as soon as you can and practically go to bed with it.

As an artilleryman you will have to devote more time to theoretical study than any other student officer. The course will mainly deal with scholastic matter. You must therefore be the one to teach yourself the external marks of leadership, voice, brace, general behavior, a certain aloofness. Get these habits before going to school. You will find the going there the more easy.

Last but far from least of these trivial matters: call an end without delay to the terrible habit of loose talk and loose

letter-writing. Cease describing in detail to the people back home your military activities, your proposed changes of station, your feud with the top sergeant. Remember that a gentleman does not talk shop.

II. STOICAL TRAINING OF YOUR CHARACTER IS THE ULTIMATE REQUIREMENT TO MAKE OF YOU AN EXCELLENT SOLDIER, AND OF THE TOUGHEST EXPERIENCE AN ENJOYABLE ADVENTURE. The French call it *esprit sportif*—and it is not at all our "sporting spirit." It is a faculty of looking after hardships as the proof of your strength. It is a very simple psychological trick that turns into action and self-forgetfulness that which was originally self-concern. It has been called *athletism* in the case of the Christian martyrs, and the word remains in the language of sport because trackmen need the same virtue as a martyr (though in a different degree) to acquire complete control over their own selves. That spirit cannot be acquired in a few easy lessons—but what you can do, until you become an officer, is to forget for a time that grumbling is the basis of military expression. Take advantage of your being K.P. or on guard on a cold night, to prove to yourself what you can stand. By doing that you will keep your mind alert and learn a multitude of details of which the lack would be sorely felt later on.

If this program does not frighten you—and there is no reason why it should—you will soon be ready to join a fine body of men and to do what is not only a most important job in the warring world of today, but also—as it always has been—the noblest task for a man worthy of that name.

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#### TARGET!

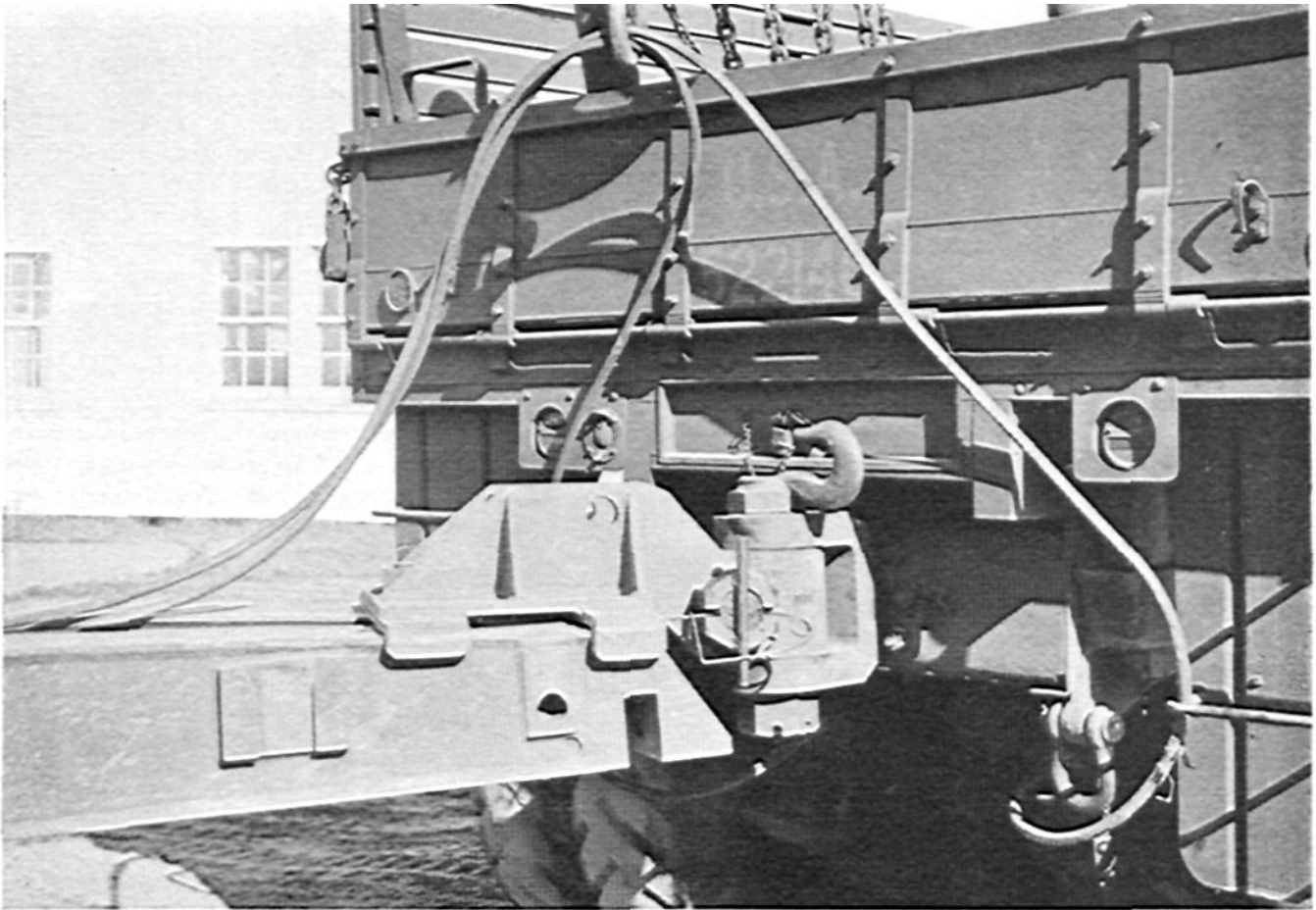
Usefulness of the JOURNAL as a medium for spreading word of developments and devices is well illustrated by the reception given Col. Mellon's recent article. For example, *On the Way*, periodical of the Field Artillery of the 80th Division, carried the following article in its February issue:

##### "MINIATURE SERVICE PRACTICE RANGE COMPLETED

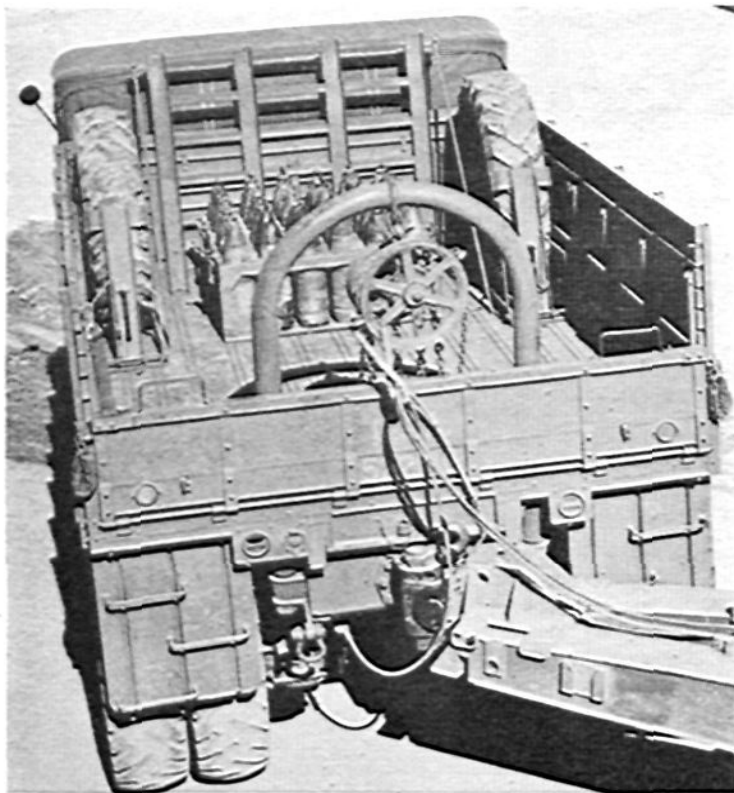
"The Miniature golf course craze of the early 1930's has been inducted into the Service and re-designed for Artillery use. Next to the 315th-905th Rec Hall is the recently completed Miniature Service-Practice Range. It has been designed and built for the use of Div Arty O's and EM and affords them an opportunity to fire problems with many of the features of actual service-practice conditions.

"Inspired by an article in the [February] FA JOURNAL, Col. Wilbur S. Nye, Div Arty Exec Officer, ordered the construction of this midget range, built under the energetic supervision of 2nd Lt. W. G. Dudman. The scale is one ft to fifty yds and the range permits the simulated firing of problems at targets as far distant as '7000 yds.' Suspended on a wire net, the range is complete with miniature towns, farms and appropriate landscape. Objectives are marked by little puffs of chemical smoke (ammonia and hydrochloric acid) blown from under the mesh."

Col. Nye advises that this miniature range was functioning just five days after the JOURNAL arrived. It has aroused much enthusiasm, and is as fine as Col. Mellon claimed.

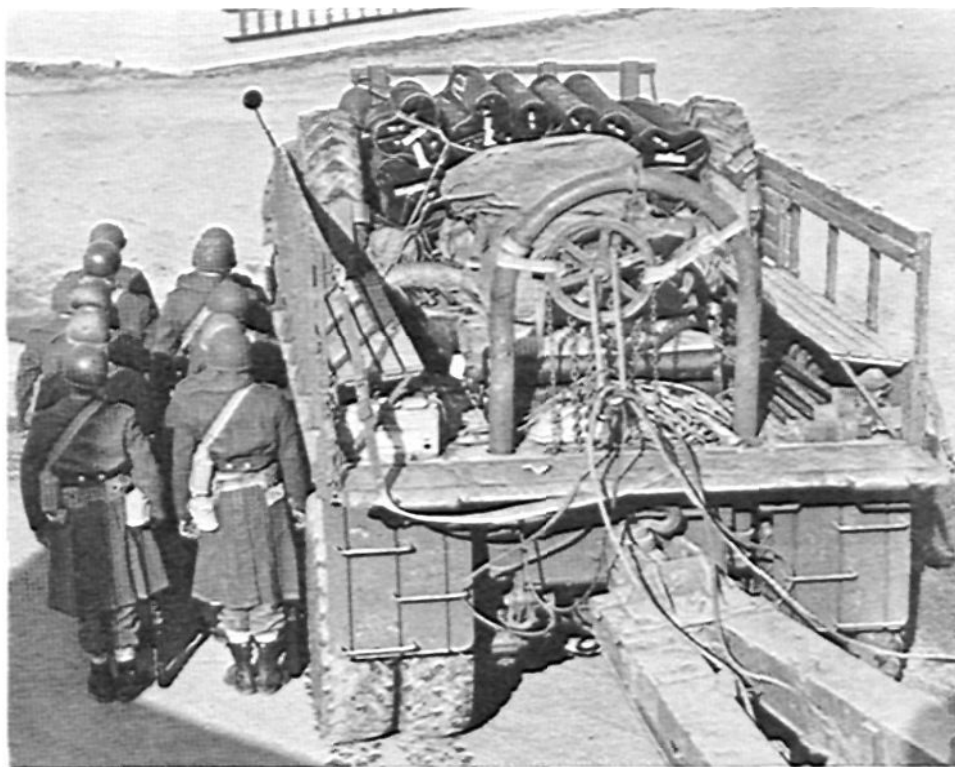


*When using the 7½-ton 6×6 heavy artillery prime mover, BE SURE that brake lines to the piece cannot be pinched on turns. The only fool-proof method is shown here. Loop the lines outward on the prime mover, through the step, thence as high as the top of tailboard, and smoothly out to the piece without excess slack to droop and cause trouble. The lines' entire length is thus positively kept well clear of the coupling — and your brakes will work when you need 'em.*



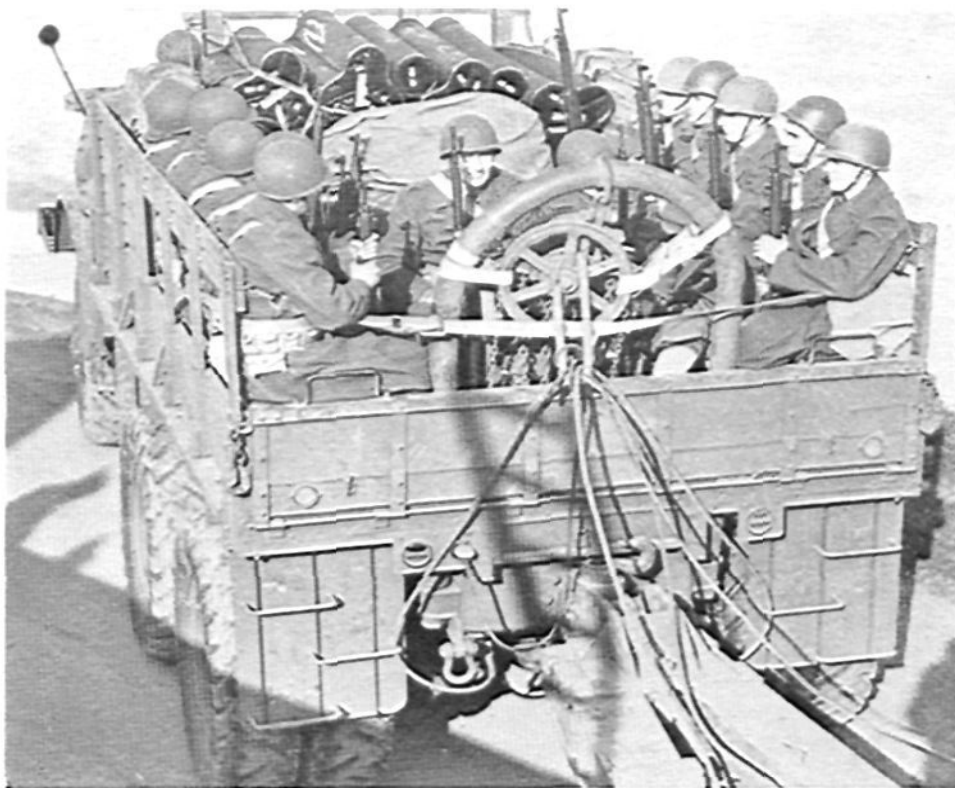
*Here is a prime example of how NOT to route brake lines. A sharp turn to the left will surely mangle the droopy-drawered line from the prime mover's left. This picture also shows how 155-mm. shells are carried in their rack on the truck's bed. You probably have found it out already, but the inside of spare tires is an ideal place for your men's packs. For use of lattice-work behind the cab, see top of next page.*

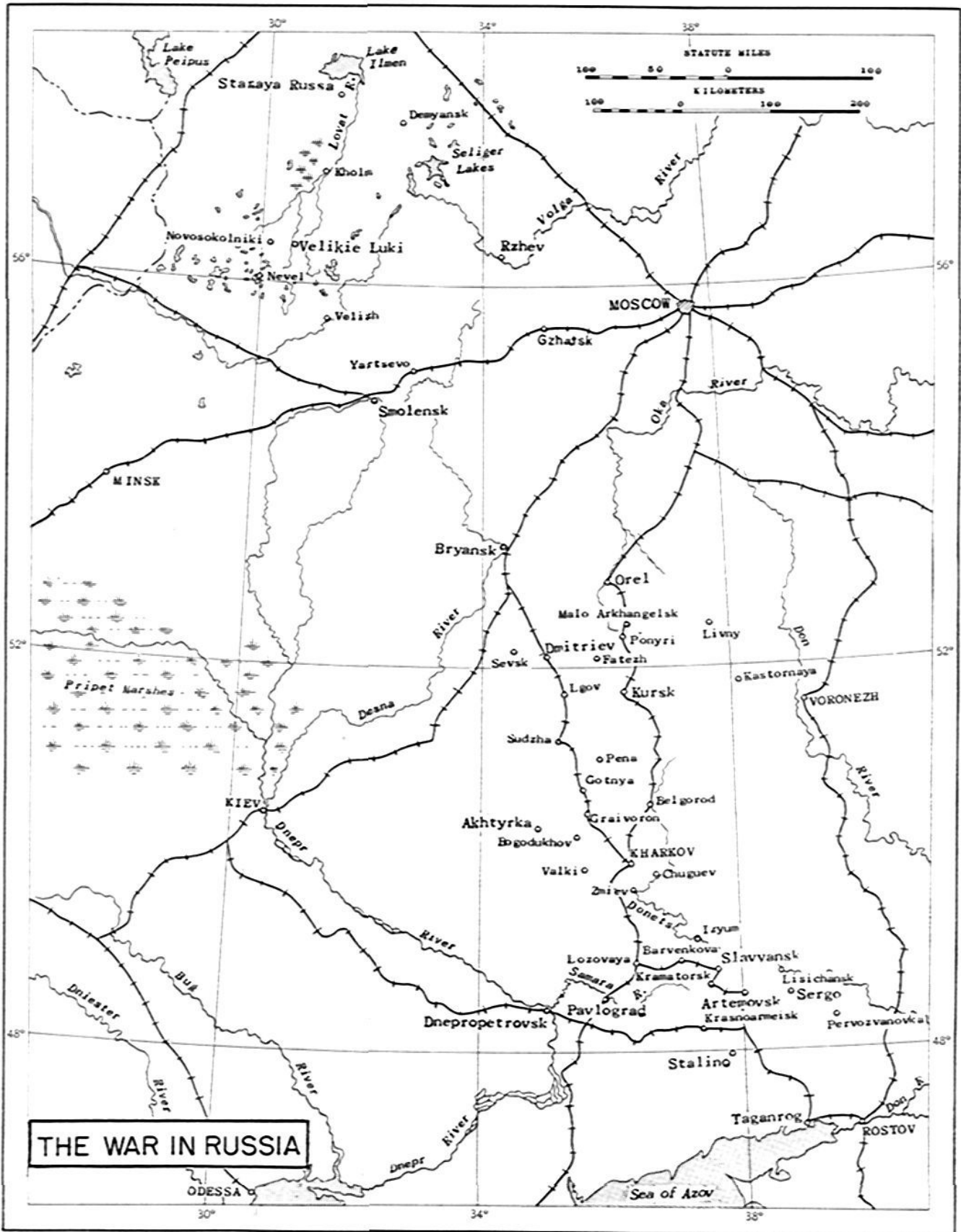
*Powder charges are stacked on top of projectiles, then firmly lashed to the latticed frame behind driver's cab. Poles, rammer, stakes, etc., go under one seat; fuzes, tools, and the like under the other. Camouflage net is piled in center—and remember to make a powder-charge seat for the men who can't get onto the benches. Incidentally, there ARE twelve men alongside the truck—even if one is too short to be seen!*



## HEAVY PRIME MOVER

*Nothing can rattle around in the fully loaded prime mover, but there is room for everything and everybody — even in winter clothing. This photo and the one above will bear close scrutiny by all who have or expect to receive this vehicle, as a guide for working out your own loading method.*





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# *RUSSIA:*

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February 20  
to  
March 15, 1943

(Based on the best information available at date of writing, this article is subject to later historical correction.)

By Col. Conrad H. Lanza

## GENERAL SITUATION, 20 FEBRUARY

Prior to this period the Axis (in compliance with orders issued by their GHQ about December 24th) had been engaged in withdrawing their troops to a shorter line, the location of which had not become known to observers. Due to the greater distances involved from there, the retreat commenced in Caucasia and had been substantially completed by the period covered herein. This particular Axis force accomplished its withdrawal with only minor fighting for so great a war, and without special losses.

Further north, the troops engaged with the Russian armies attacking along the Don River from November 19th on had been forced back at first in heavy fighting and had suffered considerable losses. Most of the troops were intact as to organization. They were across the Donets River, and nearly on the new line of operations.

Still further north, opposite Kursk, the withdrawal was still in progress. Except for 9 divisions almost entirely destroyed near Kastornaya (west of Voronezh) in January, the troops were in good shape. Continuing north, the front between Orel and Bryansk had not changed, and apparently no change is here contemplated.

East of Smolensk, and south of Lake Ilmen, the withdrawal to shorter lines had not yet commenced. North of Lake Ilmen no change had occurred, and none seems to be contemplated.

## THE CAMPAIGN IN UKRAINIA

Since November 19th two Russian Groups of Armies under

**Colonel General Philip I. Golikov, north of Kharkov (inclusive), and Colonel General Nikolai Vatutin, south of Kharkov**

had been engaged in a general offensive with the mission of liberating Ukrainia. This large province with a population of some fifty millions furnished the majority of the food supply of the Soviet Union. It also contained vast mineral resources and great industrial establishments. Its loss to Russia was a severe handicap. Its occupation was an asset to the enemy, and it was known that he was organizing the province for his own benefit.

The Russian offensive had had unexpected success, having advanced in just three months some 200 miles from the Don to across the Donets, and still greater distances in Caucasia. It was still moving west. By February 16th the front had arrived on the following line:

**Taganrog (Axis)—thence east of the Mius River to Pervozvanovka (Axis)—Sergo (Axis)—Artemovsk (Axis)—**

**Kramatorsk (Russia, with a Russian salient at this point to Krasnoarmeisk)—Barvenkova (Russia)—Zmiev (Russia)—Valki (Axis)—Graivoron (Russia)—Gotnya (Axis)—Pena (Russia)—Lgov (Axis)—Fatezh (Russia)—Ponyri (Russia)—Livny (Russia)—Orel (Axis).**

Due to the fact that the Axis in their retreat had destroyed roads and railroads, demolished towns and villages most completely, and planted numerous land-mine fields, the Russian forces were dispersed in depth. Forward were the armored troops and their artillery. Scattered to the rear were infantry divisions with their artillery, consolidating and reorganizing the recaptured areas and opening supply lines to the front. There was a shortage of railroad rolling stock. The railroad gauge had to be reconverted back from the German standard gauge to the Russian wide one, bridges rebuilt. Still, no particular danger was apprehended. As one Russian division commander expressed it, they had now been on the offensive for three months, and despite difficult situations had always won. The general impression was that the offensive would continue to roll on.

The Axis' plan of withdrawal had contemplated retirement only to a line from behind which the offensive could be resumed. This decision accords with the rules of strategy: that the defensive should be adopted only temporarily, or limited to certain sectors. If there be no hope of resuming the offensive, there is usually no sense in going on with the war. Such a situation existed for Germany in November, 1918—being defeated, she realized she could not thereafter successfully resume the offensive and thereupon signed an armistice. The fact that no such procedure was taken during this winter, coupled with statements from reliable sources that the Axis was raising new forces, pointed to the probability of an offensive return whenever the withdrawing Axis armies had reached the line selected.

In fact, during the two months since adoption of the December plan the Axis had been moving troops to Russia from Germany, allied states, and occupied western Europe. In the area east of Dnepropetrovsk a mass of maneuver had been assembled consisting of 12 divisions, of which 7 were Panzer divisions. Another mass of maneuver was being assembled south of the line Orel—Bryansk, but it was not yet ready. Replacements had been furnished to divisions in line, who had been withdrawing.

The Axis in south Ukrainia covered the important industrial, coal, and mine ore area which centered around Stalino. No further withdrawal was contemplated, as

except for the salient south of Kramatorsk, Russian attacks had broken down before this line. It was in part substantially the same line as had been held by the Axis in the preceding winter. About February 16th Gen. Vatutin decided on the following plan for surrounding this Stalino position.

Observing that Gen. Golikov's armies had captured Kharkov and in so doing had completely defeated three German divisions in and about that city, it appeared that the Axis was probably weak in this vicinity and thus no danger was to be expected from this direction. Gen. Vatutin therefore organized a force of some three armored corps northwest of Barvenkova and directed it to proceed southwestwardly (via Pavlograd), cut the Axis line of communications to the Stalino position, and then envelop it from the west. At the same time another armored force, which had the spearhead at Krasnoarmeisk, was ordered to attack vigorously southward and split the Stalino position in two. At the proper time the two Russian armored forces would join in encircling the Stalino position. If this plan should succeed it offered hopes of destroying the large Axis force within the Stalino position. If this happened, the way would be open to the liberation of all of Ukraina.

Movements of both forces started on February 17th. The attack south from Krasnoarmeisk met very strong opposition and was unable to make any gains. The advance around the north of the Stalino position, as expected, met no great opposition and pushed on to the west. Weather alternated between snow and rain and was continually cloudy. The Russian air service failed to discover German troop movements, but the German air service did discover the Russian north force advancing westwardly. The latter kept on, its advance elements arriving at Lozovaya on February 19th and at Pavlograd on the 20th, still without serious opposition. Although the Krasnoarmeisk attack had been continuously pushed (without advancing) against very strong forces identified as Panzer and motorized infantry divisions, the Russian command felt that their maneuver was on the point of succeeding and that the Stalino position would shortly be encircled. Air observation was still bad.

In view of the Russian maneuver, the Axis High Command adopted a plan which in principle was the same as that of the Russians. The mass of maneuver east of Dnepropetrovsk moved northeast under protection of an air umbrella, with its main force north of the Samara River, and prepared to attack in the direction Lozovaya—Slavyansk, striking the north Russian force in flank. This Russian force would also be attacked by German divisions issuing from the Stalino position. A second German force south of Krasnoarmeisk was to attack northward through Kramatorsk, also on Slavyansk. If both attacks could be kept advancing in coordination the north Russian column would be completely encircled.

The German attack at Krasnoarmeisk was launched on February 20th, without much success. The attack of the

Samara River was made on the 21st. On that morning the Russian north column had its advance elements at Pavlograd (which turned out to be the high water mark for the current Russian offensive), while its rear elements were near Lozovaya. This army had made a flank march in front of the German mass of maneuver without knowing it and was now preparing to move on south, believing that it had nearly accomplished its mission of cutting the Axis line of communication from Dnepropetrovsk to Stalino.

Unexpectedly strong hostile forces now appeared on both right and left flanks, led by Panzer troops and accompanied by violent artillery fire and dive bombers. At the same time reports were received that the enemy ahead, who had been retreating, had turned and were attacking the advance guard. Other reports came in that enemy forces were working around the rear. Instead of surrounding the Axis forces in the Stalino position, the Russians now saw themselves suddenly surrounded while far away from any support. This information was reported by radio to the Russian High Command, who also received reports which convinced them that the enemy's attack about Krasnoarmeisk was no minor affair but a serious effort which threatened to move north.

The High Command made an instant decision which saved the bulk of their armies: they abandoned the maneuver to surround the Stalino position. Both Russian columns, now heavily engaged with what appeared to be superior enemy forces, were each ordered to detail one armored corps as a rear guard, the bulk of both forces to break off the battle and withdraw immediately to the area southwest of Izyum, the nearest point where they could unite. This position would also protect their communications across the Donets River. Both Russian forces were able to carry out this order, and by promptly moving to the rear the main bodies got away that night.

The Russian IV Motorized Guard Corps, less transportation and services, was detailed as the rear guard at Krasnoarmeisk. It selected a defensive position. Its guns were concealed in stone buildings of the city as far as practicable; tanks were dug in, as nuclei for strong points. The transportation of the Corps was used to expedite the withdrawal of the main body. This rear guard held until February 23d, by which time it had been practically destroyed. Its commander was among the killed. Only about a thousand prisoners were taken by the enemy, the balance of the Russians dying at their posts. They had succeeded in obtaining time for evacuation of the salient south of Kramatorsk.

The Russian north force detailed the VII Guard Cavalry Corps (armored) as their rear guard. It endeavored to hold the road centers around Lozovaya, while the main body broke out of the near trap they had been in and rushed back toward Izyum. This rear guard held out until February 24th, without being able to prevent a part of the German forces from by-passing it.

Notwithstanding these delaying actions, which resulted

in the Russians losing two complete armored corps, the main bodies did not escape without loss. In spite of low clouds and alternate rain and snow, the retreating Russians were continuously bombed and machine gunned. More important appears to have been the fact that the Axis was fully informed of Russian troop positions, while the Russians were only partially informed.

On February 26th the Axis force moving north via Krasnoarmeisk was just south of Kramatorsk, attacking northward. The German army of maneuver, near Barvenkova, attacked eastward. A great tank battle occurred with the advantage in favor of the Axis. Kramatorsk was lost, and it appeared that the two enemy forces would shortly join in a common effort. The Russian High Command thereupon detailed the XXV Tank Corps as a rear guard to delay the enemy and ordered the main bodies to withdraw without delay across the Donets River.

On the 27th the last of the Russians near Lozovaya were overcome, thereby opening valuable roads to the enemy; the Kramatorsk area was completely evacuated. To relieve the pressure a Russian attack was ordered to be delivered northwest of Rostov, moving westward against the Axis defensive line east of the Mius River. This attack was made as directed on the morning of the 28th, starting with a violent artillery preparation. It broke through the Axis front but was stopped by the enemy's artillery fire before his main line of resistance. This did not change the general situation.

The German forces now attacked the Russian XXV Tank Corps, protecting the withdrawal of the main forces across the Donets. This held until March 2nd. Again at the expense of the loss of the rear guard, the main body of the Russians escaped. According to Russian accounts they were severely shelled and bombed while crossing the river. The German report of booty captured indicates that the Russians (in spite of the difficult situation) moved most of the materiel of the main body to safety. What was captured is reported as about 500 tanks, over 600 guns, and more than 750 trucks. Three armored corps (less the transportation of at least one of them) which the Russians had now lost, would account for this much materiel.

The Germans reached the Donets River on March 2nd and by the 4th (after mopping minor Russian detachments which had failed to move in time) held the Donets from the vicinity of Zmiev to around Lisichansk, a front of about 150 miles. This ended the first phase of the Axis offensive return. In 12 days they had advanced about 75 miles, defeated important forces, and cleared the Stalino position from danger.

The German mass of maneuver was now strengthened. From the Stalino position west of Kramatorsk were taken 12 divisions and from near Kharkov the 3 divisions which had been driven out of that city about February 16th and which were now a short distance northwest of Kharkov. This increased the Axis mobile force to

### DIVISIONS (all German)

|                                | <i>Panzer</i> | <i>Motorized</i> | <i>Infantry</i> | <i>Total</i> |
|--------------------------------|---------------|------------------|-----------------|--------------|
| Original mass of maneuver..... | 7             | 1                | 4               | 12           |
| From Stalino position.....     | 8             |                  | 5               | 13           |
| From Kharkov area.....         | 1             | 2                |                 | 3            |
| <b>Total.....</b>              | <b>16</b>     | <b>3</b>         | <b>9</b>        | <b>28</b>    |

The Axis now decided to make the capture of Kharkov the next step in an uninterrupted continuation of their offensive return. Several ways were considered, involving a direct attack, a turning movement from the south, and a turning movement from the north. It was decided to try all three methods, perhaps with the idea that the probabilities were that at least one would find a weak spot and succeed.

Kharkov as a city was in ruins and had no value in itself. It was important as a rail and road center, especially if the offensive was ultimately to be continued beyond the Donets toward the Don. The Russians foresaw that the enemy would attempt to cross the Donets. General Vatutin's forces believed the enemy's main effort would be south of Kharkov, probably near Izyum and Lisichansk: his main force was supposed to be in this vicinity, this was the maneuver that had been used to capture Kharkov during the summer campaign of 1942, and it appeared to be the logical thing to do again; General Vatutin thereupon organized a defensive position on his side of the Donets, covering this stretch of the river. General Golikov had the Third Tank Army covering Kharkov; he knew about the 3 German divisions to the northwest, and as his force was superior in numbers he desired to overwhelm these; he did not know what the enemy to the south was going to do, but he detached forces to watch in that direction.

The German divisions northwest of Kharkov attacked on March 2nd. They made only a small gain, but they attracted attention to themselves. The Russian Third Tank Army consisted of the

|                  |                        |
|------------------|------------------------|
| XII Tank Corps   | 2 divisions (armored)  |
| XV Tank Corps    | 2 divisions (armored)  |
| ? Infantry Corps | 3 divisions            |
| ? Cavalry Corps  | 2 divisions (armored?) |
| <b>Total</b>     | <b>9 divisions</b>     |

This Third Army decided to contain the enemy on the south, concentrate, and attack the enemy to the northwest. On March 3d they detached a rear guard to watch toward the south. This rear guard consisted of elements of all corps so that if the enemy obtained identifications he would believe the whole Army was on that front. At this date the enemy had not appeared on the south: he did not reach Zmiev until the 4th. The Third Army was slow. On March 6th their main body was preparing to attack to the northwest next day when the enemy suddenly attacked the rear guard in great force and drove it in. The Germans did at first think that all of the Third Army was in their immediate front, but as they had sufficient strength they kept right on and completely overwhelmed the rear guard.

On March 7th the Third Army attack to the northwest finally started and made progress. News now arrived that the rear guard south of Kharkov had been practically destroyed, that the enemy armored troops were dashing north. In view of this unpleasant information the attack was discontinued and troops rushed back. By night the enemy was at Lubotin (about 12 miles west from Kharkov), but at the southwest exits of the city he was right at the edge of the town. German reports state that the booty from the defeat of the Russian rear guard amounted to 61 tanks, 225 guns, and about 1,000 motor vehicles—which would indicate that the rear guard had approximated 2 divisions.

Meantime a German effort on the 6th to cross the Donets near Lisichansk failed, but it convinced Vatutin that his estimate was correct—that the enemy's main force was in this direction. Later information indicates that the main enemy force had already left for the north. It is possible that the Lisichansk effort was a holding attack, to detain Vatutin from marching north himself; whether it was or not, it had this effect.

On March 8th, the German front around Kharkov being contracted, a redistribution of troops was made by extending the left north from Lubotin to form a force to envelop Kharkov from the north. Strong attacks were delivered, however, on the west and south sides of the city, making slight progress against strong resistance. That night Russian infantry divisions arrived at Kharkov, were immediately brought through the city, and entered line with a view to attacking westward in the morning. The Axis Air Force discovered these new divisions and attacked them continuously on their way to the front, but they delivered the attack as planned. These Russian troops were probably worn out before the attack started. This met a withering fire from the German artillery and was attacked by a large number of dive bombers; it broke down. The Germans at once counterattacked, and under protection of their artillery and good air cover advanced from Lubotin to the west exit of Kharkov. The city was now closely invested on the west and south. As this shortened the German line still more, more divisions side-stepped to the north.

On the 10th the Germans attacked west and south of Kharkov without gaining ground. They continued to mass troops to the north, on their left. On the night of 10/11 March, 3 German divisions (including 1 armored division) moved eastward north of and clear of Kharkov, crossing in turn the Lopan and Kharkov Rivers. Only slight opposition was met. The Lopan River enters Kharkov in the northwest sector, the Kharkov River in the northeast portion; both rivers unite at the center of the city and then flow south into the Donets near Chuguev. Another German force protected the left and rear of the troops moving east by establishing a line south of Bogodukhov, facing northeast.

March 11th German troops entered Kharkov from the north, east of the Lopan River. Less than a month before

the Russians had themselves captured Kharkov by entering the city from the north, but the German move appears to have been a surprise and met little opposition until it was inside the city. The Axis Air Force, which included detachments from vassal states, supported three German attacks from north, west, and south. All attacks gained in violent street fighting, and that part of Kharkov which was west of the Lopan River was partly lost.

On the 12th the Russians decided to yield Kharkov, and commenced to withdraw to the southeast—to the general vicinity of Chuguev. This was the only route that was clear of the enemy. A rear guard was detailed to defend what remained of Kharkov. This seems to have been improvised from whatever units could be found.

This day the Germans delivered a violent attack from south of the line Bogodukhov—Akhtyrka. This attack carried both places, and a Panzer Division in the center pushed through and seized Graivoron. The direction of the attack for subsequent days was fixed as Graivoron—Belgorod. The Russian rear guard in Kharkov held out in the southeast section until the 13th, preventing a pursuit of their main body.

On the 14th Russian reserves which had been concentrated west of Belgorod attacked westward, with the support of some 60 tanks. These tanks encountered the German Gross Deutschland Division (armored), most of the tanks were lost, and the attack failed. This German Division, which was cited for unusually gallant conduct in this battle, had been previously reported by the Russians as having been routed at Kharkov as late as February 16th.

March 15th, when this account closes, a second Russian attack west of Belgorod again failed. On this date German troops marching east and southeast from Kharkov and others crossing the Donets near Zmiev were engaged in a maneuver to encircle the Russian forces near Chuguev, which included the troops that had escaped from Kharkov. This date also closes the second phase of the Axis' offensive return. In ten days it had advanced the line about 40 miles in places and secured the Kharkov bridgehead.

For rapidity of maneuver this campaign from its inception on February 21st recalls the time of Napoleon, when rapid maneuvering on decisive points was the essence for military success.

#### THE OREL OFFENSIVE

Orel is a strong point in the Axis defense system on the Russian front. It is also the point of a salient extending westward toward Bryansk and south toward Kursk. As far as known, the Axis contemplates no retirement in this area.

During the early part of February the Russians had moved north from the vicinity of Kursk toward Orel and had reached Ponyri. From an east-west front north of this town a strong attack was delivered northward on February 21st during a heavy snowstorm, which prevented



both air and ground observation. A very strong artillery preparation was first fired. It being impracticable to use tanks due to deep snow, the attack was made by ski infantry. This attack failed, the ski troops suffering very heavy losses.

It is possible that the ski attack was intended to divert attention from the main attack, which was launched on the next day on a wide front northeast of Orel. The artillery preparation was unusually long and formidable, and it was hoped would suffice to drive the enemy out. This attack was led by armored troops, accompanied by dive bombers who kept close to the advance lines. The Germans met this attack by a counterattack of Panzer divisions. The presence of these troops seems to have been unexpected by the Russians and they did not have enough tanks to meet those of the Germans. According to the German account the Russians lost 55 tanks in this battle; the Russian account does not claim any loss of German tanks. The Russian attack as a whole was a failure.

In order to widen the base on the south side of Orel, near Ponyri, a secondary Russian offensive was started this same day, moving about west from the line Lgov—Fatezh. This made some gains.

On February 23d the Russians renewed the attack on Orel, simultaneously from the northeast and south sides. The north attack was extended on its right as far as the Oka River. Both attacks had the support of strong and constant artillery fire. The south attack entered and held Malo Arkhangelsk. The north attack broke under what German reports state were excessive losses, leaving an estimated 10,000 killed before the German front line. The main line of resistance was not reached in any place.

During that night, the next day, and the following night, the Russians replaced their front line divisions with fresh ones. With these new troops both attacks were renewed on February 25th. Again a slight gain was made on the south side and none on the north. Additional tank forces were inserted in line, air forces were freely employed to support the infantry, while the artillery maintained a strong fire on enemy defense positions. The attack was renewed each day during the 26th, 27th, and 28th without making any gains, leaving the front line divisions exhausted. As near as can be determined from present available reports, these Russian attacks had an artillery support of less than 40 batteries per division. Division fronts appear to have been 2½ to 3 kilometers and possibly more, which would give only 16 batteries or 64 guns per kilometer as against about 100 guns per kilometer employed in the Don offensive and

200 guns per kilometer reported in the Stalingrad offensive.

After the last failure the Russians during the succeeding night, day, and following night replaced the divisions in line. On March 2nd a new attack on Orel was launched on the south side, while the attack on the north was shifted westward to the northwest front. The south attack pierced the German main line of resistance but was unable to hold the entire gain. Nothing was gained on the north side. For some reason the attack on the south was discontinued, while that on the north was renewed on the 3d by a



*The Germans have mounted Russian 76.2-mm. AT guns on Czech T.N.H.P. light (10-ton) tanks, for use in Africa.*

succession of waves of attack. No gains being made, the attack continued on the 4th, but without success. Russian losses must have been high, for again it was necessary to replace divisions. The preceding set of divisions had fought for 4 days, as against 3 days for this latest replaced set.

After one day lost while changing divisions, on March 6th the attacks were renewed both north and south of Orel. The north attack dented the German main line of resistance in the vicinity of the Oka River. Encouraged by this success, the Russians continued this attack on the 7th and 8th. On the latter day 4½ divisions were used in the main attack, supported by 40 batteries to a division. No gain was made, and toward the end of the 8th the Germans regained by counterattack the terrain they lost near the Oka River. The Russians renewed the attack on March 9th and again on the 10th, on which day the Germans report they had unusually heavy losses. Russian divisions had now been in line for 5 days of very severe fighting, and the attack was once more suspended pending replacement of exhausted divisions. On March 11th the Germans made a large raid into the Russian lines without provoking any counter action.

While this severe fighting was in progress around Orel, the secondary Russian attack (which started on 22nd February from the vicinity of Fatezh) had been making slow but steady progress toward the west, against strong enemy resistance. On March 3d this attack had reached the line Lgov—Dmitriev, both inclusive. The

Germans in this sector then fell back, enabling the Russians to move up to the line Sudzha—Sevsk (both inclusive), which were occupied on the 4th. Now strong resistance was met, and up to March 15th only a slight advance had been made west from Sevsk.

The Russian attacks on Orel were unusually persistent and appear to have been unusually bloody. There is no information yet as to what the Axis loss was in this great battle. Contrary to their practice, the Russians have not claimed any German losses in this sector.

#### THE NORTH SECTOR

Prior to March 1st the line here was approximately **Orel (Axis)—Bryansk (Axis)—Desna River—Gzhatsk (Axis)—Volga River—Rzhev (line passed through this city, north half to Russia)—Velikie Luki (Russia)—Kholm (Axis)—north edge of Seliger Lakes—Demyansk (Axis)—southeast corner of Lake Ilmen.**

The general shape of this line was two salients, the north one circling around Demyansk and the south one on the line Gzhatsk—Rzhev, which had at one time been a base of operations against Moscow. During this winter no special fighting has occurred about the south salient, which has been generally a fairly tranquil sector.

Around the Demyansk salient there has been continuous and heavy fighting all winter, mostly Russian attacks but also some German counterattacks. Due to the large number of water surfaces around Demyansk, together with swamps and dense forests, Russian attacks have been confined to rather narrow channels and it has been possible for the Germans with interior lines to check these attacks as fast as they were delivered. So far as this sector was concerned, there was no military reason for a withdrawal. That it was ordered is explained by the necessity of reducing the number of divisions in line to make more available elsewhere.

During January and February the Germans evacuated from the salients a large amount of supplies and materiel, and as much of the military establishments—such as hospitals and air field installations — as possible. No Russian report has been found reporting this action, so it is presumed they did not discover it.

The initial German withdrawal was from Demyansk on the night 28 February/1 March; thereafter withdrawals were made as follows:

| From:    | On the night: |
|----------|---------------|
| Rzhev    | 2/3 March     |
| Gzhatsk  | 5/6 "         |
| Svchevka | 6/7 "         |
| Bely     | 9/10 "        |
| Vyazma   | 11/12 "       |

The Russians have claimed some great battles resulting in the recovery of the foregoing towns. A careful examination of the reports and attending circumstances indicates that the only hostile encounters were with weak rear guards, and this only occasionally. The only thing the Russians recovered appears to have been abandoned materiel not

considered by the Germans as worth salvage, which included old tanks dug in the ground and some pieces of artillery.

According to Russian accounts the German destruction prior to withdrawal surpassed any previous Russian experience. In the smaller towns not a building was left; in the larger towns none that could be repaired. All live stock, other food supplies, in fact everything movable including farm machinery and tools, had been removed to German-held territory. Bridges were out; culverts destroyed; railroads dismantled. It will take time to reopen communications through this devastated territory. This unusually complete destruction was made possible by the two months and more that were available for preparation and to a large part of the area's having relatively few towns and farms, much of the country being water, swamp, and forest.

At the north end of the north salient the Russians started an offensive on March 4th against both sides of Staraya Russa, a German strong point and apparently the north anchor of their new line. The front of this place is covered by several water courses flowing to the north; at this date they were still frozen and passable for troops of all arms. This attack continued for 4 days, but made only minor gains; troops being exhausted, the attack was suspended. It was renewed on March 14th but again failed, notwithstanding the assistance of a large force of dive bombers and what had been thought would be a sufficiently heavy artillery preparation. On the south side of the same salient a strong attack was delivered against the strong point of Kholm on the 10th, but without success.

At the middle of March the German withdrawal is not yet completed, and the new line can only be guessed. Indications are that this will be Desna River—vicinity of Yartsevo—vicinity of Velizh—Nevel—Novosokolniki—Lovat River to Lake Ilmen.

Assuming that this is the new line, the change in the length of the front will be

|                       | Was        | Now will be: | Saving:    |
|-----------------------|------------|--------------|------------|
| Demyansk salient      | 185 miles  | 75 miles     | 110 miles  |
| Rzhev—Gzhatsk salient | 320        | 140          | 180        |
| <b>Entire front</b>   | <b>505</b> | <b>215</b>   | <b>290</b> |

This will enable a much smaller number of divisions to be used to hold this front. In view of the destruction in front of this line, it can be assumed that a strong Russian offensive can not be delivered across that area until after extensive reconstruction. This will reduce the number of divisions required in reserve.

#### MINOR RUSSIAN THEATRES OF OPERATION

Russian attacks in the vicinity of Leningrad and north of Lake Ilmen along the Volkhov River have ceased for some time. It is possible that Russian divisions have been sent south from this area for the heavy fighting there.

When the Germans withdrew from the Caucasus they left a strong force holding a bridgehead around Novorossisk.

This has been strongly attacked by the Russians from the north side. Initial successes were followed by a serious repulse, due to a strong Axis counterattack. The German position at Novorossisk appears to be a strong one. It can be supplied by sea as well as by ferry over the Strait of Kerch.

Very little is heard these days about Finland's activities. The Finn front is quite active; there are no major operations, but the number of small operations (involving forces up to a battalion and occasionally up to a regiment) is startling. The Finns are very good in staging winter raids. They hold the south part of the line, covering the best part of their country. Some of their raids have reached the Murmansk Railroad, resulting in temporary interruptions and damage. Neither are the Russians backward as to raids, and they regularly move into Finland.

The north sector through Lapland is held by German divisions. They are opposite Murmansk and Kandalaksha. They would like to capture these places, but have been unable to do so. A railroad is being built to this area to enable a stronger force to be maintained, which might make it possible to initiate a major offensive against the Murmansk Railroad. For the present air raids are made intermittently against Murmansk and ships in that harbor and against sensitive points along the railroad. They cause a certain amount of damage, but have not yet influenced the general situation.

#### COMMENTS

1. The Axis line which was broken in the November battle, and which at that time extended along the Don River and thence to Stalingrad, was defeated because there was a lack of reserves behind this front. When the line was pierced (as may happen to any line) it was necessary to fall back, and it was not possible to arrest the retreat until after three months had passed and the Donets River been left behind. Incidentally, the Axis lost perhaps half a million men prisoners, killed, and permanently disabled—a very serious loss.

The Russians made the same mistake when they advanced beyond the Donets. They had no reserves available to meet the German offensive return, and so were forced back in turn just as the Axis had been.

Both errors, or rather the repetition of the same error, seems to have been due to an erroneous assumption that the enemy was finished and could not stage a come-back. All armies and the best generals will suffer occasional defeats. A great general, if defeated, falls back to some place or line where he can reorganize a new offensive. An excellent example is our General Washington's return offensive in New Jersey in 1776-1777 after his defeat at New York. Both Germans and Russians should have credited their opponent with enough intelligence to have watched carefully for signs of such a possibility, and have maintained reserves to meet a possible offensive.

2. Reserves in rear of a front may be in a continuous line or echeloned. They should be so disposed that if the enemy penetrates the front line, they can promptly close in around him. They should be far enough in rear to avoid any possibility of being involved in any disaster to the front line.

In July, 1918, Marshal Foch had such a second line about 20 miles in rear of the front line along the Marne River, ready to circumscribe any hostile advance across that river. That distance was sufficient for those days. It may have to be greater now. Rocade lines, or diagonal lines connecting the front line with any rear line, may be very useful. They need not be manned, but should be so planned as to be quickly manned if necessary to prevent a hostile penetration turning to right or left and rolling up what is left of the front line.

Double defensive lines are an ordinary precaution in war, and should never be neglected. Failure to have them may not lead to disaster, for the enemy may be incompetent or too weak, but it is a risk not to have a reserve line. Due to the great length of the Russian front the Axis apparently omitted proper reserves, believing that the Russians would be unable to take advantage of the situation. The shortening of the Axis front will now enable a reserve line to be established.

3. When a penetration is made into the enemy's lines, the force advancing through the gap should be superior in strength to at least one of the separated parts, while being able at the same time to hold the other separated part. If this rule is followed, one of the separated enemy wings can be rolled up.

If the penetrating force has less strength than indicated, it runs the risk of being attacked simultaneously on both flanks by the two separated enemy parts and thus overwhelmed and destroyed. This is what happened to the Russian column which attempted to pass around to the west of the Stalino position. It was inferior in strength to either of the hostile forces between which it passed. By prompt flight a large part of this force was saved, but the losses were considerable.

4. Winter weather with low clouds and snow impede observation both from the air and from OPs. If armored troops are being employed, this affords a possibility of making considerable bounds in position without the enemy discovering it. Thus the Russian force attempting to pass around the west of the Stalino position failed to discover very strong forces on its right flank. Prudence requires that under such conditions main bodies be protected by flank guards as well as advance and rear guards, and that ground patrols be pushed out at least 50 miles in all directions.

5. On February 23d German GHQ issued a General Order, purporting to be signed by Chancellor Hitler, which read in part:

"... the German people will mobilize and use their forces to an extent exceeding that in any war in history. Neither shall we hesitate a single second to call upon the countries which are responsible for the outbreak of the war to do their bit in the fatal struggle. We shall not scruple about foreign lives at a time when such hard sacrifices are expected from our own people."

The raising of new Axis reserves was started at the end of last year. There is little information as to how far it has progressed, except Hitler's statement after the fall of Stalingrad (on February 2nd) that the 22 divisions lost there had already been reconstituted. The Axis states, excluding occupied countries, have a combined population of about 180,000,000. This body is to furnish as large a military force as possible.

The reference in the General Order to "countries responsible for the outbreak of the war" refers certainly to France, and possibly to Yugoslavia and Greece. The populations of these countries are being drafted for labor forces, to replace Axis personnel drafted to the fighting forces. The combined population of these countries exceeds 50,000,000. Nearly another 20,000,000 of peoples are in occupied countries that had no connection with the outbreak of the war, but were invaded by the Axis for its own benefit. This force is not being drafted to the same extent, but their countries—Norway, Denmark, Holland, and Belgium—furnish considerable support to the Axis by compulsion.

The immediate effect of the announced German policy is to strengthen the Russian front, due to

- a. shortening of the front;
- b. new levies.

Shortening of the front is now about completed. New levies have not appeared as yet in Russia, but their presence in west Europe has enabled strong forces to be despatched to Russia, which are already in line.

This organization of 250,000,000 Europeans under one master is a formidable force, even admitting that some 70,000,000 people are working unwillingly and not to their best ability. This minority, to obtain food for themselves and (more important) for their families, much as they may dislike it have to assist the Axis.

Present indications are that the Axis will push the war against Russia with the hope of decisively defeating that great country before any invasion of west Europe can become effective.



## THE PRIEST MOVES IN

Last August we received 23 tons of brutal firepower in the form of an M-7—a medium tank with the turret practically removed and the upper structure reduced of some of its armor, but with plates sufficiently thick to repel any small arms and most machine gun fire. Protruding from the middle front is the tube of a 105-mm. howitzer. That is our present artillery, an M-7. A 10" Georgia pine will not stop it. Very few obstacles will slow it down. It is brutally beautiful. The occupation of a position is revolutionized again.

In a deliberate occupation the time-proved ideas are easily applicable with this type artillery; I shall therefore deal principally with the hasty ROOP.\* Since the mission of artillery is to support the infantry and the infantry we support is mounted in the half-track, we must ever be ready to displace forward at a moment's notice. Infantry mounted in these vehicles are capable of moving much faster than the foot soldier. With this in mind, the hasty ROOP has

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\*A corruption of the time-honored RSOP.—Ed.

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By Capt. Miles A. Warren

Notes on occupation of position with our newest weapon, by an officer who has come up through horse-drawn and motorized artillery to this newest type.

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been emphasized in our organization. On each service practice, the BCs were given an aerial photo with six different positions circled and numbered. Each battery occupied and fired from four of these. They were allocated by the battalion commander, who was at the OP. The distance between positions varied from 1,000 yards to 2,500 yards. No BC could make any reconnaissance until his next position area was designated at the OP, so there was little time to make a reconnaissance of the new position. Time was measured at the OP from when *March order; Move to position X* was ordered until the battery reported *Battery is laid and ready to fire, compass . . .* The time varied from 13½ minutes to 23 minutes, for all positions.

In my battery we have three types of occupations: in the normal "line," as a diamond, and in an inverted "U." Each type is applicable to any type of terrain, each has weaknesses and advantages. The initiative of the battery commander must be allowed full play. Arm signals must be improvised, since voice communication is impossible with four airplane motors roaring. For the line position we use the standard artillery signal—one arm extended motionless in the direction of metal, the other moving in a vertical plane in the direction of fire. For the diamond position we have handily adapted the standard Armored Force signal for the wedge: facing the direction of fire, this signal is given by raising the arms

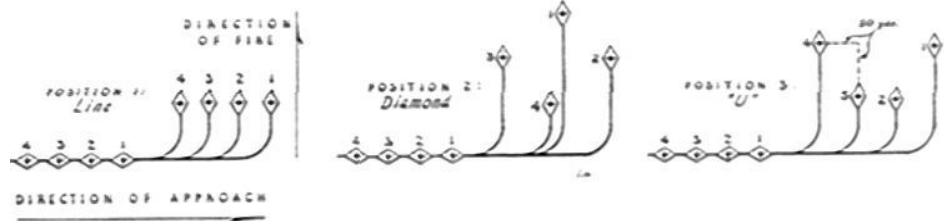
vertically over the head, fingers clasped. For the inverted "U" we move both arms vertically in the direction of fire, with prearranged position for each howitzer. We consider the diamond position preferable when mechanized attacks are imminent. A "U" position is preferred when in an open field or desert.

We have found that there is a big difference between heaving trails around and moving an M-7. Each time you move an M-7 to try to lay it in the center of traverse, you can figure on consuming four minutes. Also, your natural camouflage is usually reduced appreciably. When we hit position there are three ways by which we place the tubes within 100 mils of being parallel.

The first method is to have the chief of section pick an object parallel to the adjacent piece. He pulls his vehicle into position with the gunner sighting on that object. He does this if no one directs otherwise, but this method is the least accurate.

Second, we can pick objects (out to the front) which are approximately parallel and point out his object to each chief of section individually, while the higher numbered cannoners are uncoupling the armored ammunition trailer from the M-7 in the rear of the position.

The third method, which I favor, is to go to each



howitzer position with an M-2 compass. The Scout Corporal, with a stake for each howitzer, runs to the front from 50 to 100 yards. With the compass, line in this man successively and have him place a stake in the ground, with a piece of paper on the top so the stake can be easily recognized. At the actual positions I place a piece of paper on a branch; the gunner pulls the site of the piece up to this point and looks through the peep sight at the stake to bring his tube parallel to the others. The sight must be zeroed, and quickly placed into position. With this method we have occupied positions with a maximum error of 23*m*.

In all occupations, the executive gets out of his vehicle and runs to the most advantageous spot from which he can lay the battery. Chiefs of section halt their vehicles approximately 20 yards from their final positions. Cannoners dismount rapidly and drop the trailer. Number 2 takes both aiming stakes and runs in the direction designated by his chief of the section; he places the far stake in the ground, returns half the distance to the piece, and awaits the gunner corporal's instructions for aligning the near stake. The chief of section runs toward the executive to form a chain to relay commands to his gunner.

The gunner corporal, as soon as he is satisfied his tube is in the desired direction, refers to the aiming circle of the executive and makes a mental note of his reading. If the deflection given by the executive to lay the piece is less than 100 *m* from the referred deflection the gunner read, the latter traverses on the instrument with the deflection as given by the executive. If the deflection read by the gunner is off by more than 100 mils, he must move his tank in order to have his tube laid approximately in center of traverse. These moves are the time-consuming factor in the laying of a battery, but they are necessary because the M-7 has a traverse which is only slightly over 700*m*.



# DEADSPACE OVERCOME

By Lt. Manfred W. Ehrich, Jr., FA

I was very much interested in Capt. Gildart's article on "105" deadspace which appeared in the October issue of the JOURNAL (page 792) because as RO of a firing battery of 105s I had to solve a very similar problem last August and used a method not very different from that set forth in his article. You may be interested in the results of using that method in an actual tactical situation.

Our problem was slightly different from the normal field artillery setup, partly because our terrain is so hilly and chopped up, partly because (instead of the usual small field artillery sector) we must be prepared to deliver fire in a 360° sector. For those reasons we have had to do a great deal more than the normal amount of approximating, in constructing our deadspace chart.

Our battery is in a gap more than 500 feet above sea level, and the ends of the gap are covered at a greater range by mountains running roughly at right angles to the axis of the gap. So we really are in a large bowl made up of peaks, ridges, and saddles of varying heights and shapes; the nearest peak is only 600 yards from the center of the battery and is 620 feet above our battery level; the furthest peak is 4,000 yards away (resulting in no dead space for Charge 1) and rises more than 1,200 feet above us. In line with it is the opposite extreme, a pass 225 yards from the guns where the angle of site is—72*m*. Beyond this bowl are many hills, valleys, passes, and ravines that alter our minimum ranges, and in some directions our minimum range falls in the sea, giving us a large minus angle of site.

Our procedure was simple but time-consuming. We first set up a BC 'scope at the battery position (an aiming circle could not be used because of the size of the angles of site) and measured the maximum angle of site to each of the prominent peaks and saddles (23 in all). Then we calculated the minimum elevation for each charge in each direction, working in pairs to catch errors. Next we translated the minimum elevations into horizontal ranges and started finding actual ranges by trial and error.

Having no trajectory diagrams for the 105s, we determined our actual minimum ranges by mathematical calculations, using the slope of fall factor from the firing tables. This method is not wholly accurate, of course, but the error is not great; and where our only available map was on a 1/62,500 scale with 100 foot contours we considered that method accurate enough for our purposes.

As we calculated our actual minimum ranges we plotted them on a grid sheet (using a 1/40,000 scale you can put the whole field of fire of a 105 on a standard 1/20,000 grid sheet) and then, by inspection, joined the seven groups of 23 points by lines approximating the minimum ranges for each charge in the intervening areas.

We did not put the maximum ranges nor the high angle areas on the chart, because we felt they would be too confusing. However, we did cross-hatch the deadspace area and mark on the chart the location of the high angle peaks.

We found one peak that gave us 400 yards of dead space and 15 that had to be fired over with high angle fire to hit the reverse slope. These peaks were tabulated, showing the base angle to each peak, the area that could be reached only by high angle fire and the charges needed to do this, and the minimum ranges and elevations for each charge firing over the peaks with low angle fire. Here is a fairly representative sample of our High Angle Table:

| Peak<br>(name)               | B.A.             | High Angle Area          |
|------------------------------|------------------|--------------------------|
|                              | 4344 <i>m</i>    | Ch4 5300-5800 yds.       |
|                              | to 4450 <i>m</i> | Ch5 6100-6500 yds.       |
| Min. Rn. & Elev. (Low Angle) |                  |                          |
| Ch4 5800 (612 <i>m</i> )     |                  | Ch5 6500 (428 <i>m</i> ) |
| Ch6 6650 (340 <i>m</i> )     |                  | Ch7 6900 (264 <i>m</i> ) |

When registering on our base points we actually fired over one of the peaks used in determining our minimum ranges, and over another peak which required Charge 6 high angle fire to hit its reverse slope. In both cases the minimum elevation for low angle fire proved to be within 2 mils of what we had calculated, and the minimum range was well within one probable error. We have not yet had occasion to shoot-in the minimum ranges in areas where we merely approximated them, which is (in the final analysis) the real test of our method, but I am confident that they are not far out.

You will be interested to hear that even in this country where one reverse slope falls off 1,500 feet in 500 yards, Capt. Gildart's theory that there is no deadspace for the 105 beyond 2,800 yards proves true. The one peak that produces dead space is at a range of only 2,400 yards from the gun position.

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

"Please let me express my appreciation for your efforts in putting out the Field Artillery Guide. I honestly believe that every Junior Officer should have a copy of the Guide in his library."—1ST. LT., FA (OVERSEAS)

# *FRANCE FIGHTS AGAIN*

By Capt. Edward A. Raymond, FA

As though by definition, the French dislike the Germans and would like to drive them back across the Rhine. The only part of France which is able to fight in the open, however, is principally the French Army in Africa and the four North African territories.

## FRENCH ARMY

The word "colonial" should be used with caution in describing General Giraud's army. Continental France is called metropolitan—La France Metropolitaine—and most units raised in North Africa recruited from white Frenchmen are also called "metropolitan." Most of the pre-war artillery, engineers, and tank units in North Africa were included, and so too were the "Zouaves"—white infantry who once wore baggy Turkish trousers and have always fought like dervishes. Certain Chasseurs d'Afrique are also metropolitan. These Algerian cavalry units were once resplendent in white robes (burnous) and fez. One particularly rugged, all-white unit is the French Foreign Legion, which traditionally has four infantry regiments and a cavalry regiment. Few French are in it; the largest group has always been Polish. Despite "Beau Geste," good peacetime conditions led to a high reenlistment rate. In peace the legion is recognized by a blue cummerbund (sash) worn around the uniform. The German Armistice Commission which controlled the French Army for a time



broke up all white African units and confiscated all artillery of greater caliber than 75-mm.

"Colonial" units are composed of natives with French officers, non-commissioned officers, and key men.

French West African units, based at Dakar, include the famous Senegalese regiments. These Mohammedan negroes are loyal and aggressive soldiers, but have a primitive background. Many have their cheeks scarred in infancy; these scars are not signs of valor, in the tradition of our plains Indians and the Prussian military caste, but are simply ornamental. The Senegalese fought well in World War I, winning a reputation for bayonet fighting and skirmishing with trench knives which the Germans respected.

Moroccan troops are largely of Berber race. They are neither hammitic like the Senegalese nor semitic like the Arabs, but are proto-semitic. They gave their name to the Barbary coast of pirate days: a few thousand Corsairs levied tribute on England, France, and the Italian States; for a little while they levied tribute on the United States. Generally speaking, they are now the hillmen from the Atlas Mountains. They are rated as the best native troops in Africa. Morocco was not all pacified until 1933. Loyal Moroccans, from the part of the country under French control, formed celebrated shock troops in World War I; the Moroccan Division had a 300% turnover during the war and were called Stormy



Tunisian Terrailleurs are active allies of ours on the Tunisian front

Pettels after birds that are said to bring storms. Americans fought with them at Chateau Thierry and elsewhere under General Henri Gouraud. Abd El Krim, Berber chief, wiped out a Spanish army under General Sylvestre in Tangier in 1923, and with 20,000 men harried for 8 years a French army which grew to 140,000. Berbers flown to Spain from Spanish Morocco got Franco started in the face of huge odds. They can fight. They are organized by the French into

|                     |   |                         |
|---------------------|---|-------------------------|
| Unites Coloniales   | } | Regular Army            |
| Tirailleurs         |   | Militia in native dress |
| Goums               |   | Levies                  |
| Moghzens, Partizans |   |                         |

In Algiers and Tunis, Arabs outnumber Berbers. "Moors" are half Arab, half Berber. While considered more moody than Berbers, these groups are hardy, and excellent riflemen. Organizations include

- Spahis—Pure Arab cavalry
- Meharistes—Camel corps
- Tirailleurs

Americans serving near colonial units must discard any "nigger" complex. Few colonials are negroes. Among the black races there is no inferiority complex, with its attendant evils. It must be remembered that North Africans used to hold the negro races found in the United States (Congo, Dahomey, Gold-Coast) in slavery as we did. The French are particularly successful colonists, and have built

up an understanding which is dignified but not color-conscious.

RECOGNITION

France's Armed Services consist of three branches: Army, Navy, and Air Force. The Army does not wear the familiar horizon blue of World War I, but olive-drab. Sailors have red woolen puffs (pompoms) on top of their flat caps. Landing parties of sailors, with rifles and elongated helmets, are counterparts of our Marine Corps. The Naval uniforms are dark blue. The Air Force has uniforms of cut similar to the Navy's, but the color is a warmer blue. Officers of all three services are recognized by a system of stripes and bands around the cap. In the Army and Air Force short horizontal stripes are also worn on the lower sleeves or on the breast of the field jacket.

Branch insignia in the army are hat (kepi) colors and collar tabs. The infantry wears a black kepi with a red top and a khaki collar tab (écusson), while artillery has a dark blue kepi with red écussons. Cavalry wears a sky blue kepi, sometimes with a khaki covering and yellow or green écussons.

|  | Army                               | Air Force                          | Navy   |
|--|------------------------------------|------------------------------------|--|
| 1 stripe, gold <sup>1</sup>            | Aspirant Sous Lieutenant (2nd Lt.) | Aspirant Sous Lieutenant (2nd Lt.) | Enseigne de Vaisseau <sup>2</sup> (Ensign)     |
| 2 stripes, gold                        | Lieutenant (1st Lt.)               | Lieutenant (1st Lt.)               | Lieutenant de Vaisseau <sup>2</sup> (Lt. J.G.) |
| 3 stripes, gold                        | Capitaine (Capt.)                  | Capitaine (Capt.)                  | Capitaine de Vaisseau <sup>2</sup> (Lt.)       |
| 4 stripes, gold                        | Commandant <sup>3</sup> (Major)    | Commandant (Major)                 | Commandant de Vaisseau (Lt. Comdr)             |
| 5 stripes, panache <sup>4</sup>        | Lt. Colonel (Lt. Colonel)          | Lt. Colonel (Lt. Colonel)          | Commandant d'escadrille (Comdr.)               |
| 5 stripes, gold                        | Colonel (Colonel)                  | Colonel (Colonel)                  | Commandant d'unité (Capt.)                     |
| Band, oak leaves and acorns with stars | General (General Officer)          | General (General Officer)          | Amiral   |
| Band, gold chain with stars            |                                    |                                    | (Admiral)                                      |

In our army, the Pfc (Lance Corporal in the British Army) is not an NCO. In the French Army the Corporal (artillery "brigadier") is not either. NCO (sous-officier) grades start with Sergeant (artillery maréchal de logis). The grades of adjudant (technical sergeant) and adjudant-chef (master-sergeant) are highly responsible.

<sup>1</sup>"Cavalry" (i.e. mechanized units) exchanges silver for gold.

<sup>2</sup>Alternate, gold and silver, starting with gold.

<sup>3</sup>Called "Capitaine de fregate" when commander of any craft.

<sup>4</sup>Artillery: *Chef d'escadron* when battalion commander. Cavalry: *Chef des escadrons* when battalion commander.



NCOs may, and commonly do, wear Sam Browne belts.

#### FRENCH NORTH AFRICA

Morocco can be roughly pictured in the shape of a baby, curled up facing the Atlantic. Its head is composed of the Riff; the corridor of Taza (traditional east-west invasion route) is the neck; the belly is the reasonably fertile central plain. Rabat (political capital), Casablanca (economic center), and Mogador are on the coast. Fez, former native capital of lower Morocco, is in the eastern portion of this plain. The bony structure of the infant is formed of the four Atlas ranges—High Atlas (with peaks up to 12,000 feet), flanked on the north by the Mid-Atlas and on the south by the Anti-Atlas, with the Saharan Atlas paralleling the Anti-Atlas. The Mid-Atlas, with much snow, is the chief water supply of Morocco. Western portions of the Sahara desert form the baby's rump.

Algiers looks north instead of west. There are three principal regions. The Tell, area of gardens and orchards, runs back from the coast. The seaport of Oran does not rival Algiers, the picturesque harbor and fabled capital. Constantine is a third important port. Below a sort of border formed by ranges of high hills lies the next division of the country, the Steppe. It is rough highland where some grass is found and life is pastoral. Then, beyond more mountains, is the Sahara. Here life is found in oases only. The mountain system of Algiers is not regular, but the country as a whole is mainly highland and mountainous bits are scattered at random. In the northern Sahara vast dunes (the East and West Erg) flank a sandstone massif called the Ahaggar.

Less than 5% of Algerian natives are found in cities: rain, which spells security for them, is more steady in the hills. Almost all the whites, on the other hand, are on the coast or in the Tell. Algiers is politically a part of France, and the departments of Oran, Algiers, and Constantine are normally represented in the French parliament.

Movie-bred American soldiers, when they get to the city of Algiers, start off to the Kasbah at the earliest opportunity to find Hedy Lamar. (To their disappointment they find it is off limits.)

Artillerymen may know the story of a French consul who once offended a Bey of Algiers. When a French flotilla entered the harbor to press some point or other, the unfortunate man was stuffed into a cannon and shot out onto the deck of the leading frigate. The French now have the cannon on display at Le Havre, and call it Le Consulaire.

Tunisia appears as an eastward prolongation of Algeria, with extensive mountain regions in the north and a desert in the south; 80% of the country is an eastern plain. From north to south the aspect of the country is changed as much by vegetation as relief. The northern massif, all under 3,000 feet in altitude, is green. It has cork oak and zean oak and fresh springs.

Then further south the woods thin out to Aleppo pine and arganier, a sort of wild olive. This stand is often little more than brush. On plateaus littered with great stone blocks and kouskefs (artificial rock piles) are pastures and fields of alfalfa and wheat. Here and there are peaks. The Zahovan, with almost vertical walls, rises to 4,249 feet. Then by successive terraces, the country settles down across monotonous steppes. Only nomads live in these regions, though traces of old waterworks show that once they were prosperous. Then comes the phosphate area of Gafsa-Metlaoui and a huge depression, well below sea level, containing numerous salt lakes. Still further down is the desert, with bare stony plateaus and Ergs (sand dunes) which form a waterless inland sea with seemingly infinite undulations.

The coastal region must be considered separately. First is the valley of the Medjerda River and the alluvial plain it has formed between Bizerta, Mateur, and Tunis. The far larger Sahel plain runs from Cape Bon down to the Gulf of Gabes, following the curves of the coastline. It has a few hills in the north, but is generally protected from the violent northwest wind; in its upper portions it is well cultivated. Lower down the altitude falls almost to zero. Here it is too dry in the summers for general cultivation, but there are extensive oases of palms. There are no all-season rivers and great salt lakes (*Chotts* Rharsa, Djerid, and Fedjedj) are hardly useful. The chalky plateaus of Matinatas and Ourghammus are separated from the sea by the plain of Jaffara.

Tunisia's climate is influenced by northwest winds from the Mediterranean and blistering southwest winds from the Sahara. The northern and central highlands form a windbreak and cause distinct climatic zones. Northwest winds prevail in winter, and southwest winds (at times the strong *Sirrocco*) in summer. Most of Tunisia is wet from October to May, with January the rainiest month. Most of it is dry from May to September, and the south is parched. The city of Tunis expects about eighty days of rain a year, Tatahouine (in the south) about thirty. More than 8 inches of rain have fallen in a single Tunisian cloudburst. At Tunis the coldest month averages 53° F., with occasional freezing temperatures, and the hottest month averages 80°. Particularly in the south dryness causes a brusque change from night to daytime temperatures.

Railroads must be regarded as a secondary means of transportation by the Allies in Tunisia. Despite the fact that Tunisian railroads burn Algerian soft coal, the network is primarily a coastal one and only unravelled bits run up into the massif. An exception is the standard gauge line to Tunis from Algiers. The State railroads in the north are of standard gauge, while central and southern lines are narrow. All are single track.

Of primary interest, then, is the highway network. It too stems out from the principal ports of Bizerta, Tunis, Sousse, and Sfax. It serves the northern and central portions of the country well, however, and an artery runs

south to Tripoli. On January 1, 1940, there were the following roads in Tunisia:

|                    |       |       |
|--------------------|-------|-------|
| Cement or tar..... | 1,693 | miles |
| Macadam.....       | 2,031 | "     |
| Gravel.....        | 447   | "     |
| Dirt roads.....    | 1,107 | "     |
| Tracks.....        | 2,875 | "     |

For a country of 48,000 square miles, this works out to one mile of improved road per 12 square miles, but a great deal of this country is a desert with no roads.

Tunisia has a population of approximately 2,500,000, of which 100,000 (in round figures) are French and a like number Italians; 60,000 are Jews and the remainder Mohammedans. Of these about a quarter live in tents, a third in gourbis (huts of mud and stone), and a quarter in houses. In the Matmatas many natives live in caves. While the interior does not have many houses, it has a large number of shrines to Muslim saints. Both the shrines and the holy men are called marabouts. The structures have small, white-painted domes, and are placed as much as possible on commanding peaks and crests. The familiar old

formula, *Aiming Point, Right Front, That Church Steeple*, comes home to roost.

People are not widely scattered, but congregate in towns. The population of the city of Tunis exceeds 220,000, with 42,700 French and 49,879 Italians.

Our artillery owes a great deal to French teaching in World War I. Until 1936 our gunnery text (TR 430-85) was almost a literal translation of French manuals, and the many general principles still stand. Much of our materiel is still French. American artillery is good; the French have done a lot to make it that way.

Americans are not likely to forget their French heritage, including the political ideas of our Declaration of Independence, the critical naval and material aid of France in our Revolution, the Statue of Liberty, and the defense of democracy against the Germans in 1914-1918 (while we first stood by and then prepared ourselves). America is a free country; for that it owes a great deal to France. No American who knows the history of France can doubt the combat value of Frenchmen with good guns. Every German-hating Frenchman who fights today fights for the freedom of his country and of ours.

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# BATTLE EXPERIENCE COURSE



*Men hug the ground, especially after the first dynamite blast!*

By Capt. Gilbert T. Webb, FA

All artillery units of our division go through the Battle Experience Course by battery, under the command of their own officers. Nothing about the problem is different from any other, when service practice is the order of the day. The battery occupies position, completes its camouflage, digs the howitzers in, and mans an OP. A battery officer takes a distant target under fire using bracket methods. The usual number of cannoneers are present at the howitzer position. Their rifles are neatly stacked close at hand or in slit trenches at the rear of the howitzer position. The battery is laid for direction near the center of the sector. A cross trench is dug at the executive's position in rear of the howitzers; with him are his recorder and telephone or radio operator. His communications are in and he receives a set of fire commands from the battery's OP.

Transmission of those commands to the firing battery is the signal for the Battle Experience part of the problem to begin. It is usually initiated by a dozen or so hand bombs tossed about the rear of the position, very conveniently close to the executive's pit. Land mines that have been buried about the battery position begin to blow up, throwing dirt, sticks, and stones high into the air. About ten bombs per minute rend the air uncomfortably close to guns and executive; about two land mines per minute add their blast to the general confusion.

The battery has continued to deliver the fire on the distant target despite the fact the bombs and mines have made the executive use every ounce of his leather lungs plus a megaphone to make himself heard above the din of simulated battle.

Between "ducking" near misses on his post, the executive is still trying to get a deflection-change

command through to the fourth section. A huge land mine (about seven sticks of dynamite) planted near the muzzle of the tube blows up, filling the howitzer with snow and mud. Smoke pots on the windward side of the position begin to function now; the entire area is enshrouded with thick white smoke. A section chief is wondering why he failed to select some auxiliary aiming point and take a reading from his referred deflection—his aiming stakes have done a fadeout in the smoke.

Finally the officer at the OP gives "Battery one round, elevation so-and-so." Then four .30-cal. machine guns start firing real ball ammunition between the howitzers. Bombs, land mines, and smoke continue. All the while a Cub is flying back and forth over the howitzer position, cascading bags of sand and flour onto the pieces.

The firing of the machine guns is the signal for all personnel not actually serving the pieces to come up from the rear. They are met by one of the control personnel who directs them to the flank where an attack by foot troops is being received. Down on the belly flops the soldier; grasping his rifle into the crooks of his arms to keep it out of the mud, he begins to move slowly forward, using elbows and knees for power.

For the next sixty yards the soldier crawls toward the place where he can fire at the advancing enemy. Slowly he drags himself through the mud and slush of a recent snow or rain storm. An ear-splitting blast nearby—and he gets dirt, mud, and a shower of sticks and stones from a land mine or one of the 85 hand bombs. That steady chatter of machine-gun fire is getting nearer and he realizes that he is crawling directly under its ball ammunition;



*Switchboard is over 15 feet high, and concealed from the howitzer position. Simple knife switches are used for both economy and safety.*

he is scarcely eight yards in front of the spitting muzzle. When the end is near that deadly sputtering grows louder—the second machine gun is almost directly overhead; it too is spitting death-dealing slugs.

Ear-splitting and persistent in their harassment of the crawling personnel, the hand bombs and land mines are designed to represent counter-battery fire falling in the gun position. Maybe Johnnie Cannoneer is tempted to get up and crawl on the hands and knees—but then he remembers the machine gun again, and tries to submerge.

Finally at the flank, the men load their rifles and take targets under fire. No element of the problem has yet reached its height. Noise and confusion are steadily mounting. Bobbing targets appear at various places without warning. The riflemen lay low behind any cover available and wait until a target appears; they shoot and duck, waiting for another shot. When all the clip of ammunition has been extended the soldier retires to the rear, and his part of the problem is completed. Up to this point in the problem only that extra personnel has made the crawl under the machine gun fire, through the field of explosives, to the flank to meet the attack.

Fire for effect is completed and the battery receives *Cease firing*. Moving targets appear ahead and slightly to one flank. The executive directs the howitzers to take them under fire. Slowly the gunner tracks his target, heedless of the falling dirt and stones. At the proper time he directs his piece to fire. This is continued until all 105-mm. ammunition is exhausted.

Not being needed in the howitzer pits, all but about two or three men per piece take their rifles and crawl to the flank to assist in the foot-troop fight. The remainder of the section delivers the direct fire at the moving targets. When out of ammunition, the entire gun crew leaves the pit and goes to the flank—the last part of the battery to make the hazardous crawl under machine-gun fire.

Every officer and man in the battalion goes through the course. Mud, sleet, or thawing snow make the course all the more difficult. Fresh snow simplifies the crawl considerably.

The course, as set up, represents battle conditions as nearly as possible. Every element of enemy action is furnished, and live ammunition is used in all cases except by the dive bombers. The machine guns firing (four of them) and the bombs crashing around tend to make the soldier a bit nervous at first, but that is soon overcome. The crash of the howitzers often cannot be distinguished from the simulated battle noises going on; recoiling pieces and hustling cannoneers are the best evidence that the battery is delivering fire.

Men who previously showed signs of being "gun-shy" usually come through with a set of nerves much settled. Each now has that settled feeling that comes from having a better idea of what is expected of him when the real McCoy hits his outfit. HE HAS HAD BATTLE EXPERIENCE.

The biggest lesson learned is to *get low and stay there* until there is something worthy of a shot, then let it go. In this course men are learning to fight as soldiers and men will have to fight later.

\* \* \*

Considerable time and planning must go into the problem before the first troops reach the scene. An officer or officers with experience in explosives will greatly assist in the safe conduct of the entire exercise. These people must have a staff of enlisted men who can be trusted to handle dynamite, nitro-starch, or TNT without unnecessarily endangering themselves.

When the battalion uses 500 hand bombs per day, it is necessary to fashion them from whatever materials are at hand and get them to the site without interrupting the schedule of training at the course. Explosives have to be drawn daily from the engineers, and in sufficient quantities to keep things moving. It is usually necessary to construct the bombs at night or during any other available spare time.

Howitzer pits must be prepared in advance—and tactically. Holes must be dug to receive the planted mines, and wire must be laid from these points to the switchboard in the control tower. Sufficient moving targets must be available, and extra towing cable at hand. Machine gun cribbing has to be built and the guns "registered" in at the start of each day. A weather eye must be kept on the wind so that smoke pots may be placed properly.

Someone is always definitely responsible that the knife switches in the control tower (used to detonate the planted mines) are *open* at the conclusion of each problem.



*Machine gun fire keeps heads and bodies low. Mounted on cribbing, the gun throws its stream about 42" above the ground.*

Usually a good sergeant is best for that job, since the life of some soldier is dependent upon that one feature alone.

Radio is used for control communication.

To keep from using too many "safety" features, the machine guns are located to the rear of the howitzers on cribbing that allows them to fire in the same direction of the howitzers and about 42" above the ground. They are located so they will fire down the flanks and between the pieces. One gun fires along the right flank, one between Nos 1 and 2 guns, a third between howitzers 3 and 4, and the fourth along the left flank of the battery.

A control tower about 15' high, to the rear of the howitzer position and directly in the center, greatly aids in control. From that point many of the hand bombs are tossed, and all the land mines are blown from the switchboard located there. The observer-control officer has a commanding view of the entire situation, including the four machine guns. He has a chart of the position showing locations of all the planted mines, by numbers; each wire coming into the switchboard bears the number of mine to which it is attached. No mines are detonated when personnel are too close.

Both control tower and machine gun positions are carefully camouflaged so the cannoneers, though they know they are there, won't get a wrong tactical impression.

The holes for the land mines are dug about two feet deep to receive the charges of dynamite and then partially filled with snow, dirt, or mud as the case may be.

Just before a problem is to be run, the control person checks the knife switches to ascertain that all are open. Each hole that is to receive a planted mine is in the charge of a specific enlisted man. That man goes directly to the demolition truck, draws his dynamite, and checks in with the demolition officer near the control tower. That done, he proceeds to place the charge in his pit and cover it. All mine planters return to the control tower, where they answer a roll call by number, thus giving the demolition officer a complete picture of what is out there to be blown in the faces of the next unsuspecting battery to take the course.

The men assigned to the task of tossing hand bombs draw their explosives, station themselves along the route of the crawl, and await the first wave of crawlers. Machine gunners draw their ammunition and stand by. While all this has been taking place the crew assigned to the tow-targets has been getting their target into position for the next pull. They may have

had to patch the target or completely replace it. Sometimes a tow cable must be spliced.

Normally it takes about fifteen minutes to recharge the course and get set for the next outfit going through. If the wind happens to be blowing into the face of the battery, it will be necessary to place the smoke pots out in front of the howitzers and in direct line of battery and machine-gun fire. When this is the case, a time fuze is rigged up with sufficient length of blasting fuze. This time fuze is necessary so that the smoke will appear when the firing battery is about half through delivering fire on the indirect target. That takes a lot of guessing and involves some mistakes, since some gun batteries will deliver



*When the last of the gun crew starts its crawl, only a control man remains in the pit. Deep snow makes crawling both easier and cleaner. Cub plane in background furnished "bombing" atmosphere.*

the fire and complete their part of the problem faster than others.

The job of operations and control for this problem is a big one. Control will use about eight officers and as many enlisted men. Operations will require about thirty enlisted men, with many of the officers doubling as operating personnel. A course requires two officers on demolitions, one on smoke pots, two on machine guns, and a sixth to care for the timing of the moving target. The seventh and eighth officers are the general assistant and the officer in charge of general operations.

Operations will see both the demolition officers working to get out the bombs and blow the planted mines. The machine gun officers may be helping to direct the battery through, or to get a machine gun back into operation after a jam, or any of the dozens of small chores that come up during a problem. The smoke-pot officer will have little time to do anything else, if he keeps a close eye on the shifting wind; he probably will be planning on where the next smoke-pot location will be.

Enlisted men on operations man the machine guns, throw hand bombs, pull the tow target, direct the battery along the path under the machine gun fire, operate the radio. Sometimes there will be a crew to the rear building more hand bombs so that the next organization will not be delayed.

The ideal site for this problem is one that will give the firing battery a tactical location with some open space in front of the howitzers. A good OP should be near the battery position, but it does not have to be any nearer than is used for a normal service practice. Natural cover is very important at both the battery position and the OP, but is not absolutely necessary.

A fair-or-better road should run along one flank of the battery position. If the road is not available a flat prairie (smooth enough so a towed target can be pulled) should be sought, to help out the crew in charge of moving targets. If possible, some heavy woods should be in the rear of the battery position. This will greatly assist in carrying out the tactical part of the demonstration. Then too, the cannoneers will have some difficulty with the aiming stakes—and that is part of the problem. Bushes and small trees mixed in with the pale white smoke will often appear as an aiming stake, and frequent checks will have to be made.

Before a battery participates it is allowed to observe some other unit as it goes through the course. This is best done if there is some high ground very near the battery position: the observing battery may occupy that hill and see all that takes place before it is called upon to follow. Usually it is better for a battery to observe the program,

then go right down and get ready to go through the course.

An explanation of the problem by the battery officers before taking the personnel to the OP is desirable. This will give the men a good idea of what to look for. Then go over the problem again, just as it is finished and before the battery takes the course. If this is done, every man knows just what is to take place and just what is expected of him when the shooting starts; there is thus little or no confusion when under fire.

The course, though laid out with care, is not designed to remove all element of personal danger. Even though necessary safety precautions are taken, it is easily seen that a man may "blow-up" and get himself hurt before anyone can get to him or give the order to cease firing. He is advised before he starts through that there is a great deal of personal danger involved in his participating, and that unless he uses all the skill and knowledge at his command he may get hurt. When the man thoroughly understands the course, he usually comes out much the better for it. Most of them come out grinning or admiring the mud gathered in the long crawl. Once in a while some man will come through with a slight show of fear on his face. That may mean that he has just realized what an awful job he has when his battery comes under this type of attack. If that is the case, no amount of estimation could correctly gauge the value of the course to him.

After having gone through this course twice and witnessed several units going through, one is convinced that it is a valuable and necessary bit of training for the men. It takes about four or five days to process one division artillery of four battalions plus division artillery headquarters. Nowhere else is there a training program that means so much to the men, that can be given to an entire battery in less than 20 minutes—the average time for a battery to go through the problem.

From an ammunition standpoint, it is a cheap problem per battalion: 500 hand bombs (made of  $\frac{1}{4}$  lb. nitro-starch or  $\frac{1}{2}$  stick of dynamite) and 85 land mines (made of from 1 to 7 sticks of dynamite each) are all the explosives used. The .30-cal. machine guns require about 4,000 rounds with much tracer, .30-cal. rifles 5 rounds per man, and the .45-cal. tommy gun 20 rounds per gun. The howitzers require about 75 rounds of HE.

If the range into which the 105-mm. ammunition is fired is small it is best not to use the M48 fuze, but instead use the M54 with the time set at approximately 2,000 yards so that any overs fired with charge 7 won't inadvertently leave the reservation before blowing. The medium howitzers are not fired at the moving target because of the danger of bouncing a round off a pile of dirt and into someone's victory garden in another county.

# FO's RECORDING SHEET

By Sgt. Eric Waldman

The Forward Observer is supposed to keep a record of the various factors used for the targets fired upon. The reason is obvious: when he gets a new target in the vicinity of an old one he can use the same or slightly changed factors to start his adjustment, to obtain faster and more satisfactory results. But no definite method is prescribed.

The accompanying form combines a panoramic sketch and a chart, and has proved highly practical.

The heavy line in the center of the sheet is the extended OP-BP line. As soon as a BP is selected, the FO draws the skyline as he sees it through his field glasses. The horizontal scale is numbered according to the area or zone assigned and the approximate range of the BP.

## USE OF FORM

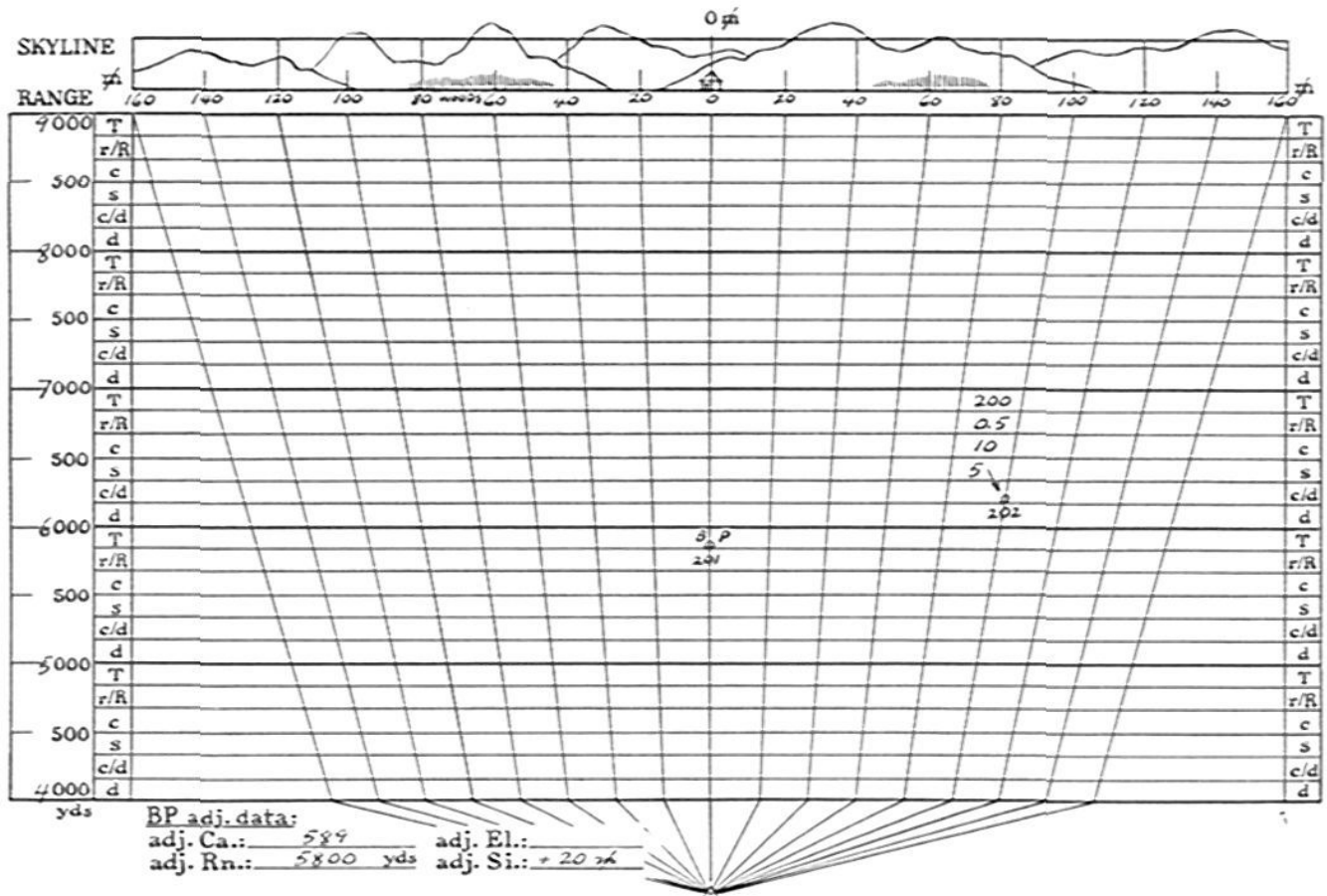
After registration on the BP is completed, the adjusted data are noted on the form; here, adjusted range was 5,800

yds. The Range Scale on the left side of the form is filled out, starting near the center with the nearest 1,000 yds. (in this case 6000). The other lines are labelled appropriately, then the BP is marked on the extended OP-BP line at its proper location. This completes our initial set-up.

Assume that a straight line from the OP to a target meets the skyline 100  $m$  right of the OP-BP line. The range was found to be 6200 yds. Follow the line from 100  $m$  on the skyline, and mark the concentration at a range of 6200 yds. Adjustment in this case was made with small T (200  $m$ ); in the proper spaces note the factors ( $r/R = 0.5, s = 5, c = 10$ ).

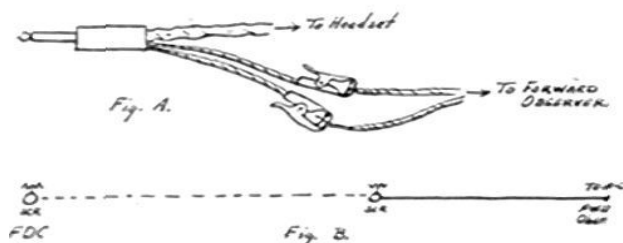
The form contains space for any kind of factors, depending on the target offset or type of adjustment used. It is especially useful for young officers since the two-dimensional method of recording targets and factors is much easier to read than most other ways.

## TARGET'S FACTOR RECORDING SHEET



# Not in the BOOK

## COMMUNICATIONS FOR THE FORWARD OBSERVER



For years the forward observer has been trying to get away from his radio so he could function tactically. We have used several systems, including everything from telephone nets to remote control units. In all systems previously used, either heavy equipment was necessary or an ambidextrous enlisted genius was required to keep the communications system functioning.

Now we simply attach an additional lead to each pole of the headset plug of the FO's radio—five minutes' work (see Fig. A). The forward observer leaves his radio (w/operator) in some sheltered spot and, laying a line of W-130, works his way forward to a point of good observation. His radio operator attaches this line to those extra leads, and at his OP the observer clips his TS-10-C (voice powered) phone to the end of the telephone line.

The observer's target designations, sensings, and reports of enemy activity are made into the phone, travel back through the wire, and are heard in the radio operator's headset. The radio operator verifies his reception of these messages by repeating—speaking into his transmitter, button depressed. This transmission is received by the base set in the vicinity of the FDC, and is also fed back through the phone line to the observer.

If "voice powered" handsets are not available, another set of headphones can be substituted with very satisfactory results. Also, this type of forward observer communication is not restricted to any one type of military radio.

EDITOR'S NOTE: *This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.*

This setup is not difficult for the average man to understand, does not require a specialist to operate, and does not demand that the forward observer devote 90% of his time to communication difficulties. It is satisfactory and efficient.

CAPT. HOWARD K. CLARK, FA

## SPEEDING 155-HOW. COMMANDS

An artilleryman should never be separated from his range table, but if that misfortune should occur he need not feel badly if his weapon is the 155-mm. howitzer. By memorizing the range and *c* of elevation 300 for each of the seven charges it is possible to determine quickly the elevation for any range within a few miles—which, of course, is accurate enough for estimated data.

For example, using HE Shell, Mark I, narrow band, fuze M46 and M47, we find the following ranges and *c*'s at elevation 300:

| Charge | Range | <i>c</i> |
|--------|-------|----------|
| I      | 2500  | 15       |
| II     | 3000  | 13       |
| III    | 3700  | 10       |
| IV     | 4600  | 8        |
| V      | 5700  | 7        |
| VI     | 7200  | 6        |
| VII    | 7900  | 6        |

To determine the elevation for a given range, select the charge the range of which at elevation 300 is closest to the desired range, and alter 300 by the appropriate number of *c*'s.

Suppose we wish to take a target under fire that is at a range of 5,000 yards. Running down the ranges at elevation 300 we find that 4600 is closer to 5000 than any other, so we select charge IV. To determine the elevation we add four *c*'s (the difference between 4600 and 5000) to 300. This gives us  $(4 \times 8) + 300$  or elevation 332—which is only two miles from that of 334.4 given in the range table.

It will also be noted that this system facilitates the selection of the proper charge.

CAPT. ROY A. SCRUGGS, FA

## 420TH ARMD FA BN INSIGNIA

As an element of the 10th Armored Division, the 420th Armored Field Artillery Battalion was activated at Fort Benning on July 15, 1942. Its insignia, which has recently been authorized, is reproduced herewith.

This is in the shape of a medieval shield, representing the armored nature of the battalion. The shield is horizontally divided into four sections (separated by raguly lines, symbolic of force and striking power) which are alternately colored gold and scarlet. Two black pallets extend from top to bottom of the shield and in the center of the shield is mounted a warrior's shield. Color, shape, and symbolisms are illustrative of the functions of the organization. The numerical designation of the battalion is indicated by the four horizontal divisions, the two black pallets and the warrior's shield representing the cipher.





# Diary of War Events

(As Reported in the American Press)

## MARCH, 1943

- 1st British and Canadians bomb German sub base at St. Nazaire.  
Convoy of 14 Jap ships sighted approaching New Guinea.
- 2nd U.S. troops recapture Sbeitla, Tunisia.  
Jap convoy of 14 scattered, 2 sunk.
- 3rd MacArthur's forces destroy Jap convoy approaching northern New Guinea. Sink 10 warships, 12 transports.
- 4th Remnants of Jap convoy approaching New Guinea annihilated.  
Russia continues advance on the Rzhev front.
- 5th British infantry throw Germans out of Sedjenane (Northern Tunisia), American armored forces enter Sidi Bouzid.
- 6th German armor attacks British Eighth Army south of Mareth Line, but are thrown back.  
U.S. troops recapture Pichon.  
Chinese in Yunnan force Japs back toward Burma.
- 7th British Eighth repels Rommel's armored attack on Mareth Line for second time.
- 8th U.S. bombers attack Axis convoy between Sicily and Tunisia, with heavy loss to Rommel's supply ships.  
Germans gain in Kharkov region.
- 9th Germans, strengthened by 25 fresh divisions, push Russians back in Donets Basin.  
Rommel retires deep into Mareth Line after failing to break through the British Eighth Army.
- 10th British and Canadian air forces raid Munich with 500 tons of bombs.  
French guerrillas continue to molest the Germans. 500 killed in 4 days.
- 11th Bitter fighting continues near Kharkov.  
British repel strong German attack 40 miles west of Mareth Line.  
Allies shoot down 14 of 40 planes that tried to bomb Oro Bay, New Guinea.
- 12th Anthony Eden arrives in Washington.
- 13th R.A.F. raids Essen for second time since March 5th.  
Germans push Russians back, west of Kharkov.  
French guerrilla warfare continues to grow.
- 14th Germans report the recapture of Kharkov.
- 15th Bad weather reduces activity in Tunisia.  
U.S. bombers damage 2 Jap transports off the Arn Islands.  
14 Jap planes shot out of action over Darwin.
- 16th U.S. Navy sinks 4 Jap ships, damages 3 more.  
Chinese advance in Hupeh region.
- 17th General Giraud restores republican form of government.  
British Eighth Army starts long-awaited assault on Rommel's Mareth Line.
- 18th U.S. troops recapture Gafsa in Central Tunisia.  
Lt. Gen. George S. Patton, Jr., assumes command of American forces in Tunisia.  
In largest American air raid on U-boat yard at Vegesack in Germany, more than 100 planes took part and shot down 25 German planes.
- 19th American forces slowed down by heavy rains after occupying El Guettar.
- 20th R.A.F. Bombs Louvain (Belgium) and Leev (northwest Germany).
- 21st Our troops take Sened, push on toward Maknassy (only 50 miles from the coast).  
Russians admit loss of Belgorod, 50 miles north of Kharkov.
- 22nd U.S. Flying Fortresses and Liberators make third assault on Wilhelmshaven.
- 23rd U.S. troops capture Maknassy.  
Allied planes shoot down 26 of the enemy and bomb 32 tanks; loss; 7 planes.  
British Eighth Army tightens squeeze on Rommel's forces.  
General MacArthur's fliers bomb Rabaul.
- 24th Germans fail twice to push back U.S. forces in El Guettar-Maknassy zone.  
Soviet armies continue advances toward Smolensk.
- 25th American forces continue to advance east of Maknassy.  
British Eighth Army pounds Mareth with heavy, concentrated artillery fire.
- 26th Heavy fighting continues in the Mareth Line area and Tunisia.  
Our fliers bomb Wewak on north coast of New Guinea.  
British and U.S. planes raid Jap airfield at Meiktila in Burma.
- 27th American troops advance toward the Axis air base at Kairouan.  
R.A.F. raids Ruhr and the important German river port of Duisburg.  
R.A.F. gives Berlin its heaviest raid.
- 28th U.S. troops capture Fondouk.  
Eighth Army continues small gains against the Mareth Line.  
R.A.F. raids U-boat base at St. Nazaire with great results.
- 29th British Eighth Army breaks through Mareth Line; Rommel retreats toward Gabes.  
Russians hold Germans on the Donets, make small gains toward Smolensk.
- 30th Eighth Army marches into Gabes and El Hamma, Navy lands forces at Sfax. British, French, and U.S. troops hot on Rommel's retreat.  
Russians check German advance crossing of Donets River.
- 31st Allied forces advance in all sectors of Tunisia.  
Eighth Army captures Metonia and Oudref.  
Flying Fortresses bomb shipyards at Rotterdam.

# BOOK REVIEWS

*GENERALS AND GEOGRAPHERS.* By Hans W. Weigert. Oxford University Press. 259 pages; appendix; index; map. \$3.00.

Geopolitics is having the same dizzy vogue today that technocracy had ten years ago—and it is supposed to offer as sure-fire a cure for the ills of the world. Geopolitics appeared on the popular American scene about two years ago, and since then Haushofer and his scientists have been credited with everything from writing *Mein Kampf* to planning German world strategy. Geopolitical catch phrases like "Who rules East Europe commands the heartland; who rules the heartland commands the world-island; who rules the world-island commands the world" are bandied about without the faintest conception of what they mean. That particular catch phrase, of course, is nonsense when it is lifted from its context, for the Mongols, Turks, and Slavs have ruled the heartland and none of them have commanded the world. It makes as much sense as the French General Mangin's remark that "Who holds Chad, holds Africa"; or Billy Mitchell's remark that "Who holds Alaska, controls the world," or Bismarck's "The master of Bohemia is the master of Europe."

All the newspaper and magazine stories, all the books and lectures, and all the talk about German geopolitics have only confused and bewildered—chiefly because geopolitics as advertised by Haushofer and his crew is deliberately intended to bewilder.

Hans Weigert has done a fine job in trying to straighten out the mess. Of the nine current books on geopolitics read by this reviewer, Weigert's is the first that surveys the matter with a certain amount of dispassion and historical perspective. He traces the growth of geopolitics, and does a masterful job of interrelating the philosophies of Haushofer and Oswald Spengler's *Decline of the West*. The account of

the struggle between the Nazi theory of geopolitics and the Haushofer theory, and the struggle between the Nazi party and the German army, throws a clear light on the present campaign in Russia. Haushofer and the army insisted that the Germans must control the "heartland" by alliance with Russia. The Stalin-Hitler pact of August, 1939, saw the apogee of this theory. Hitler and the Nazis insisted that Germany must control the "heartland" by conquering Russia. This policy was victorious on June 22, 1941, when Hitler invaded Russia. Which policy is correct will depend not on geopolitics, but on which side wins the Russian campaign.

The deciding factor then in who-rules-what is not geopolitics but several other things. The simple fact that the British made a better airplane in the Spitfire than the Germans made in the Messerschmitt was the first non-geopolitical fact to shoot geopolitics full of holes. If Germany does capture the heartland and becomes master of the world, it will get its power—not from ruling the heartland, but from the genius of German chemists, the might of German arms, the production of the Ruhr, and the knavery of the Nazi party.

Geopolitics certainly plays an important part in the strategy of world conquest, but it doesn't play the whole part. The myth of the all-powerful geopolitics is due for deflation; and the whole theory of geopolitics deserves to be revalued. Hans Weigert's *Generals and Geographers* is an intelligent and easy-reading beginning. The book, incidentally, is aptly subtitled "The Twilight of Geopolitics."

If you have time to read only one book on geopolitics, this is the one you want. If you have read any of the other books on geopolitics, you need this one to act as a fine counterbalance and orienter.

R. G. M.

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*GOING TO O.C.S.!* Edited by Major Nelson A. Voorhees, W. O. (JG) Martin Goldenring, and Candidate Tino Suarez. Military Service Publishing Co., 1943. 125 pages; appendices. \$1.00.

This is the first comprehensive book telling both soldiers and their families details about the several Officer Candidate Schools, their courses, prerequisites, standards, etc. It is logically arranged.

Part I covers material common to all schools—how to apply, prerequisites for aspirants, methods of judging candidates, analysis of causes of failures, and delinquency, demerits, and restrictions.

Part II is devoted to the several schools, each of which is described in turn. General purposes of the arm or service are described, and the general qualifications required of its officers are outlined. The program of instruction is given in considerable detail; subjects are listed, the number of hours devoted are mentioned, and text references are also included.

Appendices continue the practical help with specific suggestions as to additional basic texts every candidate should have, together with further details about the official texts.

*FLYING HEALTH.* By Martyn Kafka, M.D. 248 pages; illustrated; index. Military Service Publishing Co. \$2.00.

*Flying Health* was prepared for the Flight Surgeon and the Pilot; but its non-technical language, well-written style, and logical arrangement make it of considerable interest and value to the non-flying soldier whose curiosity is aroused.

Kafka prepared the book in such simple language that the layman understands what happens to a man's body when it is carried suddenly to 30,000 feet, under what stress a man works when flying at 300 MPH, and how one can correct his failings and stay ready for flight duty.

Then there are chapters on first aid, Arctic flying, work in southern jungles, snakes, insects, forced landings, air accidents, and others of first interest among airmen.

A book that should have a wide reading among airmen and those interested in flying.

A. V. R.

*BOARDS OF OFFICERS.* 48 pp. The Adjutant General's School. 20c.

Maintaining its high standards, The Adjutant General's School has produced another highly useful pamphlet. The subject is approached from the point of view of the adjutant or other administrative officer, but is replete with concrete help for board members. An excellent list of primary and secondary references is included, and many model forms (including check lists) round out the booklet.



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*GUADALCANAL DIARY. By Richard Tregaskis. 263 pages; endpaper maps; photographs. Random House, 1943. \$2.50.*

For a straight, honest, clear account of the first seven weeks of our Solomons occupation, read *Guadalcanal Diary*. Read it for as fine a picture of combat conditions and of actual combat as is to be found. For, you see, in this war—and especially when with the Marines—correspondents are truly in the thick of things.

Mr. Tregaskis was in on the Solomons show from the very outset. He landed on Guadalcanal immediately after the first wave of landing boats, and stayed until September 26th. Between times he not only fared the same as the Marines, but he accompanied their raids and expeditions. It was no small job to keep up with their marches, especially with his six-foot-seven frame, but stay with them he did. And how he tells the story!

There is nothing fancy, nothing braggart, no do-dads in this book. But it gives a clear picture of terrain, living conditions, the Japs, air and sea raids, and pitched battle. Its very calmness makes you *see* the scene. Tops!

*MIRACLES OF MILITARY MEDICINE. By Alber: Q. Maisel. 373 pages. Duell, Sloan and Pearce, 1943. \$2.75.*

Our troops today are benefiting from many drugs, developments, and devices that were utterly unknown only yesterday. Sulfa drugs, bottled and dried blood, new anaesthetics, revised surgery and other treatments, tetanus toxoids, yellow fever inoculations, synthetic antimalaria specifics—all are recent developments. And as important as any are the new means to bring together quickly the patient and his cure.

These things are the subject of this new book on weapons that *save* lives. They are told, too, in language that you and even I can understand and appreciate.

*THE LIFE AND DEATH OF A SPANISH TOWN. By Elliot Paul. Modern Library, 427 pages. \$.95.*

Elliot Paul, author of *The Last Time I Saw Paris*, tells the story of what happened to a peaceful Spanish town in the Spanish civil war. He starts his tale well before the war and describes at length and in detail the town and its people. He talks of the influence of the priests and of politics, how the men worked, drank, danced, lived. "It was gospel in Santa Eulialia that if one drop of rain fell, work was off until the next day." [Santa Eulialia is on the island of Ibiza in the Balearics, about 70 miles off the Spanish mainland in the Mediterranean.]

They lived there for hundreds of years with little change or desire for change. But when Franco, with the aid of Hitler and Mussolini, made a battlefield of Spain,

Ibiza was engulfed and her people drawn into the maelstrom of civil war. The once-beautiful island is now destitute of all that once was smooth and tranquil; its people starve, its pleasant past just a pleasant memory.

"Even destitute refugees from Central Europe weep when they pass through Spain and see the suffering there."

If you want to know what happens to a pacific people when war and hatred overwhelm them, this story of Paul's will give you a picture—a picture harsh, bewildering, distasteful, convincing.

A. V. R.

*THE POCKET BOOK OF WAR HUMOR.* 226 pages; glossary of army slang. Pocket Books, Inc., 1943. 25c.

Edited by Bennett A. Cerf, this little book is a swell one to dip into for a few tidbits every little while. You'll find 'em all here—old jokes and new, choice selections from such best-sellers as *See Here*, *Private Hargrove*, cartoons from *The New Yorker*, *Collier's*, and others—plenty of belly laughs along with delicious humor. The guarantee is fun—and how!

*TOKYO RECORD.* By Otto D. Tolischus. Reynal & Hitchcock, 1943. 404 pages; appendices; index. \$3.00.

Here is a magnificent account of both why and how Japan worked herself into the present war. Quiet, dispassionate, sometimes even cold, it is even more damning than a more emotional book would have been. Mr. Tolischus's inhuman treatment would be ample excuse for a different sort of presentation; it is well for the world he reacted as he did, to give us by far the best of the many fine accounts on this subject recently published.

Mr. Tolischus landed in Japan just ten months before Pearl Harbor, to represent the *Times* of both New York and London. His wide experience gave him full appreciation of the day-by-day developments. He realized that Japan was actually at war when he arrived, that her outlook on the world was that of a nation at war—inevitable results of her role in the "China incident." He was well attuned to developments, tells them clearly and understandably even to those who may have just been headline-skimmers in pre-war days, and includes some new material never before published.

When sailing for Japan he took along heavy underwear for prison use, "just in case." Careful, cautious, accurate, and restrained in his reporting, he had no use for it until all Americans were rounded up when war actually broke. From then on his life was as thoroughly unpleasant as the two-faced Japs could make it. Indeed, the experiences of our own people make us wish we had not been quite so considerate of our Jap internees before the exchange took place.

For a sober, accurate, methodical analysis of Japan in



## OTTO D. TOLISCHUS' TOKYO RECORD

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the last year before Pearl Harbor, this is *the* book. For a cold, dispassionate narrative of Jap prison life and a summary of the experiences of Americans and British caught in the coils of the Jap snake, read Mr. Tolischus's fine book. For a well-presented and eminently readable reference book that will be useful through the years, put in your library a copy of *Tokyo Record*.

*BATTLE FOR THE SOLOMONS.* By Ira Wolfert. Houghton Mifflin Co. 200 pages. \$2.00.

*Battle for the Solomons* is a true account of a reporter's experiences in the Solomons during the months of October and November, 1942.

From some place out in the Pacific, Mr. Wolfert takes his readers to the Islands and gives them a first-hand account of the major battles he witnessed there.

In order to write this book it was necessary that the author endure the hardships and take the chance of life or death along with our fighting men. This is exactly what he did.

On one occasion he went with the crew of a flying fortress on what was expected to be a pleasant search mission. They ran into a four-engined Japanese flying-boat which they battled for forty minutes before watching it fall and burn in flames. Once during the battle the planes were only fifty feet apart.

This is not the only hair-raising episode Mr. Wolfert relates. He tells of the suicide spirit of the Japanese and the manner in which our soldiers combat them. Countless other incidents occurring only on the battlefield are told by Mr. Wolfert.

In a sense this book should tend to wake up those of us on the home front, suppress our feelings for the minor sacrifices which (as Mr. Wolfert points out) never will be comparable with those of the boys fighting day and night against overwhelming odds to make the world free of tyranny or dictatorship.

This is one of the most enjoyable books I have ever read, and I recommend it most highly to everyone interested in learning the "inside story" of what the battlefields are like.

B. H. W.

*ARMY-NAVY GUIDE.* 320 pages; index; illustrated. Crown Publishers. \$1.50.

The idea of this book, apparently, was to provide answers to most of the questions that people like to ask about different branches of the Military and Naval Service. However, one important factor was overlooked—*having correct answers*.

Being particularly interested in Field Artillery, I looked at that first. Here's some of what I found:

"Q.—What is bracket firing?

"A.—The placing of a shot a certain distance over or beyond a target."

"Q.—What is precision firing?

"A.—The placing of a shot a certain distance short of a target."

Thousands of interested artillerymen know that those answers are about as right as Hitler. It is difficult to imagine a more incongruous, factless set of statements. But more of the same:

"Q.—What is pack artillery?

"A.—Artillery in which the personnel marches on foot, leading mules which draw the guns."

In the first place the Pack Artillery is armed with a *howitzer*, not a *gun*. Secondly, the mules *carry* the howitzer—they do not *draw* it.

These references cover only a small part of the book and, in all justice to the *Army-Navy Guide*, I selected only those artillery parts that were obviously incorrect. Hundreds of questions and answers are well arranged, well stated, interesting, and adequately handled. The book in a corrected form would provide a ready reference for the uninitiated and the inexperienced.

A. V. R.

*WE CANNOT ESCAPE HISTORY.* By John T. Whitaker. 367 pages; index. The Macmillan Co., 1943. \$2.75.

This book gives a clear, vivid description of how Hitler and his generals prepared, unmolested, a colossal, world-wide program of larceny and loot. The cost of the German arms program was 90,000,000,000 marks, and this they regained from their victims in the first year of the war. Mr. Whitaker describes also how Mussolini blundered into the war; how the plans for invading Poland, Czechoslovakia, France and all the other countries were cunningly plotted out.

Everyone should read this book, as Mr. Whitaker's understanding of the countries and their peoples enables him to give us a realistic appraisal of the high spots of history in the making.

M. K. W.

*JOHN PARADISE AND LUCY LUDWELL.* By Archibald Bolling Shepperson. The Dietz Press, Inc. 484 pages; illustrated; index. \$4.00.

This is a book of wide appeal. It is for those interested in colonial Virginia; students of Britain at the time of our Revolution; people like me, who have some acquaintance with English and American history—yet need some integration as to how personalities fit together, paths cross, friendships and little incidents affect national events.

Story? plot?—what could be more gripping than the biography of a Salonika-born Englishman who married into one of the "first" families of our colonies, was friend of Boswell, Franklin, and Jefferson, was perhaps our first naturalized citizen, and whose acquaintance included all the great figures of his day? It is told, too, in an eminently

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*THE NEW GARDEN ENCYCLOPEDIA. Edited by E. L. D. Seymour. Wm. H. Wise & Co., 1943, 1380 pages; illustrated. \$3.50.*

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*SOVIET ASIA. By R. A. Davies and Andrey J. Steiger. 384 pages; index; map. The Dial Press. \$3.00.*

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The other of the pair, Davies, is a Canadian journalist of some note and considerable experience. Their combined work is a momentous task. They have done a remarkable job and an outstanding service toward the understanding of Russia in this book.

*SPHERICAL TRIGONOMETRY.* By *W. C. Brenke.* 71 pp.; tables. *The Dryden Press, Inc.* 80c.

This little booklet treats its subject in two sections. In the first, formulas are derived and applied to the solution of spherical triangles. Applications are presented in the second, with problems principally in navigation and nautical astronomy.

*ARMY POSTS AND TOWNS (The Baedeker of the Army).* By *Charles J. Sullivan.* Fourth Edition. *Haynes Corporation, 1942.* 200 pages; indexed. \$3.00.

This compilation of facts and figures about army posts and towns is fairly complete. It tells you by what railroad, airline, or highway you can reach 'most any post. Too, it contains such essential information as transportation on the post, schools, hotels, quarters, climate, clothing, whether you will need or will be allowed to have a private car, and often includes a short history of the post.

The index is a valuable asset. It lists camps and posts by states, by Service Commands and alphabetically by name.

Reorganization of the War Department, origin of American military insignia, decorations of the United States Army, and an army pay table round out a useful book.

A. V. R.

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*THE MERCHANT SERVICE TODAY.* By Leslie Howe. 159 pages; indexed; illustrated. Oxford University Press, 1942. \$1.75.

This is the book for a landlubber to read if he wants to learn of *lighterage, dirty money, freeboard, plimsoll line, light and heavy cargo, and 'tween decks.*

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A. V. R.

*THE STORY OF WEAPONS AND TACTICS.* By Tom Wintringham. Houghton Mifflin Co., 1943, 230 pages. \$2.25.

Mr. Wintringham attempts to cover the period from Troy to Stalingrad, and within his space limitations he does a pretty good job of it. For a quick over-all glance at the alternating superiority of the offensive and defensive, look over this book.

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| Oil, Blood, and Sand  | Nov. '42                            | 2.50   | Roots of Strategy                                      | April '43                           | 3.00   |
| Shooting the Russian War  | Sept. '42                           | 2.75   | <b>STRATEGY AND TACTICS</b>                            |                                     |        |
| Preely to Pass  | April '43                           | 3.00   | The War in Maps  | Jan. '43                            | 1.50   |
| <b>NAVY</b>   |                                     |        | <b>PERSONAL DEFENSE</b>                                |                                     |        |
| How to Abandon Ship   | March '43                           | 1.00   | Defense Will Not Win the War                           | June '42                            | 1.50   |
| Know Your Navy, Now!  | March '43                           | 1.00   | Strategic Materials in Hemisphere Defense              | March '43                           | 2.50   |
| Submarine! The Story of Undersea Fighters                       | Dec. '42                            | 1.00   | Principles of War                                      | Dec. '42                            | 1.00   |
| <b>MILITARY HISTORY</b>   |                                     |        | <b>PERSONAL DEFENSE</b>                                |                                     |        |
| Brothers of Doom  | Nov. '42                            | 3.00   | Modern Judo  | March '43                           | 2.00   |
| Peace and War (United States Foreign Policy 1931-1941)          | March '43                           | .25    | Get Tough  | Aug. '42                            | 1.00   |
| School of the Citizen Soldier                                   | Oct. '42                            | 3.00   | Do or Die (Manual on Individual Combat)                |                                     | .50    |
| The History of the United States Army                           | Nov. '42                            | 5.00   | Hands Off  |                                     | .75    |
| Carbine and Lance (The Story of Old Fort Sill)                  | Oct. '42                            | 3.00   | <b>OUR ARMY</b>  |                                     |        |
| Frederick the Great   | Sept. '42                           | 4.00   | The Army Means Business                                | Dec. '42                            | 2.75   |
| Great Soldiers of the Two World Wars                            | Oct. '42                            | 3.50   | Officer's Guide  | June '42                            | 2.50   |
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| Decisive Battles of the U. S. A.                                | Feb. '43                            | 4.00   | West Point, Moulder of Men                             | Oct. '42                            | 3.00   |
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| The War in Maps   | Jan. '43                            | 1.50   | The Guilt of the German Army                           | Nov. '42                            | 3.50   |
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