The FIELD ARTILLERY Journal

IN THIS ISSUE:

Artillery on Guadalcanal

OCTOBER, 1943

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THIS MONTH we are proud to present a complete, over-all picture of the artillery on Guadalcanal. Island and jungle warfare is increasing; there will be much more of it before the final *Cease Firing* sounds. May this group of articles be of help to those who will encounter conditions of similar type.

A special word about Brig. Gen. Pedro Augusto del Valle, USMC. Graduating from the USNA in 1915, he served during the last war aboard the USS *Texas* with the British Grand Fleet in the North Sea, attaining the rank of major. Subsequently he had much foreign service, including duty as an observer in Ethiopia. On Guadalcanal he commanded all Marine artillery; those services won him the Legion of Merit "for exceptionally meritorious conduct against enemy Japanese forces."

The fitting cover photo shows Marines on Rendova Island, shelling Munda airport, 11 miles away, with their M1 155-mm gun.

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Camouflage is a fine thing. In the tropics every soldier turns chameleon and gets his individual coat of OD. White underwear destroys the illusion, however, whether it's being worn or is hanging out to dry. The QM, now as camouflage-conscious as the engineers, is procuring these items in khaki color. These Marines, by the way, are on Guadalcanal.

MARINE FIELD ARTILLERY ON GUADALCANAL

By Brig. Gen. P. A. del Valle, U. S. M. C.

It is not intended to cover every detail of the operations of the Marine Field Artillery in the Guadalcanal Campaign in this article. The author will keep to the point of view of the artillery commander, giving the broad outlines and omitting much valuable detail which can better be given by the battalion and battery commanders, the forward observers, the aerial observers, the liaison, communications, reconnaissance, motor transport, and munitions officers whose indefatigable efforts, professional excellence, and courageous loyalty were responsible for the successful execution of our mission.

The field artillery of the division was formed into a regiment consisting of a regimental headquarters and service battery, a special weapons battery, and five battalions. Three of the battalions were pack howitzers intended for the direct support of the three infantry regiments. The battalion of 155 howitzers and a newly formed battalion of 105 howitzers were intended for general support. The pack howitzers were towed or carried by one-ton 4×4 trucks. They were fitted with balloon wheels to give them better flotation over sand. The 155 howitzers were drawn by special 4×4 trucks and the 105 battalion was to be equipped with a smaller prime mover of the same type. Unfortunately, these vehicles were not available, and we sailed from the States with one-ton 4×4 trucks as prime movers for the 105s. The 105 battalion was in process of being formed and was short certain items and materiel and about 40 per cent of its personnel. Since it was planned to disembark at some place in the theater where we would train for a period of time, it was believed that this battalion would be complete as to personnel and equipment by the time we were ordered into combat.

As is so often the case, the plans were considerably altered before they could be executed. This required readjustment of our artillery to meet the new situation. First of all, one of the pack howitzer battalions accompanied its infantry regiment into another part of the theater, leaving us with four battalions. Then on reaching the part of the theater for which we were destined, we found that instead of months in which to prepare, we had only a few days in which to unload the ships that brought us from the U. S. and reload the ships which were to take us to the scene of action. The limitations of tonnage made it necessary to leave behind the 155-mm battalion, from whose personnel and materiel the 105-mm battalion was then completed. This same difficulty made it necessary for us to leave behind a portion of our motor transport as well. Since we were not completely motorized to begin with, this was a serious handicap.

One thing that had not been neglected was training. The batteries had trained with infantry battalions in landing operations, the battalions trained with infantry regiments, and the regiment as a whole had operated on maneuvers in support of the division. A generous policy as to ammunition expenditure prior to leaving the States permitted us to produce and maintain a very high excellence on the range. The terrain over which we fired our practices required almost entirely forward observer methods. This was very fortunate for us as the terrain we fought over likewise required this method. Our communication personnel, our motor transport, metro section, and the ordnance and munitions sections all were trained for combat in the most practical way possible. Problems had been played out in which the supply situations, particularly the handling of ammunition, simulated as closely as practicable what we expected to meet in the field.

The embarkation in the States was as nearly as possible in conformance with standard procedure for combat team embarkation, the batteries being distributed with their corresponding infantry battalions among the available ships. This was only approximately possible, due to the different capacities of the ships involved. As stated before, it was expected that the division would disembark at a port in the theater where there would be some time for training and organization. As a matter of fact, we disembarked from the troopships and immediately reembarked in the navy transports that were to take us to the scene of combat, all within a period of six very rainy,

chilly days. When we reembarked it was done as closely as practicable in accordance with the doctrine of combat loading. The regimental commander had with him, on the same ship, the 105 battalion, the Headquarters and Service Battery, and the Special Weapons Battery. The 105 battalion was really organized en route, a task presenting many difficulties, considering the limitations of shipboard life and facilities.

The artillery annex to the plan of attack was extremely simple and entirely orthodox. Batteries were attached to infantry battalions for the assault, reverting to battalion control as soon as the infantry regiments regained centralized control of their battalions. Similarly, control of the artillery battalions became centralized in the artillery regiment as soon as the infantry regiments reverted to division command. In this case the procedure coincided with the landing of the artillery commander, who assumed command of the beachhead as a whole until the division commander landed.

Suitable areas were assigned to the three battalions from the available map. A base point was selected beforehand. Registration was to be effected as early as possible. Air observation was provided for the initial landing, to be supplemented by forward observers as soon as practicable. Since the unit commanders were scattered in the various ships, they were summoned to the artillery commander's ship before sailing and the entire plan discussed, maps distributed, and opportunity afforded for questions in order to have everything ironed out as well as possible beforehand. This did not preclude our having to transmit additional orders and maps en route by visual signal and by using destroyers as mail carriers. They would come alongside and shoot us a line with a watertight container. This would be returned with the orders and maps in the same manner. The maps available were, as would be expected, very inadequate, and our survey problem a difficult one. Eventually the artillery regiment restituted aerial photographs and superimposed an arbitrary grid system. This was adopted by the division, and we were thus able to understand one another on the map, in spite of inaccuracies which were only gradually corrected as time wore on. The lessons seem to be that one must be prepared to operate initially from crude, inadequate maps, and that no agency has more interest in the correction, improvement, and gridding of the maps than has the artillery. Wide angle aerial photographs would have been most useful, but there were none available.

In summing up the lessons we learned from the initial stages of the campaign, it is sufficient to say that, while keeping in mind the principles of both tactics and technique, we found it essential to compromise with shipping limitations; to improvise; to make one vehicle do where several are normally needed; in short, to be sufficiently flexible so that in the end the artillery got to the scene of action in reasonable shape to perform its functions. It seems to be the congenital defect of all sea-borne expeditions that there is never enough space, and never adequate maps, so we yielded and contrived and protested and finally got into the show and did our job acceptably instead of sitting on the high horse and being difficult. We could not have what we wanted; not even what we needed; so we turned to and did the best we could with what we had.

THE LANDING

There were several landings made in the area on the same day. Tulagi and Gavutu were assaulted simultaneously with Guadalcanal. One of the batteries of Hagen's battalion (75-mm pack howitzers), was sent to Tulagi with its combat teammate, an infantry battalion of the 5th Marines. This battery performed no mission during the landing, nor did it come into action during the mopping up which followed the landing. It was emplaced for use against enemy submarines which occasionally surfaced in the early days of the campaign and threw a few shells into the defenses. This employment of a pack howitzer battery was not only unorthodox but of practically no value. The terrain over which its infantry teammate had to operate was impracticable for artillery. Its employment against submarines was ineffective. The proper thing to have done was to detach that battery to control of the artillery commander forthwith. The difficulties of combat team loading, and the dearth of boats, prevented this from being accomplished. The battery languished on Tulagi until several weeks later, when they joyously rejoined the regiment on Guadalcanal and got into action almost immediately and to good effect.

The landing on Guadalcanal was effected by two assault battalions of the 5th Marines, each with its pack howitzer battery attached for the assault. Orders had been so worded, however, that the batteries reverted to the command of the artillery battalion commander as soon as his headquarters command elements set up their command post. This meant that, almost as soon as he landed, the battalion commander had control of his batteries, and the infantry regimental commander had the concentrated fire of a battalion with its FDC facilities instead of uncoordinated batteries. Actually the assault met with no opposition on the beachhead, and Hagen's battalion of the artillery regiment accordingly took up positions previously assigned from the available maps, facing the expected direction of advance, which was west. Survey was out of the question for the early hours of the attack, and so were forward observers, as the next target area was well beyond our infantry lines. Air observation was provided for. The howitzers were laid by corrected compass on a base point selected from the air photograph available, namely the northwest corner of the Jap airfield which bordered on a cocoanut grove. The first battery ashore[1] registered on a visible check point for which data had been computed en route, and transmitted corrections to all other batteries through normal command channels. Later air observers directed the registration on this base point by radio. Concentrations had been provided for on the maps at places likely to be defended. These were to be fired on call from the infantry. The data for these was worked out on the basis of the *K* obtained during the registration. If air spot was available, then it would be simple. If not, it was planned to get the forward observers up as far forward as possible, in the greatest numbers available, in order to give us the best coverage obtainable in a terrain as flat as a pancake and covered with tropical growth. The enemy solved our difficulties by failing to make a stand between Beach Red and the airfield, although two streams (Ilu and Tenaru), both offering excellent obstacles, intervened. It may be that the rapid advance of

[1]The two batteries of 75 pack howitzers were ashore 28 minutes after the first infantryman hit the beach. One of these batteries went into a position about 350 yds, in from the beach and registered on the mouth of the Block Four River. The range and deflection correction were given to other artillery units as they came ashore. The battery was laid by compass. The first artillery round fired by U. S. offensive forces was "on the way" only one hour and seven minutes after zero hour.

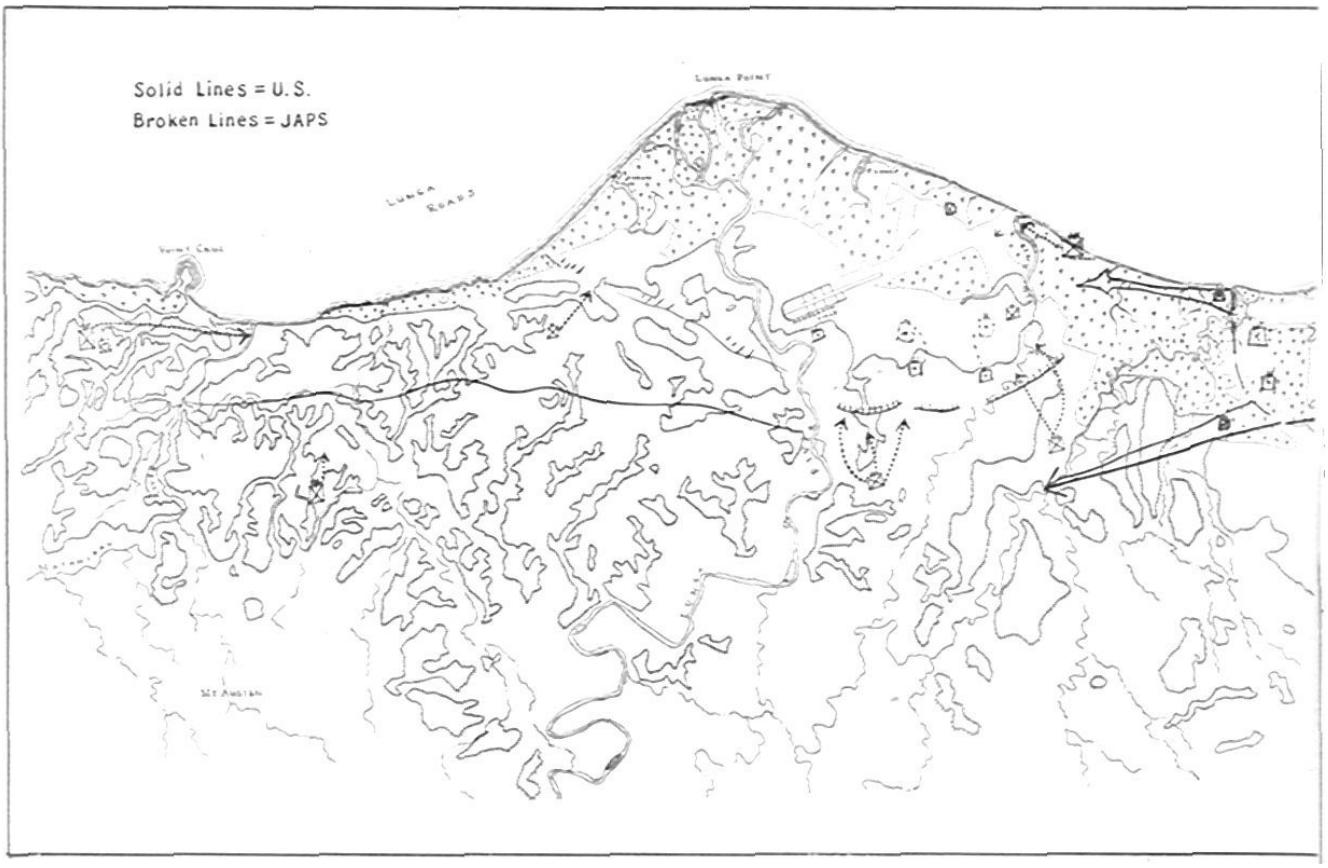
the leading battalion of the 1st Marines (Lt. Col. Pollock) in the direction of the grassy knoll (Mambula) discouraged a stand on these streams.

At about 1000 hrs. the artillery commander landed with an advance echelon and established his command post on the banks of the Ilu (now Tenaru)[2] before 1100. By this time the battalions were all ashore save rear elements left on board for unloading, etc. Of particular interest was the landing of the 105 battalion. Its prime movers (1-ton trucks) were not considered adequate for hauling the howitzers into position in the terrain we expected to encounter. Accordingly, we used some of the amphibious tractors in connection with the usual ramp boats. The ramp boats took guns and crews to the beach. The amphibious tractors were loaded with ammunition at the ship's side and proceeded to the beach, where they coupled up the howitzers and pulled the entire load—guns, crews, and ammunition—directly to the gun positions. These vehicles were of inestimable value, although very provoking at times due to their sharp cleats, which cut our wire. In later operations, in the absence of bridges, or when bridges were washed out by torrential rains, they proved indispensable.

Nothing unusual occurred during the 24 hours following the seizure of the beachhead. The artillery commander, being senior officer ashore until about 1600 of 7 August and having been charged with that responsibility, attempted to organize the beachhead for defense before dark and to expedite the removal of stores from the boats and from the beach, where a terrific congestion was inevitably gathering. The executive officer and the R-3 (Regimental S-3) were selected to proceed forward early the next day and make a reconnaissance with a view to selecting positions for the battalions and routes of advance for the expected displacement. It was thought prudent to make provisions against a possible enemy attempt to defend the airfield itself, or perhaps the far (west) side of the Lunga on which were some heights, just west of the airfield, which might serve as defense positions. It is of interest to note that this artillery reconnaissance, as likewise a reconnaissance made by the division commander in person, proceeded beyond the infantry advance units and got as far as the airfield itself without enemy opposition. It is fair to assume that the enemy was scattered by the terrific impact of the naval and air bombardment which preceded the landing and demoralized by the effect of surprise coupled with its violence.

As the result of this reconnaissance it was decided to displace Hagen's battalion immediately behind the infantry of the 5th Marines into positions covering the target area beyond the Lunga. Keating's battalion was to follow, emplacing if necessary in intermediate positions west of the then so-called Ilu and north of Hagen's battalion. Since this unit was in direct support of the 1st Marines (Hagen's was in direct support of the 5th Marines) which was in column of battalions pointed toward Mambula (Mt. Austen) with its leading battalion out of communication, the emplacement of this battalion was not attempted; it merely limbered up and proceeded to assembly areas just west of the then Tenaru River. Price's 105-mm battalion, in general support, stayed in position until

[2]Present maps, following native information, reverse the names of these two streams as known to us originally.



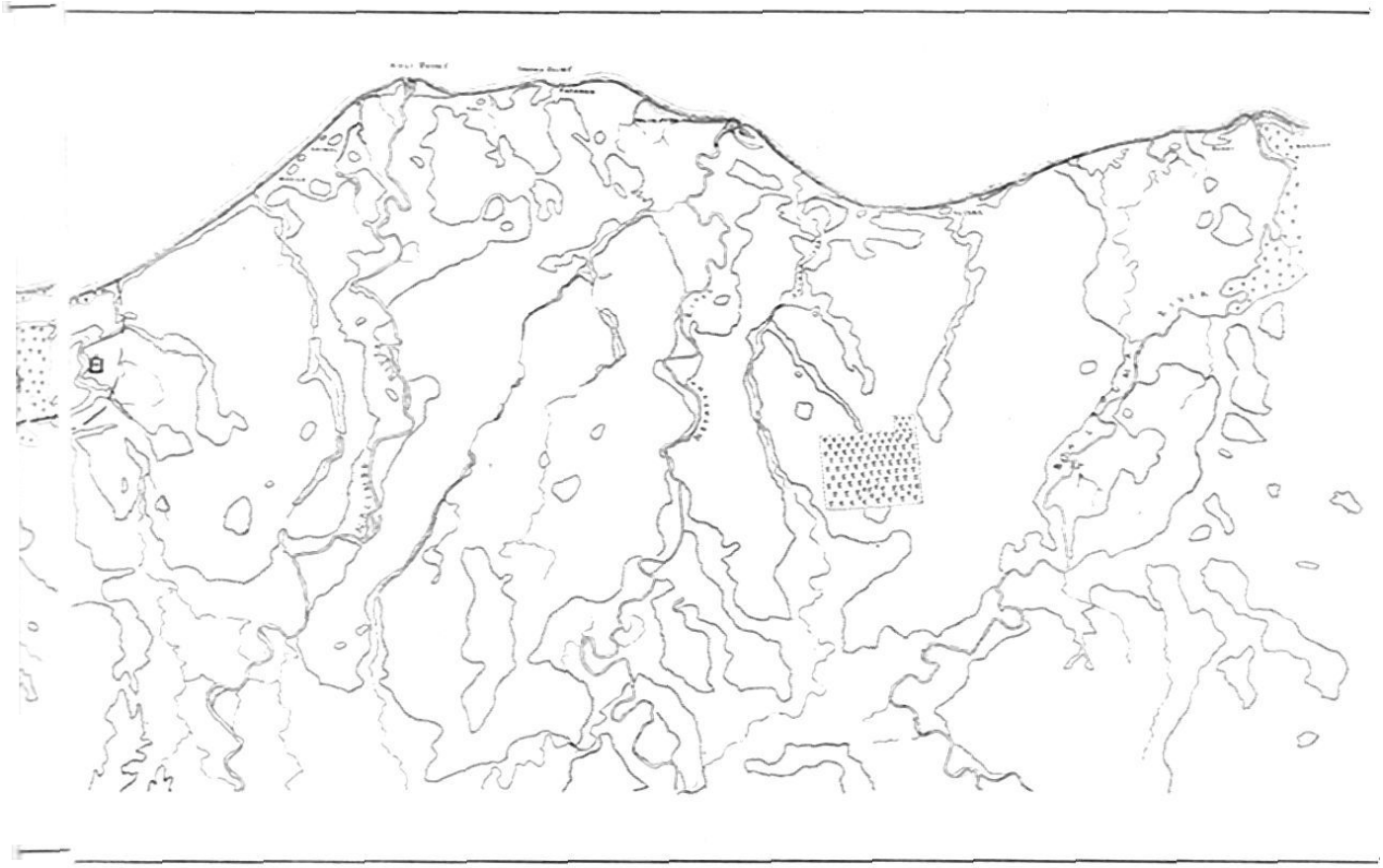
dark and began its displacement under the discouragements of a heavy rain over the crowded beach trail; they were in transit practically the entire night. Keating's battalion, whose assembly was close to the artillery CP on the night of 8-9 August, was given a portion of the beach front to observe and to hold with its automatic weapons. This was in addition to its own local security measures. It was but one of the several instances where artillerymen were employed as infantry. There simply were not sufficient infantry to cover us, and we had to cover not only ourselves but also, as in this instance, the flank of the division itself against an attack from seaward.

In the afternoon of the 8th a spectacular, and to the enemy disastrous, attack was made against our transports by an enemy air force. The division, on the march via the beach trail, could see the awesome spectacle as from grandstand seats. Some 30 torpedo planes and dive bombers swept over the sea areas between us and Florida island and attacked the ships which were got underway and were making erratic courses. So terrific was the antiaircraft fire from the transports themselves as well as from the escort vessels that they never got a single torpedo or bomb home. They lost half their number. The spectacle was magnificent, and it bucked us all up considerably. The transports still had a lot of our gear on board.

The original beachhead was left behind us guarded by one of the battalions of the 5th Marines, the Pioneers, the Engineers, and the Special Weapons Battalion. Some AA units from the 3rd Defense Battalion were to be landed to aid in the AA defense. We could not abandon this beach until we had finished unloading the transports and had got the amazing conglomeration of stores of all kinds moving. The artillery commander was relieved of his duties in connection with the defense of Beach Red and resumed the advance with his regiment in support of the units of the 1st and 5th Marines advancing to the west. No artillery was detached for the defense of this beach, although the 105-mm battalion stayed on until dark.

The advance over the beach trail was slow. There was no other practicable route, as the streams were unfordable save at the sand bars at the mouth, and we had no bridging. So it was not possible to teach the airfield on the 8th and we bivouacked near the Division CP just west of the stream now called the Ilu, about 1,000 yards south of the beach, in a palm grove. Only the two batteries of Hagen's battalion (75-mm pack howitzer) were emplaced, Keating's battalion being employed on the beach as described and the 105s displacing westward during the night of 8-9 August.

It began to rain shortly after we are our evening rations, a tropical downpour which made our sketchy shelters untenable. Our small blackout tent was practically the only dry spot we had. We had slept hardly at all the first night, and now the second night loomed ahead of us, dark and wet and sleepless. The commanding general had gone aboard the flagship to consult with the admiral, so the artillery commander was once more senior officer on shore. There was no communication with the advance battalion of the 1st Marines as yet. The remainder of the division was strung out between Beach Red and the airfield. A great deal of firing was heard from the vicinity



of Beach Red. Then the naval escort posted off Savo Island opened fire, and a brisk naval battle could be observed by the bright gun flashes in the appalling darkness of the night. The chief of staff brought a message saying that Beach Red was under heavy enemy attack. Enemy planes dropped flares over the sea areas to the north of Guadalcanal. A line of boats, dimly seen through the torrents of rain, began to approach the beach opposite the CP. Our 3rd Battalion opened on them with small arms when they failed to show recognition signals.

A few anxious minutes passed before it was established that these boats were our own. They had lost their way in the utter darkness and were making for the nearest beach, as they were running short of fuel. Fortunately "cease fire" was given before any casualties resulted to the personnel of the boats. A coxswain leapt overboard, swam ashore, and succeeded in convincing the alert artillerymen that they were friendly boats. The naval battle went on, a terrifying spectacle to those whose fate depended on its outcome without their being able to do anything about it.

The firing on Beach Red continued, so an officer's patrol was despatched to gain intelligence of the situation there, the telephone and radio having failed. This patrol was gone a long time, but the firing ceased after about an hour, save for occasional shots. They encountered mud, traffic congestion, and all the other concomitants to be expected in these situations. They finally reached Beach Red CP, and established the fact that there was nothing wrong there, the shooting being that which almost all troops indulge in when first holding a line at night in a strange place. Every jungle noise and every jungle animal that moves conjures up imaginary foes, and the first youngster that fires sets the rest of them doing the same until the officers and NCOs can get them steadied down. Dawn was cracking drearily when the patrol got back. The advance was not resumed until after the commanding general got back at 1000. Meanwhile a few Jap prisoners began coming in, some of them wounded. Some enemy motor vehicles in running condition were brought back triumphantly by our grinning youngsters.

An artillery reconnaissance was ordered and the positions selected for the defense of the airfield against attacks from the sea and from the flanks. These positions lay generally in the wooded area south of what is now Henderson Field, where some defilade from seaward was to be had along a low ridge. The artillery commander, once more released to his basic duties, proceeded to the airfield and found his executive officer had selected a CP just west of the Division CP, which was near the west end of the airfield.

The general plan of defense was to divide the beachhead into two sectors. Responsibility for defense was given to the two infantry commanders, the 5th having the west sector and the 1st that which lay east of the Lunga, the dividing line. Accordingly the normal artillery missions were prescribed, Hagen's battalion supporting the 5th Marines and the West Sector, while Keating's Battalion directly supported the 1st and the East Sector. Price's 105 battalion was held in general support. Survey operations were initiated at once. There being no benchmark available, a stake planted by the enemy at the southwest corner of the airfield served as initial point in an arbitrary horizontal control developed by the regiment to give the battalions their controls. Numbered concentrations covering the sea approaches and the flanks to a considerable depth were laid out on the available maps, and the battalions instructed to register on check concentrations as soon as possible. Advantage was taken of charted water areas to register. Center of impact was the rule, using the center of the 200-yard circles which represented our concentrations on the map. A smaller circle would have been difficult to number properly. The actual area covered by each concentration was only the normal one, however, regardless of its plotted size.

A regimental ammunition dump was set up in the palm grove southeast of the airfield, and the battalions each established their own, as did the batteries. The ammunition was dispersed as much as possible, and it was eventually dug in, all precautions possible being taken against deterioration by dampness. We had extraordinary luck with our ammunition in that seldom if ever was there a dud reported. Toward the end of our stay we had more elaborate magazines, dug into the sides of small hills. One of these was practically bomb proof, as it had about twenty feet of earth and rock overhead. But in the beginning we merely dispersed, then dug trenches, still dispersing. These measures and some unusual luck resulted in no casualties to ammunition from the severe bombings and shell fire to which the congested areas about Henderson Field were subjected. We found the clover leaf packings quite satisfactory. They were easily handled in the calibers we had, and they afforded excellent protection against the weather.

The early days of the defense of Henderson Field were filled with work, fighting, and digging. Registration proceeded regularly, using forward observers along the beach front and on the flanks, as well as observers in boats. We made good use of the fact that splashes in the water were easy to observe, with never a round "lost" as happens on land. Enemy air attacks interfered at times, but served to make us dig with celerity and ingenuity. Our batteries were well dug and well concealed, and personnel shelters were spotted in adequate numbers about the various installations. In addition to protection from enemy air attacks, we soon discovered that this unusual artillery situation called for protection against infiltration attacks from flank and rear, and so these sectors had to be attended to likewise, the rear of the battalions eventually presenting a fairly continuous line of machine gun and rifle pits which were alertly manned by artillerymen every night.

Almost as soon as we emplaced, the enemy snipers and small groups of light machine gunners began a nightly harassing of our rear and east flank, where the infantry coverage did not extend. The artillery commander visited the areas in question and came to the conclusion that the situation called for immediate action, mostly to be assumed by our own men, as there was simply not sufficient infantry to cover us. That very night the artillery was again attacked. Over a party line which included the artillery CP and all battalions, and was hooked in with the Division CP, we heard the commands and the firing of our numerous automatic weapons, in what was immediately dubbed by some humorist as "the 11th Marines Civil War." It is to be doubted that any large volume of the fire poured into the surrounding jungle that night was actually directed at targets which were seen. On the other hand, our gun flashes undoubtedly revealed our positions to the lurking enemy. In consequence of this the artillery commander ordered no further firing except upon orders of a responsible officer, no firing of .50-caliber weapons on enemy personnel (use only as AA

or AT), and no movement of men after dark to avoid shooting our own people. It was also decided and ordered to form three patrols, each commanded by an officer, in each battalion. These nine patrols were to proceed on a compass course due south into the jungle each morning, returning to our lines on an opposite course before dark. They were to keep lateral contact as far as practicable. For the protection of our east flank, which affected Keating's battalion primarily, infantry was secured and posted nightly across the gap between the east flank of the artillery and the right or south flank of the 1st Marines, which rested on a small stream feeding into the Ilu about 1,000 yards north of us.

The artillerymen, thus turned infantry, went into the brush as ordered and had almost immediate success. Officers and men quickly became "jungle wise." The jungle lost its mystery. The enemy encountered were few in numbers, mostly labor troops; these were quickly killed or captured. During the seven days during which they operated, these artillery patrols captured and brought in 95 of the 150-odd prisoners taken by the division during this period. But the psychological effect was even greater than the physical. We discovered several "natural" patrol leaders. The men discovered that the Jap was no superman in the jungle, but merely a very human, very tired little fellow who had been taught a few tricks. The defensive spirit induced by the necessity to dig in was replaced by a very definitely offensive spirit, a cocky sort of attitude which makes men do the things which win wars. Altogether this experience was extremely valuable to us. As far as the division was concerned, it made the necessity of some kind of perimeter defense obvious. The artillery shared the burden of providing for this defense by assuming responsibility for the line generally from the Lunga to the eastward almost to the Ilu. This was accomplished by machine gun outposts and by energetic patrolling.

Rains are incessant in Guadalcanal's wet seasons. In bivouac areas shelter halves must be used to cover two-man foxholes, mortar emplacements, and light machine gun nests.

Having once determined that perimeter defense was necessary, the artillery was forced to make an effort, not previously foreseen, to cover with its fires any point in these defenses. This meant that the artillery as a whole had to be prepared to fire in any direction, the entire 360 degrees of the compass. Accordingly each battalion was assigned additional sectors and, after making their surveys, emplaced in alternate positions. This affected both the 75-mm pack howitzers and the 105s, but particularly the latter, which were forced to emplace in a series of positions so as to cover north, south, east, and west. These positions were, for the most part, in the open flats north of the initial positions. The guns were well dug and slit trenches were provided for the personnel but they were, nevertheless, in a very exposed position from both bombing and shell fire. We were fortunate in losing relatively few officers and men by bombing or by the intensive naval bombardments to which the area was sometimes subjected by the enemy. While every attempt was made to camouflage, it was impossible to conceal these emplacements, and sometimes it was necessary to continue a fire mission in spite of enemy bombing or shelling.

This all-around fire problem had another angle which complicated our affairs, and that was the problem of liaison officers and forward observers. It was manifestly impossible to cover the entire perimeter with forward observers with the personnel at the disposal of the artillery commander. Some areas, such as the beach front, contained good coverage but never during the entire operation could we adequately cover the entire perimeter. In the matter of liaison officers, we learned a good many things the hard way, particularly the importance of employing experienced artillery officers on these missions.

The tendency was, in some cases, to dispatch to the infantry headquarters for liaison duty the officer who could most easily be spared. In our very first fight we found out that this was a grave mistake, and that the importance of the task often warranted the presence of the Battalion or even the Regimental Commander at the infantry command post in order to gain the best value from the available artillery. Thereafter, liaison officers were picked with care, and the infantry regimental commanders with whom they operated soon began to place confidence in them to the benefit of all concerned. Here again we were somewhat perplexed by the all-around defense problem. It was sometimes necessary to shift a liaison officer to the engaged sector, taking him away from the unit with which he was familiar. At all times, batteries were able to fire in any direction after a few minutes' delay in changing direction of the pieces. All batteries were registered on check points in each sector and all data kept corrected for weather. When deemed necessary and advisable, from one to twelve batteries could be massed on a single point with surprise fire within a very short period of time.

BATTLE OF THE TENARU

About the 21st of August the division had orders to stand to at 4 o'clock in the morning, as the patrols had discovered some enemy activity to the east and an attack could be expected. This attack, known later as the Battle of the Tenaru, developed some time before 3 in the morning. Small arms fire of increasing intensity could be heard from the general direction of the mouth of the Tenaru, now called the Ilu River. Keating's battalion was in position to lay down fires previously prepared on the numbered concentrations along that front. There was one artillery observer along the beach just east of the Tenaru, and another one in the palm groves about 800 yards up the Tenaru River. There was a liaison officer with the infantry command post but, unfortunately, he was not sufficiently experienced, and the infantry commander had not been made entirely aware of the potentialities of artillery fire in his threatened front.

As dawn approached, and no artillery fire was called for, the Artillery Commander got in touch with the Infantry Commander in that sector by telephone, and advised him that he had an entire battalion of pack howitzers at his immediate disposal and that should the situation warrant, a battalion of 105 howitzers could be quickly brought to bear on his front. It was not until somewhat later that the pack howitzers opened fire, and at about 8 in the morning the Infantry Commander informed the Artillery Command Post by telephone that he wanted artillery fire to cease because our fire was falling within his lines. With our careful registration and frequent metro messages this did not seem possible at this short range, so the artillery commander proceeded to the infantry comand post, after ordering the 105 battalion to shift to its alternate position, facing east. At the infantry comand post the artillery commander consulted with the infantry commander, who described what had been reported to him as our own artillery fire bursting in the palms above his men. He therefore went forward toward the scene of action, where he observed that high explosive projectiles were falling inside our lines, although our own artillery had ceased fire. He was consequently able to convince the infantry commander that it was enemy artillery and mortar fire and not ours which had caused the original complaint. Accordingly, the fire of Keating's battalion was resumed on concentrations in the sand spit across which the enemy was massing for attack.

By that time the 105 battalion was emplaced, and heavily deepened and supplemented these fires with concentrations farther to the east. The enemy masses were struck with the concentrated fire of two battalions of field artillery. Many observers credited this fire with the destruction of hundreds of the enemy who never reached the Tenaru itself in the frantic mass attack of what was later discovered to be a force of about 1,200 men. At one point the assault had succeeded in making a small penetration, but was thrown back by our infantry. The human mass pressing from the rear was undoubtedly broken up by the artillery. Later a counterattack by a battalion (Lt. Col. L. B. Creswell) reinforced with tanks, which had crossed the river at a point a mile or so above the mouth of the Tenaru, struck the disorganized remnants in flank and rear and destroyed them completely. During the advance of this force the artillery ceased fire, as the counterattack did not proceed on schedule and it was feared that it might run into our own fires.

Our casualties were very light indeed. A lieutenant (forward observer) was badly wounded and one enlisted man of the forward observer party slightly wounded. It will be noted that the lack of experience of the young officer serving as liaison with the Infantry Regimental Commander led to delay in opening artillery fire and later caused this fire to cease due to the unfounded apprehensions of the infantry. It was noted that high explosive shell bursting in the palm trees were very effective against infantry in the open. From the reports of a few prisoners which were taken in this fight, the moral and material effect of artillery was considerable. One prisoner stated that he was the sole survivor, together with six wounded men, of a unit pressing from the rear and consisting of 90 men. They had been caught in an artillery concentration while in close formation approaching the river. The preliminary work, the surveys, and careful registration had paid good dividends.

BATTLE OF RAIDERS' RIDGE

In the period following this fight, there began the work of making a map from the available aerial photographs, which were uncontrolled mosaics. This was put in the hands of the executive officer, Lt. Col. J. A. Bemis, whose patient and skillful work produced a workable map with arbitrary grids good enough to be adopted by the division and issued to all units. When you consider that he and his assistants worked in a period in which enemy air and sea forces scarcely gave us any rest, this map was nothing short of miraculous. Nevertheless, we had then no knowledge or surveys of the target areas to the south and west, and as yet no vertical control had been attempted.

The artillery commander, in an attempt to seek better observation to the southward, took a patrol along the ridge later known as the Bloody, Raiders', or Edson's Ridge, and beyond to the stream bed which skirts its southernmost tip. He was immediately struck with the importance of this piece of terrain, both as a means of observation for us to the south and west and as an avenue of approach by the enemy to Henderson Field. Shortly thereafter, the Raider Battalion and some paratroopers were posted in that area.

The artillery commander selected arbitrarily a point on the beach as mean low water and instructed his RO to start working on a vertical control as well as a horizontal control to take in the area recently explored, in order to survey as accurately as possible an observation post for the artillery. Panoramic photographs were taken from this point, but no special use was ever made of them. A ridge was picked somewhat south of the Raiders' Ridge on which recognizable trees could be pointed out, and this was used as a base point on which the 105 battalion registered from their alternate positions facing south. Shortly thereafter the Division Command Post moved to a wooded ridge northeast of the Raiders' Ridge and the Artillery Command Post was moved to a wooded ridge just north and west of that ridge. The Regimental Special Weapons Battery was bivouacked along the flank of Raiders' Ridge south of the Artillery Command Post to provide local security. On September 11, 12, and 13, intensive enemy air and sea bombardment, directed mostly at the area in which the two command posts had been established, gave warning of an impending attack. Infantry patrols had previously reported that the enemy were cutting a trail through the jungle from east to west in the general direction of the Raiders' Ridge. On the 13th of September, four aerial attacks and a severe naval bombardment were directed at these positions.

Early in the night of 13-14 September the Japanese attacked the Raiders' Ridge from the south, employing an estimated 3,000 men. The artillery observer, working close to the Infantry Comand Post, fell back when the Raiders were pushed off the ridge at the point of the bayonet. The Regimental Special Weapons Battery, whose bivouac was overrun, fell back and took up position between the Division Command Post and the Artillery Command Post, prepared to hold that line if the Raiders were entirely overrun.

The infantry commander, Col. Edson, called for artillery support almost as soon as the fight began. The 105 battalion, which had been emplaced to cover that sector, fired all night in support of our infantry. When the first forward observer was washed on back with our retreating infantry, he became lost trying to find his battalion CP and was missing until next

morning. Another forward observer, a young corporal who afterwards earned a commission, immediately replaced him and went forward with our infantry when they regained the ridge. He too disappeared from the scene temporarily as the enemy attack again forced our withdrawal. The 105 battalion commander informed the artillery commander that there was no communication with the infantry commander on the ridge, and requested instructions. From his command post, only some 300 yards from the infantry fight, the artillery commander could hear the bursts of the 105s ringing clearly in the gulleys to the south. He could also hear the shouts of both friend and foe during the various bayonet charges. Accordingly, he gave orders to the 105 battalion to continue to fire on the last concentrations requested by the infantry. Staff officers, by ear, then directed this fire to move right or left in pursuance of the general objective of keeping the Japanese constantly under artillery fire.

This odd method of control served, in lieu of anything better, for about an hour. Meanwhile, the assistant operations officer was dispatched (with communications personnel, wire, and telephone) to the ridge to report to the infantry commander, to serve as forward observer until the others could be located. Throughout that night, during which the Bloody Ridge changed hands several times, the constant fire of the 105s encouraged our men and discouraged the enemy. It was noted that when our concentrations fell, enemy firing died down. Accordingly, we attempted to keep the artillery firing continuously. One battery alone fired over 800 rounds. Most of the time they were firing Charge 1 at minimum range. The danger of hitting our own troops was disregarded in the effort to place a wall of fire between our men and the enemy. Two shells did indeed burst in the tree tops over the Division Command Post, causing slight injuries to six men, but no protest resulted as everyone understood the seriousness of the situation and the inestimable value of the artillery on that strenuous night. So close was the action that the clear commands of the executive officers at batteries could be heard in the Division Command Post, as well as the bursting shells a few hundred yards to our front. Executive officers had to be changed due to hoarseness and exhaustion. One gun per battery had to cease fire for rest, and constant swabbing was required to cool the tubes. Jammed cartridges were simply rammed home with a ramrod. No time could be lost.

At dawn the enemy withdrew, leaving behind him a great crop of dead and dying, many of whom were accounted for by the artillery, which pursued them by opening (increasing) the range as long as it was practicable. The infantry proceeded forward, mopping up the area and seeking to regain contact with the retreating enemy. The Battle of Raiders' Ridge was over. For the artillery it was the most strenuous fight of all. We were fortunate in having made a reconnaissance of the area and having registered beforehand.

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Headquarters First Marine Division
Fleet Marine Force,
c/o Postmaster, San Francisco, Calif.

22 October, 1942.

Division Bulletin
Number 61a-42

Fifth Battalion, Eleventh Marines Commendation of, for action against the enemy 13-14 September, 1942.

1. In connection with the battle which occurred on the night of 13-14 September, 1942, when an enemy force attempted to gain control of the Guadalcanal Airfield.

The Commanding General particularly desires to commend the Fifth Battalion, Eleventh Marines, for the exceptionally effective fire support furnished the Infantry units engaged in the fighting. The support of the Fifth Battalion was of inestimable value in enabling the infantry units to maintain their position through the night. The high quality of the support delivered by the Fifth Battalion is a tribute to the professional attainments and devotions to duty displayed by the Battalion Commander, Lieutenant-Colonel Eugene Price, the Battery Commanders, Captain Joe R. Russell, Captain Roger S. Bruford and Captain John B. Gillespie III.

A. A. VANDERGRIFT,
Major General, U. S. Marine Corps, Commanding.

INTERIM

The enemy made two attacks the following night: one about 1,000 yards east of Raiders' Ridge, and another in the west, against the ridge (southwest of Lunga Point) held by K Company of the 5th Marines. The battalion commanders of the infantry holding the defenses at these points were prompt in their requests for artillery fire, showing an improvement in liaison conditions. Forward observers were available in both these cases, and the direct support battalions handled the situation easily with fires previously prepared for the defense of these sectors. One battalion concentration caught the colonel commanding the attacking Japanese in his CP, wiping out the entire staff and probably causing the early collapse of the assault. Both these attacks were evidently made to coincide with the attack on Raiders' Ridge, but something happened to spoil the timing.

By this time our infantry were becoming enthusiastic artillery fans, which is as it should be. They practiced the biblical injunction, "ask and ye shall receive." Some even overstepped the bounds, asking us to knock snipers off the trees for them. But the important thing was that the players were really joined into a team, the artillery running the interference while the infantry carried the ball. Both these enemy assaults failed miserably and with great losses.

Four enemy assaults had now been delivered in less than a month. The artillery used against us was naval artillery plus a few field artillery pieces—battalion and regimental guns of 70-mm and 75-mm caliber. The enemy's naval fire had not yet been used with enough intensity to produce any marked effect, and its timing was bad. His field pieces had been used mostly piecemeal in close combat, and were hardly more articulate than mortars in the dense jungle. They were entirely ineffective and so close that our own mortars may sometimes have silenced them. The problem of counterbattery had not yet arisen.

Spurred by the ghastly failures thus far experienced by the forces despatched to retake Guadalcanal, the Jap redoubled the fury of his air and sea attacks. Our artillery command post was straddled seven times by bomb patterns. Fortunately, losses from these attacks were extremely small.

In addition to shelling and bombing us, the enemy between the middle of September and the 23rd of October reenforced his troops on the island, sending Lt. Gen. Hyayutake, Commanding General of the 17th Army, to assume command. The

balance of the crack 2d Division ("The Undefeated"), replacements for the Oka Regiment, a battalion of 15-cm guns of the 969th Heavy Field Artillery (afterward known to us as "Pistol Pete"), a battalion of mountain artillery, twelve medium tanks, and other special troops arrived in various convoys. There were present by that time elements of two divisions—the 2d and 18th—and special troops.

The counterbattery problem for the marine artillery commander landed with "Pistol Pete" (the 15-cm jobs) and "Matanikau Mike" (the mountain batteries). By early October they had become a veritable pest. They shelled the navy out of Kukum, fouled the airfield and the surrounding landscape, and otherwise made life extremely unpleasant. They loved to shoot when an air raid was on and they thought we were all in our holes and could not observe them. They enjoyed opening up at mealtime, especially in the evening, as they were to the west where the sinking sun impeded our observation. When our transport planes arrived on the field was another favorite time, as was also when ships were unloading.

All this bore bitter fruit for the artillery commander. He had been to see the division commander about the counterbattery problem before it arose and had arranged for some 155 guns and howitzers. These were expected very soon. In the meantime, what to do? No suitable counterbattery weapons were available, no flash and sound unit. The 105s were run up almost to the front lines in a frantic effort to range our tormentors. Some effect was secured and they put some of the closer ones out of action, but those we could not reach still hurt. And people became irate, blaming all on our own artillery which could not stop this outrage!

Our R-2 (regimental S-2) and all the observers we could crowd into the picture kept a 24-hour watch. A gun flash or a puff of smoke was immediately lined up on whatever instrument was available, cuts were made, and the gun positions reported by coordinates. We had artillery aerial observers on a 24-hour watch standing by the ready tent with a plane to observe and mark gun positions. Air photos were carefully studied. But still, without the 155s we could do very little. The situation was tense and uncomfortable. Perhaps to relieve the tension and give the harassed artillery staff something to smile about, a new type of fire was invented, "Appeasement Fires." All good field artillerymen know about neutralization, destruction, harassing, etc. Now our contribution to the gunner's art! Appeasement Fires!

A pack howitzer battery, conveniently emplaced on a hill by the airfield, where all could see and hear it, was told off to execute these fires. They were pointed west on concentrations within the enemy lines. As soon as "Pistol Pete" or "Matanikau Mike" began to puff, our appeasement battery opened up forthwith. The battery commander could use his own imagination for a target. Thus when irate and indignant telephone messages of "Hey! They're falling right by my place! Why don't you do something?" variety came in from all sources, as they invariably did, we truthfully and indignantly called their attention to the fact that we had already opened fire on the enemy ourselves. This device had to serve until the arrival of the 155s, when all the preliminary work of the harassed R-2 could begin to bear fruit.

The 155 gun batteries we secured belonged to the coast defense units of the Army Coast Artillery and Marines (Steidtman's battery of Sturgis's Defense Battalion). We had already selected and surveyed positions for them, so that no time was lost in getting them ready to shoot. At first we maintained a sort of interpreter at the artillery operations dugout who translated field artillery terms and vice versa, but they soon became inured to our crude, quick methods. It was not necessary to explain what we needed them for, as the transport plane in which the battery commanders arrived landed during a shelling of the field. They collaborated with enthusiasm! Within 24 hours they were registered and ready for business. From then on we had fun with our friends beyond the Matanikau, who became very cagey and much less annoying. Eventually, with the collaboration of aviation and the Navy, we put them out of business — but it took time and patience.

BATTLE OF THE MATANIKAU

Meanwhile, at about 2100 on the 23d of October when we expected the normal evening "hate" to commence, we were surprised to receive an artillery preparation instead. It came down on our front lines (which at that time were along the Matanikau), then opened the range to include CPs and communications, and finally wound up with the rear areas and the airfield. This was the first orthodox and concentrated use of artillery on the enemy's part and it gave us an idea of what we had been giving them with ours.

The bombardment lasted about two hours. Such a phenomenon could only mean one thing: they were launching an attack. Obviously from the west, but from what other quarter? This question held the dilemma for the artillery commander. How much artillery could we commit to action to the west? We could never leave the rest of the perimeter uncovered.

At that time there were available ten batteries of marine pack howitzers and the three batteries of the 105 battalion. Knowlan's battalion (later Curry's) had arrived with the 7th Marines, just after the Raiders' Ridge fight. The extra pack battery belonged to a battalion of the 10th Marines, which had come over from Tulagi. A decision was made and carried out quickly while the enemy preparation was going on.

We emplaced everything except two batteries of Keating's battalion (75-mm pack howitzer) to face the Matanikau. The forward observer net employed was that which Thompson's (formerly Hagen's) battalion, then in direct support of the infantry along the west front, maintained there normally. It consisted of three posts on the hills just east of the river. Their liaison officer was with the infantry regimental commander in the area. Their FDC was in good working order and well dug in; our regimental communications to this FDC were exceptionally good. It was decided to control the massed fires of the regiment via this FDC. Accordingly, the FDCs of Curry's and Wood's (formerly Price's) battalions were linked to it by wire, as were the BC stations of the two odd batteries. Thus we had control of the fires of eleven batteries.

This decision, however, still left us some alternatives in the employment of the fires of the regiment. We could assume that the enemy's main effort would come straight across the sand spit at the river's mouth, as did the ill-fated attack along the Tenaru; or he might feint here and strike around the left flank of our very peculiar formation after crossing the upper reaches of the Matanikau. We had concentrations plotted and prepared to cover all of the threatened areas, but where to mass the fires for maximum effect was still a moot question

which had no answer until the action developed.

The tank action commenced at about 2100, when a medium tank roared across the sand pit at the mouth of the river and succeeded in getting into our lines. A 75-mm tank destroyer engaged it and forced it out into the water out of control. The others came after in quick succession on the narrow front. The 5-inch battery of the 3rd Defense Battalion along Lunga Point gave us some illumination. The antitank guns began picking the enemy tanks off. The artillery opened up with a battalion concentration just in rear of the oncoming tanks—we killed the last three before they ever emerged into the beach area.

Headquarters, Eleventh Marines
First Marine Division, F.M.F.
Command Post.
25 October, 1942.

Regimental Memorandum:

1. The Commanding General wishes to commend this regiment for its conduct during the attack occurring the night of 23-24 October, 1942, along the Matanikau.

2. All hands performed their mission admirably under stress of battle and weather; and the Commanding General, First Marine Division, personally called to express his compliments to the undersigned. Particular credit is due to the Second Battalion and attached Negat Battery for their intelligent and effective conduct of fire; to the regimental ordnance section; and to the communication personnel.

3. The Eleventh Marines again have contributed notably to the repulse of severe and determined enemy attacks, this time assisted by medium tanks, ten of which were destroyed.

Well Done Eleventh Marines!

P. A. DEL VALLE

The tank assault was not being very successful, but where was the infantry? The forward observers reported no activity along the front south of the river's mouth. The tank attack had certainly been determined and courageous. It was still going on. It was time to decide on where the massed fires of the artillery were to be used. We reasoned that if masses of infantry were standing by to exploit the tank attack, they must be somewhere in the vicinity of Point Cruz, a place we had used almost invariably for our registration toward the west. So the decision was made to plaster an area about six to eight hundred yards wide, and about twice as deep, with the massed fires of the regiment. This area included the remnants of Matanikau Village and extended westward beyond Point Cruz.

Concentrations were parceled out to be fired in accordance with the ranges and calibers engaged, and the shoot began. We fired so fast and furiously for the next two hours that we began to get materiel casualties. We had to run the ammunition over the swollen Lunga River, using a temporary floating bridge which threatened to collapse every moment. We obtained some amphibious tractors to stand by in case this happened. At 2200 a green rocket was fired near the base of Point Cruz. Thereafter the enemy ceased his effort. We learned afterward that the area at the base of the Point Cruz peninsula was the assembly area for the regiment which was to make the assault after the tanks. About 300 of them were left to withdraw westward under the harassing fires of our batteries. Next morning our infantry patrols crossed over and went as far as Point Cruz. They found nothing living remaining in the area.

The Japanese delivered two more attacks on the 25th, both of which were evidently meant to coincide with the main attack at the mouth of the Matanikau. Both of these attacks were made at night with forces approximately the size of a regiment. The 29th Infantry Regiment attacked from the south in the vicinity of the Matanikau, striking Hanneken's Battalion of the 7th Marines and making a penetration of some importance. The peculiar formation resulting made it necessary for the field artillery to lay down concentrations on the positions formerly held by Hanneken. Thus, we fired a very unusual problem in that we fired over our own troops and short of some more of our own troops. Fortunately, the corridor in which these fires were laid down was hilly and sufficiently broad so that there were no casualties to our troops from overs. There was no need of interference by other than the pack howitzer battalion which supported this unit. When the fires were lifted, Hanneken's infantry charged and retook the salient at the point of bayonet. Later they continued to pursue the enemy beyond our original lines, capturing several of his machine gun positions. The field artillery shifted its fires to concentrations within the enemy positions and the battle ended in the virtual annihilation of the 29th Infantry Regiment, whose Colonel Furumiya was killed.

The Japanese 16th Infantry attacked along the general line east of the Raiders' Ridge, which included the southeast corner of our perimeter defense. This attack fell upon units of the 7th Marines and the Army's 164th Infantry. It was stubbornly pushed against our prepared positions and against our prepared artillery concentrations, suffering serious losses the first night and even more serious losses the following night, when the Regimental Commander, Colonel Hiroyasu, was killed and the enemy abandoned the field, withdrawing around Mount Austen to the area west of the Matanikau. Again on this occasion there was no need of interference by the regiment, as the direct support pack howitzer battalion was adequate for the task. There were sufficient numbered concentrations properly registered to take care of the artillery problem in these two attacks very handily. The enemy employed but a few pieces of artillery of minor caliber and used them merely as accompanying guns. This was ineffective in the jungle.

THE OFFENSIVE

This virtually terminated the defensive phase of the Guadalcanal Campagin and so we pass to the experiences of our Marine Artillery on the offensive. In the early days of the campaign, patrol actions and reconnaissances in force made beyond the Matanikau were supported by batteries within the perimeter, employing forward observer methods and radio control. At one time in an attack on Matanikau Village by elements of the 5th Marines, the artillery was controlled from a boat offshore, the observer using large T methods. Later on, the 5th Marines made an attack with a limited objective to expel the Japanese from a bridgehead which they had established across the Matanikau in a heavily wooded area. The attack was made by two battalions and supported by ten batteries of artillery, the concentrations being laid to cover the entire Japanese pocket or bridgehead. On this occasion, the infantry did not close in on the enemy until after the fires of the artillery had been lifted for over an hour and no further

fires were requested, although the artillery commander was himself on the forward OP and could tell that the infantry were having a hard time. The Japanese dug themselves in, particularly at the foot of large banyan trees. The foxholes were deep and enabled them to get some overhead cover, being constructed with a compartment in which the individual soldier could crouch for this purpose. It is not believed that the neutralization of the enemy in this pocket was exploited properly by the infantry, but it is also believed that the defensive measures adopted by the Japanese in the thick growth probably reduced their casualties from artillery fire to a minimum. The infantry finally cleaned out the pocket by use of bayonets and hand grenades.

Another offensive with a limited objective was made at about the end of October employing portions of the 5th and 7th Marines. The artillery, on this occasion, had a very difficult problem, as the holding attack was made along the Matanikau, while the main effort was made directly to the north from the hills along the upper reaches of that river which bends westward in that area. Our preparation was simple and orthodox, being concentrated upon the Japanese positions west of the Matanikau, beyond which the holding attack was not expected to advance, but the other supporting concentrations presented delicate and dangerous aspects. The two battalions making the main attack advanced at uneven rates, so that one was ahead of the other. Each requested artillery support without reference to the other because lateral communication had failed. Radio communication with our forward observers and liaison officers was intermittent and unsatisfactory. However, in spite of this, the operation was successfully supported by the use of prepared concentrations and the regiment took a hand with its general support battalion in the withdrawal, which occurred during the second day. The concentrated fires of two pack battalions and a 105 battalion effectively pinned down the enemy while the westernmost infantry battalion, that of Lt. Col. Puller, broke off the engagement and withdrew to the east via the beach road.

Not all weapons of the last war are merely relics now: 155-mm GPFs have been giving good accounts of themselves in many theaters. These Marines are taking advantage of a lull in firing on one of the Pacific islands.

The arrival of fresh forces permitted us, on or about 3 November, to commence a general advance for the purpose of clearing the enemy out of the area between the Matanikau and Kokumbona. This attack was more or less a frontal one, only a few elements of scouts and snipers, under Col. Whaling, being used on the south flank of the attack, which was on a front of two battalions extending southward from the seashore. The attack was made by units of the 5th and 2nd Marines, each supported by its direct support pack howitzer battalion. The 105 battalion was in general support. Additional batteries to a total of 11 were emplaced in the narrow corridor just east of the Matanikau. The third battalion, 75-mm pack howitzers, 11th Marines, was emplaced well forward with orders to cross the Matanikau, displacing by batteries as soon as the advance progressed sufficiently. Amphibious tractors were placed at the disposal of the battalion commander for this purpose near the mouth of the river. In preparation for this attack, the regiment dumped ammunition for all battalions involved at suitable dumps between the Lunga and the Matanikau. Again the attack was too slow in following the preparation, and consequently the neutralization effect was lost to a large extent. However, this was partially made up for by the successive concentrations with which the attack was supported, there being cases when our forward observers brought down concentrations within 50 yards of their own parties.

This attack went very slowly but it succeeded in advancing almost 2,000 yards beyond the north and south line through Point Cruz. This was the farthest west that any subsequent advance progressed until the final extermination drive early next year.

Unfortunately, the Japanese landed reinforcements both to the east and to the west of us at about this time, and it was necessary not only to abandon the attack, but to make a daylight withdrawal in order to shorten our lines in accordance with the new situation.

On or about 5 November, the 1st Battalion (pack howitzers), was hastily displaced eastward beyond the Illu River in order to support Hanneken's battalion of the 7th. This infantry battalion had been posted near Koli Point to oppose the elements of the 38th Japanese Division which landed during the night around Taivu. The pack howitzer battalion, commanded by Lt. Col. Curry, succeeded in crossing the streams with their pieces and some ammunition, and were in position to support the infantry early next morning. During the night, they had pushed a forward observer party and telephone lines through the then No Man's Land between themselves and the infantry at Koli Point. The regiment was forced to employ its Special Weapons Battery as infantry to cover the right flank of the battalion against enemy local attacks. During the night, on information furnished by aircraft, the regiment ordered a 155-mm gun battery, commanded by Capt. Steidtman, which was emplaced just east of Henderson Field, to fire harassing fires upon the enemy landing places, and upon the beach roads and other trails which he must use to establish himself on shore. This battery was well surveyed and had registered

in the water off Koli Point. Consequently, although the fires were not observed, it is believed they maintained an effective harassment of the enemy at a critical period of time.

The following day, elements of the 7th Marines and the 164th Infantry arrived to reinforce Hanneken's battalion which had fought a delaying action east of Koli Point. The 1st Bn, 10th Marines, under command of Lt. Col. Rixey, which had joined the artillery command on Guadalcanal, was displaced eastward beyond the perimeter defenses and placed in direct support of the 164th Inf. Curry's Battalion of the 11th Marines supported the 7th Marines. The 155 battery before mentioned was in general support.

Brig. Gen. Ed Sebree of the Army was given command of the operation. In view of the distance involved and the necessity to take care of the other situation in the west, the artillery was attached on this occasion to the infantry command. These troops succeeded in forcing the Japanese into a pocket and surrounded them in the vicinity of Tetere, except for about 1,000 who succeeded in breaking through before the cordon was closed. These made their way to the hills in the south. The remainder of the Japanese were wiped out in the aforementioned pocket.

Meanwhile, the 2nd Raider Battalion (Lt. Col. Carlson), which had disembarked at Aola and had made the march overland from there to the scene of action, was given the task of cleaning out the Japanese who had escaped to the hills. In this operation, Col. Rixey's battalion of pack howitzers supported the raiders directly by the use of forward observer methods and radio. The raiders would request concentrations designated by the arbitrary grids on the map and the resulting fires were exceptionally accurate. The operation of mopping up, conducted by these raiders, lasted over a period of 10 days but effectively cleaned the Japanese out of the eastern half of Guadalcanal. Only a few remnants managed to make their way around Mount Austen and join their own troops around Kokumbona.

Meantime, while this action was in progress, the artillery command was faced with the problem of covering another daylight withdrawal. The fires of all batteries were controlled by the FDC of Thompson's pack howitzer battalion of the 11th Marines. Keating's battalion of this same regiment, which had partially displaced beyond the Matanikau, was the first to displace rearward by battery, under cover of the fires of the other batteries. Thompson's battalion remained in place, as the limited withdrawal did not require any further movement on their part. The infantry was able to break off the engagement successfully under cover of this artillery fire, and reestablished its line just west of the Matanikau.

On the night of 13-14 November a Japanese convoy of 12 transports, bringing an estimated 30 to 40,000 troops to Guadalcanal, was attacked at sea by our aviation. One transport turned around and headed for home, 7 others were sunk, 4 (in a damaged condition) reached the vicinity of Kokumbona and were beached. Early the next morning a U. S. destroyer came in at short range and covered these transports with heavy fire. Aviation from the earliest dawn continued to drop bombs upon them. The 155-mm gun battery (under Capt. O'Reilly, U. S. Army), then emplaced west of the Lunga, was within range of one of these ships and also opened fire.

On or about 19 November, our attack was renewed west of the Matanikau for the purpose of driving the Japanese westward. Elements of the KDSth Army troops and the 8th Marines formed the bulk of the infantry for this attack. Again a preparation was laid down, and again the infantry failed to advance close upon it—with the consequence that its neutralizing effect was lost. Apparently the Japanese had managed to land sufficient troops and were making an attack of their own. After an indecisive two days of fighting our lines were established a few hundred yards west of where the attack started. Apparently the Japanese likewise decided to dig in, because no further offensive action was initiated by them thereafter. The period between this date and the withdrawal of the division was filled with work for the artillery, now heavily reenforced. We covered with harassing fires all the Japanese area to the westward within range. Counterbattery fires (directed mostly by air observation) were promptly employed whenever the Japanese artillery undertook to fire upon our ships in the harbor or on our installations on shore. Enemy artillery efforts in these directions became weaker and weaker until they were almost imperceptible.

PEARL HARBOR DAY

Sometime before 7 December, two American sailors who had gotten ashore from their sunken vessel in rear of the Japanese positions and had managed slowly to pass through them by travelling at night, reached the front lines and made a break to join us. One of them was killed, but the other one arrived unhurt and was able to give us a fairly detailed picture of the Japanese installations between our lines and Kokumbona. Planned fires were carefully prepared by the staff just prior to 7 December, and on that historic date, in memory of Pearl Harbor, the field artillery executed massed harassing fires upon the Japanese positions beginning at 0800 and lasting until 1800. Every troop concentration, supply dump, bivouac, motor transport park, and ammunition dump known to us and within range was struck during the course of that day. The concentrations were timed so that the intervals would be odd and the different units would be firing at different times. No counterbattery was received. This was the last act of the Marine Field Artillery before turning over to the Army Field Artillery, which carried on successfully thereafter.

Did you know that "Taps" was first sounded at Harrison's Landing, Virginia, in July, 1862—over the grave of a corporal in "A" of the 2nd Artillery? This battery became "D" of the 3d Field Artillery. From that time the custom of sounding "Taps" over a soldier's grave has continued.

LT. COL. GEORGE RUHLEN, FA

GUADALCANAL'S ARTILLERY

By Lt. Col. Robert C. Gildart, FA

The author expresses his thanks to those officers of the Division Artillery, and especially to Lt. Col. William H. Allen, Jr., whose timely comments facilitated the preparation of this article.

History has recorded how the Marines landed in the Solomons on August 7, 1942; how they captured Henderson Field with only slight opposition; and how after blasting the Japs from their caves in the rock, Tulagi and Gavutu were theirs. Too, all are familiar with the successful offensive and defensive actions which finally led to the total defeat of the Imperial Army in the Southern Solomons. But what knowledge do Artillerymen have of how their arm functioned in supporting this campaign? It is the purpose of this article to aid in clarifying the picture in order that those not present, but nevertheless destined for jungle warfare, may benefit by the experiences and lessons learned in the campaign.

The natives of Guadalcanal spin interesting yarns about the present war, many of them based on actual occurrences and tinted only slightly from real truth, which prove the Japs are crafty as they are cruel. It begins in the days of peace when Japan had not yet commenced her "Greater East Asia" war. There were two Japanese carpenters working for the Lever Brothers plantations on Guadalcanal and Florida Islands. These laborers had been employed for at least three years when it began to appear that their native homeland needed them again and they left for Japan. That was in 1935 or 1936. When the Japanese landed on Tulagi the first week in May, 1941, a Lieutenant General and a Major General landed with them. These two generals appeared very much at home on this foreign soil; in fact, they appeared familiar even to many of the natives. They were the erstwhile carpenters! It was, then, these yellow, slant-eyed men, cunning and cruel, whom the American armed forces were to meet. It was to be a game of "kill or be killed"—Artillery was destined to play its role in the killing.

The first Artillery unit which landed on Guadalcanal was of the First Marine Division armed primarily with the 75-mm Pack Hotwitzer, Truck Drawn. No maps or map substitutes which could be employed as firing charts were available; consequently the Marines adopted the only alternative, that of building up an observed fire chart. They maintained liaison and forward observers as taught at Fort Sill. In the beginning, theirs was primarily a defensive type of warfare. They therefore registered on all trails and other avenues of approach along which the enemy might advance, and when a target appeared on or near concentration "X," a battery or battalion opened fire. An illustration of this technique was the famed Battle of the Tenaru,[1] August 21, when the Ichiki Detachment, 1,500 strong, without waiting for its regimental artillery, attacked our positions in the vicinity of the river. Marching westward in column along the beach, the enemy approached the river. The Marines held their positions on the west and boxed the Japs in on the south by a deep flank attack. The artillery, machine guns, and mortars, all previously registered, opened fire with a terrific barrage. Eight hundred to a thousand of the finest of the Emperor's troops were left dead on what was thereafter termed Red Beach by the Marines.

As the weeks and months passed some survey was instituted, but still the only unobserved fires were those placed relatively near to a registered point, the shifts being made by a guess and a prayer. As late as December 30, one Marine battalion had no gridded firing chart and had its guns tied into the target area solely by registration. The firing chart which it did have, however, was unique and produced excellent results. Perhaps a better name for it might be a "firing directory," for on an 8×10 sheet of ruled paper it listed all the concentrations fired, the various columns containing the adjusted deflection, range, and *c*. When a forward observer phoned in a target with reference to a known concentration, data would be figured without any plot by merely determining the shift by the mil relation, and the range by adding or subtracting the necessary number of *c*'s to the adjusted range furnished by the "directory." Upon completion of the adjustment of one battery corrections would be applied to the other two and the battalion fired for effect—usually battalion five or ten volleys. No provision was made, however, to bring in the fire of other battalions on the same target and none for unobserved fires. The battle picture of the concentrations fired was kept on an inaccurate, hasty-terrain map compiled from aerial photographs. Forward observers provided to the Fire Direction Center the information as to location of targets on this map. (Forward observation methods were employed exclusively.) These maps being scarce, the Marines, as well as Army units now present, found it necessary for their forward observers to draw their own sketches of the battlefield. Many of these sketches were excellent and provided a means whereby relief of front line observers could be made and yet a continual picture of all firing maintained. The Marines, and the Army Artillery which first joined them, may be justly proud of their achievements and the abundance of initiative which they exercised, but it was in the largest and last offensive that the technique of the artillery on Guadalcanal achieved its greatest development.

A study of the terrain over which this last campaign was fought will be facilitated by reference to the accompanying oblique photo and the uncontrolled (and poorly matched) mosaic. To the east the dominating features are Mount Austen, which overlooks Henderson Field, Hill 27, the small "sea-horse" comprising Hills 43 and 44, and the large "galloping horse" with its head at Hill 53 and tail at Hill 50. All these landmarks are separated by the Matanikau River and its various branches extending south, east, and west. The oblique photograph gives a clear picture of the difficulties which were to be encountered, for all terrain over which the battle was fought, except the narrow cocoanut-studded strip along the beach, was as is pictured here. The light colored areas are precipitous slopes covered with a tall tropical grass averaging

[1]The natives claim this battle was fought on the Ilu and not the Tenaru, the names of the two rivers having been reversed on the map employed at that time.

four feet in height. The jungle areas also contained steep hills, but these were covered with trees one hundred to one hundred and fifty feet high surrounded at the base with a dense, almost impassable tropical undergrowth. To the west of the "horses" the hill mass from Hills 87 to 89, and the V-shaped bastion centering on Hill 90 and protecting Kokumbona, were the dominating terrain features.

From the pictured enemy dispositions it can be seen that the Japs held the great majority of the salient points described above. Furthermore, the units which occupied them, though depleted somewhat by sickness and previous campaigning, were considered some of the Emperor's finest troops. The 124th Infantry, known as the Oka Unit, had seen service at Canton, Hongkong, Borneo, Mindanao and Rabaul; the 228th Infantry had participated in the capture of Ambon (off the west coast of New Guinea) and Timor.

It was against the above units, reinforced by elements of other regiments, that our main effort (a flank attack from the south) was launched. It is principally the activity of the artillery of the 25th Division making that attack that will be discussed. The Division Commander's plan of attack, formulated after due consideration of terrain obstacles and the difficulties of supply, is pictured on the mosaics. In execution the plan was modified slightly toward the end of the campaign when, because of the complete overwhelming of the enemy, it was decided to proceed without delay toward Kokumbona.

The Division Artillery plan, though simple to prepare, appeared difficult to execute. It employed two light battalions to support their respective regiments, while the third light battalion plus the medium battalion were in general support. Zones of fire and observation were assigned, and execution of the plan began. Five days prior to the attack on January 10, 1943, detailed reconnaissance was initiated by battalions and battery positions selected (see mosaic). Occupation of position, however, was not easily accomplished. Because of a lack of shipping and the fact that we were not expected to land on a hostile shore, units had been commercially loaded, and the unloading was not yet complete. Even with this type of loading, space was not available for all organic transportation. The result was that each light artillery battalion had at its disposal only four "Jeeps," two weapons carriers, and five 2½-ton trucks. In the medium battalion was the same light transportation, plus ten 4-ton trucks. All reconnaissance, survey, wire laying, and the handling of two units of fire was accomplished with these vehicles. The result was that on January 8, after lowering some howitzers by hand into position on steep slopes, all battalions were able to report, "Battalion in position and ready to fire."

It was during the days of selection and occupation of position mentioned above that the method of handling artillery fires on Guadalcanal changed from the purely adjusted type to include those controlled by survey and fired without prior registration. Furthermore, real massed artillery fire was to be accomplished. Not only were the fires of one division's artillery to be massed, but those of another division with it. To our amazement, some of the "old timers" on the island appeared rather astonished. However, to give them due credit, their recent work in survey facilitated our job. The Marines, sometime in the latter part of '42, had selected the southwest corner of Henderson Field as an origin point, and with a

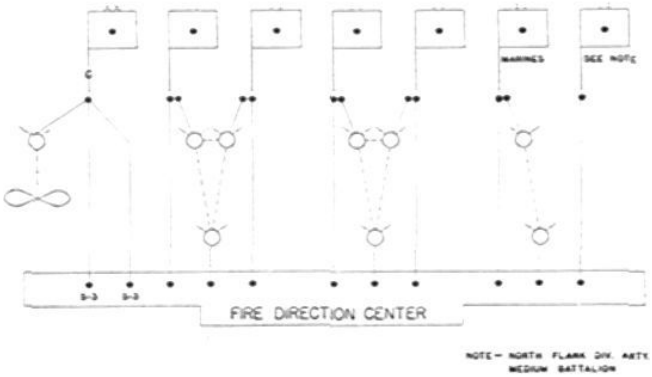
Hog-backs and gullies, ridges and draws—these make up Guadalcanal's interior. After going by boat as far as possible up a shallow river, supplies were lugged in by native carriers. It was a relief to them to emerge front steaming jungle to breeze-swept grassy knolls.

declination constant of 8° 30′ (found on naval charts) had given direction to the edge of the field and thus commenced a survey. The older Army troops on the island, when the final campaign was initiated, were tying into this master control point, and we with the division on the south flank joined them.

From the oblique photograph it can be seen that the many hills made the country ideal for survey operations. There being no accurate maps or mosaics to which we could connect our survey, our field work was developed into a combined observed-fire and surveyed chart, scale 1:20,000. Points to be surveyed were selected by a group reconnaissance (conducted under enemy sniper and mortar fire) by the Division Artillery S-3 and all battalion survey officers. OPs were selected and prominent terrain features in and near the enemy lines were assigned designations as Check Points, these designations to be employed by all units. The detailed areas to be surveyed by each battalion and by the Division Artillery section were assigned, and coordinates were ready on the 8th, when the battalions reported ready to fire.

Registrations on check points were accomplished on the 8th and 9th. To confuse the enemy as to where the main attack was to be launched, the artillery on our right was asked to fire in their sector. While the battalions were firing, the Operations Section of the 25th Division Artillery attempted to obtain horizontal and vertical control of a Jap-occupied jungle pocket, approximately 800 yards north of Hill 57, on which was to be placed a preparation preceding the attack. This pocket was not visible from any advance control points, therefore surveyed coordinates were not obtainable. However, in previous weeks harassing fires had been placed in the general vicinity by "guessed-at-shifts,"" and it was believed that aerial observation of one or two rounds per battalion in that vicinity would not jeopardize surprise and would give adjusted data for the preparation. Aerial observation was requested but was not at first forthcoming. Had the new type artillery observation plane been available it could have been employed in this and other problems with excellent results. As a substitute in this instance, we were able to obtain from troops which had been on the island for several months an overlapping pair of aerial photographs on which we could locate not only our target

FIRE CONTROL COMMUNICATIONS, DIVISION ARTILLERY



but two surveyed points as well. Horizontal control was easily obtained by restitution, but vertical control presented a problem which was finally solved principally by interpolating on an oblique photo between two points of known altitude. All personnel were positive of the accuracy of their work, but there was still an uneasy feeling among all that something could be wrong. It was to be the first firing in combat, and it had to be accurate. The tenseness was relieved the afternoon of the 9th when a Navy plane was made available to us, and we fired several rounds per battalion. To the surprise and gratification of all, the data were extremely accurate and from that point on restituted coordinates were employed with complete confidence.

At Division FDC the fire of organic units, reinforced by a battalion of Marine 75-mm howitzers and an additional medium battalion, was controlled by direct wire lines to all units (see communications diagram) in the heaviest single bombardment of the Battle of Guadalcanal. Bursts were turned on and off almost automatically by means of prearranged, coordinated, and intermittent time schedule.

Previous contacts with the enemy had determined that he was definitely on the defensive, holding strategic terrain while awaiting large-scale reinforcemesnts. His strong points were well dug in, and it was a known fact that he would seek cover as soon as the artillery opened fire and come out when it ceased. It was hoped this morning to catch him off guard. The theory, which observers stated functioned perfectly throughout the campaign, was to synchronize all watches to the second and then to designate to the battalions the times at which the rounds should hit the target area. Each battery determined its time of flight, subtracted it from the designated time of impact, and opened fire accordingly. The result was first a terrific concussion of hundreds of rounds bursting simultaneously; then an almost deafening silence. Irregular intervals between fire soon taught the Japs to remain under cover for some time after such a barrage, thus facilitating the task of the supported Infantry.

The preparation completed, direct-support battalions took over their normal missions. Except for registrations and counter-battery fires in distant areas all firing was handled by forward observation methods through the battalion fire direction centers. At the start of the campaign these observers had only penciled sketches of their zones of observation, but later most were furnished mosaics such as that illustrated here, size 8″ × 10″, mounted and waterproofed. Since adjustment in rugged, jungle country is extremely difficult and since both liaison officers as well as forward observers must be aggressive in suggesting the use of artillery, it was necessary to send out experienced officers such as battery commanders to perform these duties. The observers remained with the front line infantry, often adjusting from fox holes in the immediate front lines. Adjustment was usually slower than normally expected, as high angle fire was the rule on most problems. This type of fire was employed to aid in clearing crests occupied by friendly troops. There was one time when even high angle didn't help. A single battalion adjusted on a battalion target. When all batteries fired for effect the left one "came down" 50 yards left of the adjusting battery, and resulted in half of the volley hitting a crest 400 yards shorter in range. The moral is, of course, that terrain must be studied, and that in such a study, when firing close to friendly troops, consideration should be given to adjusting each battery that is to be fired for effect.

Forward observers of the 105-mm battalion also found adjustment difficult due to their inability to see HE in the dense jungle. Smoke was invariably employed for adjustment, but difficulty arose here because of the different ballistic qualities between the two shells even when correction was made for the five-square weight of smoke. Too, smoke shell proved very erratic, and short rounds obscured the target for a considerable period. Tests to date indicate that perhaps the great dispersion encountered was due to the methods of storing the ammunition. It was stored horizontally, with the result that when it reached a temperature of 112º Farenheit the white phosphorous melted and produced a void along the length of the shell. This void remained when lower temperatures were encountered and the liquid again solidified. We were thus firing an unbalanced projectile. If stored vertically the void naturally has no effect and a true path of flight is obtained. That is the theory. It's been proved by a short test conducted here, but perhaps further testing is needed where more ammunition is available. The real solution, for jungle warfare, would seem to be an HE shell with a compartmented booster, one compartment containing a small amount of white phosphorous. This type of shell being easily visible, a change of projectiles would not be necessary before firing for effect. The use of time shell would solve some of the above difficulties, but there's no such thing as high angle time fire.

Communications in the jungle also presented many problems to the forward observers. Wire was employed wherever practicable, but it was difficult both to lay and to maintain. Further, it was impossible for the observers and their parties to carry sufficient quantity—even of the light-weight wire—to prolong their lines as the infantry moved forward. At first an attempt was made to employ the SCR-194. It was not sufficiently powerful, however, to overcome the shield formed by the jungle. Damp weather and rain caused further difficulties in the operations of this and other sets. An attempt was made to carry the SCR-284 by hand to the front. Although the task was accomplished in this case, the set proved too heavy to make such procedure feasible. A solution was finally developed with the distribution of several SCR-511 sets. These proved rugged enough, and provided excellent communication when employed with the SCR-284. In all radio nets remote control was employed where feasible. This feature considerably extended the radio services.

Japanese trickery and snipers also caused headaches for the forward observers. The Japanese frequently withheld their artillery and mortar fire until friendly artillery began its fire for effect. At this point the Japs would fire close to our lines to give the impression that "Artillery is falling short." This happened in many cases even when friendly fire had been adjusted six to eight hundred yards in front of friendly troops. The natural result was for the infantry to call *Cease Firing*. It was only after artillery continued to "fall short" after *Cease Fire* that friendly troops became conscious of this ruse. The Jap snipers and machine gunners caused concern to forward observers in the first stages of battle. No casualties resulted, but a small shovel soon became standard equipment.

While forward observers were thus troubled, the Division Artillery Fire Direction Center was facing problems of its own. Most targets on which the infantry regiments desired fire were observed fire problems. Targets for large concentrations, however, were in many cases delivered without prior adjustment. Without survey no such fires could possibly have been delivered. With it they were delivered by the grace of God. At Sill instruction is given in the use of wide-angle photographs or in the assembly of a strip mosaic into a controlled one. In either case the unassembled prints are made available to the artillery. During combat on Guadalcanal, although photographs of desired areas had at one time been made, difficulties of supply and reprinting prevented the artillery from obtaining the necessary copies for firing charts until after hostilities had ceased. There was one (approximately 1:20,000) mosaic, uncontrolled and reprinted in 28 pieces, which could be assembled with difficulty. No unit had ever before attempted to use it. It was determined by survey, however, that in the southern sector the scale was for practical purposes 1:20,000 and that, when gridded with the fire control grid in this sector, fairly accurate horizontal control was available. Division Artillery unfortunately had the only copy. It was by means of this mosaic and restitution where possible from photo pairs that horizontal control was obtained. It was useful, furthermore, in that after aerial registration on check points, identifiable both on the mosaic and the ground, harassing fires could be delivered, the effectiveness of which was observed as our troops advanced. Vertical control was still obtained by interpolation on oblique photographs, and at times even by employing the known height (averaging 125 feet) of the jungle trees.

Many successful unobserved or surprise fires were laid down in this manner. One such was south of Hills 52 and 53 astride the Matanikau River for 800 yards. The request for fire was received at 0930; at 0945 a 20-minute preparation was begun, employing two light and two medium battalions. Many 155-mm and 105-mm projectiles were hurled into the area. During one interval while a time schedule as previously discussed was fired, the Japs in a pocket tried to break out and many were killed by our machine guns on the high ground. In firing into such jungle terrain the artillery habitually employed a mixture of either 50% or 75% fuze delay in order to penetrate the jungle. It appears now from tests recently conducted by us that 100% fuze delay might better have been employed. These tests revealed that employment of the quick fuze resulted in little effect on the ground whereas the delay fuze with high angle fire was fairly effective, although some effect was lost by shells penetrating the earth before bursting. Greatest effect was obtained by combining low angle fire with the delay fuze. This combination produced a burst just above the ground where the effect of fragments was not lost in the "jungle roof." Had

Grey = U.S.; Black = Jap

our artillery known the result of the above test prior to entering combat, much less ammunition might have been expended with far more effect. Much of the effect that was obtained in the dense jungle was due to the employment of the 105-mm howitzer and even more to the 155-mm. These results probably could have not been obtained with the 75-mm pack howitzer. This latter weapon did prove extremely effective in the first phase of the war, when the Japanese were attacking in mass through cocoanut groves and over lightly wooded jungle terrain, but the situation had changed by January. By this time, the Japanese had occupied the low, dense jungle, had dug into the sides of steep slopes, and burrowed under the base of trees four to six feet in diameter. Larger caliber artillery with its additional penetrating power was, therefore, necessary to destroy them. The 155s with a delay fuze were the artillery's answer.

The strongest and best organized of these Japanese defensive positions was the Gifu Strong Point between Hills 27 and 31 on Mount Austen. The method of attacking it with artillery was both interesting and involved. Here the Japs held a semicircular ridge with forty machine gun pill boxes, each supporting several others and each having a lane of fire cut from the jungle. Our infantry held the surrounding hills. The distance between our troops on Hill 27 and those on 31 and 42 was approximately 700 yards. The hills were such that for close support a dead space area existed which could not be accurately determined. Nevertheless, the infantry desired the effect of both the 155s and the 105s in that pocket before attacking. The Division Artillery assigned 2 battalions each of 105-mm and 155-mm howitzers, and in addition one gun of a third light battalion. This latter gun was the only piece capable of firing high angle fire in the pocket, all others being at too short a range.

"On the 17th of January observers were placed on Hills 27, 42, and 43, all being accompanied by infantry officers who pointed out the targets and locations of our infantry. Prior to adjustment the infantry withdrew 300 yards from the east perimeter of the pocket and from Hill 31. In spite of instructions to clear Hill 31, however, several OP parties from the artillery remained on the hill to observe the fire. It was not long before this party decided to evacuate the hill and shortly thereafter the OP was demolished by a direct hit from a 155-mm shell.

"At 1200 adjustment of fire was commenced. Owing to the necessity for accurately covering the entire area, approximately 1,000 yards square, each piece was adjusted on its target individually. The adjustment was conducted by forward observer methods, a report being received from each observer before corrections were made. The observer on Hill 43 had been charged with insuring that no fire fell south of the line Hills 27-43 and that none fell north of the line Hills 31-42. Observers on the line Hills 31-27 insured that no fire fell on our troops east of that line.

"Adjustment was completed by 1430. It consumed much time because of the number of pieces (49) to be adjusted individually and because of frequent calls to cease firing, principally from troops on Hill 42. The reverberation of the explosions in the bowl of the hills made it appear that fire was closer to friendly troops than it actually was.

"From 1430 until 1600 fire for effect from all guns was placed in the target area. In all, approximately 1,700 rounds were expended. Observers reported that the concussion from the fire was so terrific that the troops along the eastern side of the pocket were dazed for some time after the cessation of fire.

"After 1600 the original front lines were reoccupied without opposition. It is unfortunate that due to the difficulty of the terrain and the lateness of the hour it was impossible to assault the enemy position immediately subsequent to the lifting of the concentration. Had such action been possible it is believed that lesser opposition would have been met than was encountered the next day."[2]

During the entire campaign we were able to deliver fire without regard for Japanese counterbattery, for there was none worthy of the name. There were "Pistol Pete" and the "Kokumbona Kid," the universal names for all Jap artillery. Too, there were lone Jap bombers such as "Washboard Charlie" and his bombs who on moonlight nights seemingly tried to supplement the Jap artillery's efforts.

Artillery concentrations such as those previously outlined helped to neutralize the Japs between January 10 and 26. The division story is best told by the final compilation of the action based on an actual count of those Japs left dead on the battlefield:

Enemy killed	2,313
Enemy captured	122
Total	2,435

No effort was made to estimate the number who had been killed by artillery fire. The ratio of our losses to those of the Japanese was approximately 1 to 12.

The above divisional success was achieved through the active cooperation of all arms, none of which was subordinated to the other, while the success of the artillery can be attributed to thorough technical knowledge applied by all ranks at the opportune time. As in all campaigns, lessons were learned, old doctrines emphasized and recommendations submitted. Some of the more important follow:

1. Reconnaissance on the ground by the artillery commanders and staff officers of all grades is essential for the delivery of accurate and timely fire.

2. Survey operations should always be inaugurated immediately by the highest artillery headquarters.

3. Though we were informed that the aiming circle was inaccurate, after the campaign, when the needles were properly balanced for the Southern Hemisphere and the instrument declinated properly, we found no greater inaccuracy than would normally be expected.

4. Supporting artillery fires are only effective if perfect coordination is obtained with the supported unit for an immediate advance by the infantry after the artillery has lifted fire. Otherwise, the demoralizing effect of the artillery is lost and the enemy has the opportunity of quickly reorganizing.

5. No good portable radio was available in quantity which could be employed by the liaison officers and forward observers. Radios such as the SCR-284, while capable of perfect reception and transmission in the jungle, were too heavy to be carried far by hand; furthermore, it was difficult to detach them quickly from the vehicles. The SCR-511 when used in conjunction with the SCR-284 was a great asset, but was not

[2]Excerpt from notes by Lt. Col. Wm. H. Allen.

available in sufficient quantity. The remote control units for all sets were exceedingly useful. All sets destined for jungle warfare should be waterproofed.

6. Wire was the best method of communication but required constant upkeep.

7. In order that artillery might continue to fire effectively, friendly troops must be alert in distinguishing between Jap mortar and artillery fire and their own artillery.

8. The lack of proper aerial photographs for all units is a definite liability which must be overcome in any future campaigns.

9. Artillery observation planes as provided for in the new T/O could have been a great asset. None were available.

10. A security section must be formed and trained in each battery to deal with snipers. Sniper fire, however, was very inaccurate and our men if jittery were more dangerous than the lone Jap.

11. Smoke shell should be stored vertically.

12. An HE shell with a small amount of white phosphorous should be developed. Shells with various colors of smoke would be advantageous.

13. Forward observer parties should be equipped with entrenching tools.

14. Forward observation methods should be stressed in training, but an officer should also have thorough knowledge of regular OP methods and should not hesitate to use them when at a distance from the target. Generally on terrain such as that encountered in this campaign, it is necessary to bracket the target before firing for effect. Faulty estimations were the cause of much inaccurate fire.

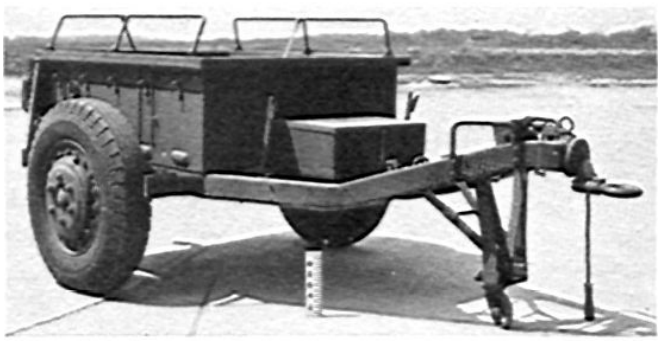
15. High angle fire is necessary in rugged, jungle terrain.

16. Low angle fire with the delay fuze produces the best effect in dense jungle.

17. When operating in rugged terrain without adequate vertical control, it is necessary to adopt special measures in order to mass effectively the fire of the Division Artillery. A sensing for altitude, in addition to those for range and direction, must be furnished the Fire Direction Center.

18. In any cooperation with the Marine Artillery it must be borne in mind that they sense their fire as *commands*. For instance, our "200 right 300 over" would for them be "Left 200 down 300." This type of sensing appears to have some advantage over that now taught at Sill.

In conclusion it might be well to emphasize again that the basic methods of artillery technique as outlined in the field manuals and taught at Fort Sill are sound. Although no two situations will ever present the same problem, personnel thoroughly acquainted and trained in the "Normal Operations" will have a sound basis from which they can, improvising if necessary, arrive at a workable solution.



Trailer, Ammunition, M10 has been adopted for all calibers of artillery. All around are ample books for lashing the load or fastening the tarp (which should be used for protection from sun or rain). Wheels have individual hand brakes. For larger calibers, a frame or rack is bolted in to hold projectiles upright; capacity: 18 rounds of 155-gun ammunition, 24 of 155-how., or larger quantities of cloverleaves for smaller calibers. A pintle permits the trailer to serve as a limber, in which case an electric cable (seen hanging by the lunette) transmits power to the piece's brakes.

A FIRING BATTERY ON GUADALCANAL

By Capt. John F. Casey, Jr., FA

Our firing batteries, as such, were rather fortunate during the latter months of the campaign on Guadalcanal. They were not subjected to heavy enemy counterbattery or to much enemy bombing or strafing. Army gun batteries lost very few men from enemy fire, either artillery or sniper.

Ground action at the end of November was limited to patrols. The Army and Marines held a line running roughly from Point Cruz on the west, inland and south 2,000 yards, then east to the Tenaru River, thence north to the shore. The eastern front was very quiet and to all intents and purposes there was no opposition. There was occasional sniper action to the south but the enemy's main concentration lay to the west. That was where enemy bombers were dropping parachutes of food, medicine, and ammunition each night. The Japs made occasional dusk sallies which were quickly rebuffed. Our patrols were feeling out enemy strong points, these scouting parties ranging in size from a platoon to a battalion.

The LDOth FA Bn (105-mm howitzer) was the first army artillery battalion to land on the "Canal." They arrived early in November, and were around to receive the shellacking from the Jap navy in the battle of November 16-17. Their firing was much heavier than that of any of the battalions which later arrived. The remainder of the Americal Division's light artillery was in position by December 8.

The first positions we (BNGth FA Bn) took over were Marine positions between the bomber and fighter strips. The Marines had placed some of their batteries in a triangular formation. Within a battery the guns were in an irregular diamond pattern, and pits were dug so that the guns could fire 360; there were base points in each directional sector. Another system used by some batteries was a series of pits facing east (or west) and another series pointing north and south; No. 4's pit was in the pivot position and became No. 1 when the pieces were shifted.

Our firing batteries averaged 89 men when we reached the "Canal," but as we only had 10 trucks and 8 peeps per battalion the motor section was released to duty with the howitzer crews. With this addition our gun crews rose to 10-man strength, and in periods of prolonged harassing fire we were able to use two shifts of 5-man crews.

During the day the cannoneers' usual costume was swimming trunks or BVD shorts, shoes, and a helmet liner or sun helmet. In the evening they covered up to protect themselves from malaria-carrying mosquitoes.

Cannoneers and CP personnel lived in pyramidals dispersed about the grassy plain to the rear of the pieces. The Marines had left us slit trenches, some with a covering of cocoanut logs. The Japs were rather inaccurate bombardiers and many of their shorts and overs landed in our general area. The second night we were in position they landed a 500-pounder about 25 yards from our No. 4 piece, burrowing a crater larger than an inverted pyramidal. Thenceforth we had trouble getting the men to stop digging to eat. They picked up slabs of sheetiron which the Japs had left behind and sandwiched them between sturdy cocoanut logs as a covering.

We cut down to two meals a day and a cold drink at noon. The ration was adequate but monotonous. Basic components were Spam, Vienna sausage, chili-con-carne, and occasionally corned beef or canned mutton; turkey for Christmas, of course. Usually there was enough flour and sugar available to keep us in pastry. A bakery was established on the island, which took care of the bread situation. The time of meals depended pretty much on the firing for the day. It usually ran breakfast at 0700, lunch at 1200, and supper at 1700. No fires were allowed from sunset to dawn.

Our CP personnel consisted of the executive officer, a telephone operator, radio man with a 194, recorder, medical aid man, and gun mechanic. Each section (including the 5th) had a pyramidal tent with cots. The remainder of the battery bivouacked in the wet and muddy fringe of the jungle, about half a mile from the guns. Old Jap dugouts—ingenious tunneling labyrinths—dotted most of the areas.

From the beginning it was apparent that the time-honored method of bellowing commands was a risky business in the presence of snipers, so we installed a wire net between the executive and each chief of section—each of the five had a head-and-chest set. Enough slack wire was left to allow all parties freedom of movement. Into the GP ran a direct line to FDC, a switchboard line, and (in the beginning) a forward OP line. The GP operator handled the FDC line, and with relief kept a 24-hour vigil. The executive, with recorder at his elbow, repeated the commands to the firing battery, and where terrain permitted kept a careful watch of their work. It soon became apparent that all firing would be done through FDC, so battery OP lines were abandoned. Actually we did little but register in this first position, as we soon moved up.

Each gun crew had at least two men who were excellent gunners, Nos. 1 and 2. We made ammunition corporals in each section out of the corporal technicians who had been prime-mover drivers. This system worked well, as the ammunition section had a busy job: all ammunition had to be separated by lot number, and there were sometimes 30 or 40 lot numbers in 500 rounds of ammunition.

Our battalion only averaged 83 rounds per day for the last 60 days of the battle. This figure is deceiving, however, as we fired little but intermittent harassing fires until January 10, when business picked up and we punched out some 300-500 rounds per day.

Battery positions were not easy to find. Originally there was only one road around the island. The engineers did a marvellous job of hacking roads along the ridges to the south as soon as we captured them. For the most part, however, the artillery straddled the coast road.

Aerial photos which showed clear spaces in the jungle were deceiving: most of these spots turned out to be patches of swamp land. At the beginning of the advance, the batteries were in bowls in the ridges. As the advance turned to a rout, they found favorable positions along the coast on either side of the shore road. A good deal of chopping and cutting of growth and trees was necessary, and a collapsible saw captured

from the Japs was an infinite help. Such an instrument would be a great asset to each battery; it came in about 5 lengths and was some 3 feet long (with handles on it) when stretched out. It folded up into a leather case about the size of a quadrant case.

The usual distribution of trucks for a move was 4 trucks to each of 2 firing batteries, and 2 to headquarters battery. Most of the batteries doctored up one or two of Mr. Tojo's delapidated bullet-spattered wrecks and used them for hauling such odds and ends as latrine boxes, mess kit pans, etc. They were not trustworthy enough to take valuable cargo, as they sometimes did not reach their destination for ten or twelve hours. The first four trucks to return were turned over to the third firing battery. A move under these conditions was little short of hectic, but everything always arrived in good order. Fortunately the moves were usually not longer than 5 or 6 miles.

On December 21st, two battalions of Army infantry advanced to take Grassy Knoll or Mount Austen, a long ridge which loomed ominously above Henderson Field. At this time some points in our perimeter defense were less than 1,000 yards from the airfield. Our battalion moved up to reinforce the fires of the Marines who were in direct support. Of necessity, our assigned area was relatively small — troops of all branches were jammed in the small sector around the airport. Our positions were on either side of a grassy ridge which ran north and south. The terrain was tricky rolling knolls and sharp declivities, as the hill ran into the jungle. It really taxed the ingenuity to get positions where the guns would not be firing directly over each other.

With the aid of a small bull-dozer the battalion moved in at dawn. Moving was quite a fear with only 10 trucks and 8 peeps in the battalion! Barracks bags and all excess impedimenta were stored at Service Battery, the men carried a change of clothes in their packs, but even at that the trucks looked like gypsy caravans.

Somehow or other we crammed on each truck at least 100 rounds of ammunition, our homemade gun section box which contained all gun equipment from pioneer tools to sight, a pyramidal tent, and cots for the men. Spread among our four allotted trucks were one gasoline range, two .30-cal. machine guns and ammunition, rations for three days, 4 miles of wide on DR-4s, a switchboard, and 5 phones. Personnel consisted of 4 gun sections, GP personnel, 3 men from the 5th section, 4 wire men, and a cook. The firing battery was made self-sufficient in case, as sometimes happened, the rear echelon could not get up for a couple of days. How did we get all this on four 2½-ton GMCs? I wonder myself, now.

With the opening of the drive, we had more calls for fire. Fire was being controlled at this time by a coalition (Army and Marine) staff at Col. A 's headquarters. Here the 105s received their first experience with high angle fire. Recoil pits were dug, and loaders became adept at literally shoving the shell skyward.

A problem which was never really solved was that of placing aiming stakes. Many of the positions were in deep hollows; no reference points were visible and the horizontal distance from gun to crest was short. Consequently only one aiming stake could be used, and that at too short a distance. This fact explained to some extent the slight inaccuracies in fire that were apparent to all observers.

Firing at this time consisted of intermittent harassing fires at night, dusk registration by forward observers on check points in various sectors, and preparation fires before the expected dawn jump-off or patrolling. Two Marine 75-mm howitzer battalions were in direct support of two regiments of infantry, one Army 105-mm battalion supported a Marine regiment, two 105-mm battalions were providing reinforcing fires, and two batteries of 155-mm howitzers (one Army and one Marine) were in general support. There was no firing from approximately 0800 to 1600 because our patrols were out. Around 1600 we would register each battery. Sporadic fires would crack through the night. Occasional long range targets would be taken under fire by aerial observers during daylight hours.

Christmas Day was an occasion of subdued festivities. Everybody received all the turkey he could eat. Cooks worked overtime putting together mince and squash pies. Fortunately, a good many Christmas presents were delivered on time. Church services were held for those who could be spared from the fighting. Extra vigilance was maintained to prevent a Jap "surprise" attack. Letters were delivered to front line doughboys, a factor which kept morale high. Mail service was remarkably rapid, approximately 10 days to 2 weeks either way.

On January 2, 1943, an Army infantry battalion secured Hill 27 to the south of Mt. Austen, thus turning the right flank of the Jap line and barring any organized enemy push to the east. For days, the action in this area was hot. However, plans were formulated for the final kill.

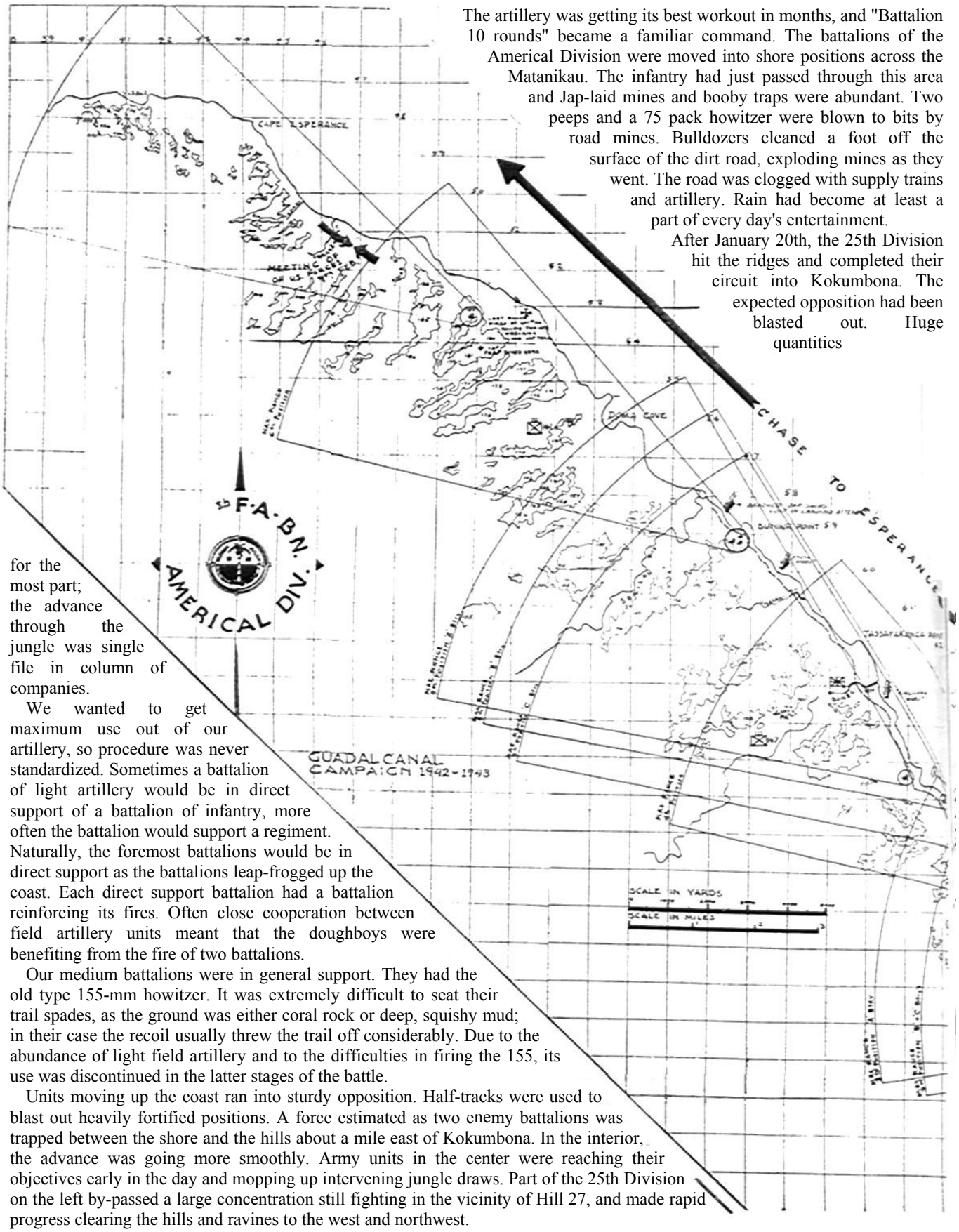
A recently arrived Army division—the 25th—moved in on the south flank. Their mission was to clear the high ground to the west of 27 (straightening out the line), then make a wide envelopment movement to the northwest and swing out to the coast at Kokumbona. When the salient on the left flank was erased the Marine regiments on the right were to move up the coast and the high hills immediately to the south. Army units of the Americal Division held the center of the line. It was felt that the Japs would probably make a determined stand on the west bank of the Kokumbona River. The envelopment movement of the 25th would eventually pinch out the other Army units in the center.

The 25th Division's light artillery moved in on the ridges just north of Hill 31. They took over a survey of the Americal Division artillery and got prepared for the jump-off on the morning of January 10th.

That morning's preparation was something to behold. Artillery boomed all along the line. The main concentration was placed at the hinge of our line, near Hill 57. Smoke shells marked enemy positions. Dive bombers whined down to unload, followed by P-40s strafing hell out of the area. The incessant ker-boom of 105s heralded the death knell of Tojo's crew as our dougbhboys jumped off. Control of the artillery had reverted to Division Artillery Headquarters.

The 25th Division Artillery, reinforced by the Marine and Americal Division Artillery, blasted a path for the advancing infantry. About the 15th the salient was straightened out and the advance started along the whole line.

It was impossible to use hard and fast combat team set-ups in this situation. Forward observers who were in position must be able to call for the fire of the whole battalion and possibly the division. The fronts of infantry regiments were narrow



The artillery was getting its best workout in months, and "Battalion 10 rounds" became a familiar command. The battalions of the Americal Division were moved into shore positions across the Matanikau. The infantry had just passed through this area and Jap-laid mines and booby traps were abundant. Two peeps and a 75 pack howitzer were blown to bits by road mines. Bulldozers cleaned a foot off the surface of the dirt road, exploding mines as they went. The road was clogged with supply trains and artillery. Rain had become at least a part of every day's entertainment.

After January 20th, the 25th Division hit the ridges and completed their circuit into Kokumbona. The expected opposition had been blasted out. Huge quantities for the most part; the advance through the jungle was single file in column of companies.

We wanted to get maximum use out of our artillery, so procedure was never standardized. Sometimes a battalion of light artillery would be in direct support of a battalion of infantry, more often the battalion would support a regiment. Naturally, the foremost battalions would be in direct support as the battalions leap-frogged up the coast. Each direct support battalion had a battalion reinforcing its fires. Often close cooperation between field artillery units meant that the doughboys were benefiting from the fire of two battalions.

Our medium battalions were in general support. They had the old type 155-mm howitzer. It was extremely difficult to seat their trail spades, as the ground was either coral rock or deep, squishy mud; in their case the recoil usually threw the trail off considerably. Due to the abundance of light field artillery and to the difficulties in firing the 155, its use was discontinued in the latter stages of the battle.

Units moving up the coast ran into sturdy opposition. Half-tracks were used to blast out heavily fortified positions. A force estimated as two enemy battalions was trapped between the shore and the hills about a mile east of Kokumbona. In the interior, the advance was going more smoothly. Army units in the center were reaching their objectives early in the day and mopping up intervening jungle draws. Part of the 25th Division on the left by-passed a large concentration still fighting in the vicinity of Hill 27, and made rapid progress clearing the hills and ravines to the west and northwest.

of booty were captured—guns, trucks, half-track prime movers, CPs, etc. The air was filled with the rank odor of hundreds of Jap dead.

The following day was spent in reorganizing the line and getting ready for the pursuit. The Marines maintained their position on the coast while the KRBth Infantry moved into the jungle on their south flank, west of the Poha River. The opposition clung mostly to the coast: contrary to popular belief, the Jap apparently had no greater love of the jungle than ourselves. He now resorted to organized and well-camouflaged groups of snipers tied to cocoanut trees. It was impossible to see them until they fired. They caused many casualties. It was the general feeling at this time that the Japs would not evacuate troops from the island, but would fight a war of attrition—especially as it was authoritatively known that they had landed reinforcements as late as January 4th.

The doughboys were all in favor of artillery and more artillery. Deploying through the cocoanut groves and jungles on the advance, the devastation wrought by the heavy barrages was easily apparent. Dead littered the ground; shell-shocked Japs wandered about without weapons; CPs, gun positions, and bivouac areas were in shambles.

The cannoneers were in seventh heaven. Our battalion's record was "Bn 12 rd" from the time of command given at FDC to last "Rounds complete from the battery"—ONE MINUTE. Individual sections claimed better records. And yet, we were checking the cross hairs and bubbles after each shot.

In the matter of protection, we always built strong revetments to ward off bomb or shell fragments. The type used always depended on the terrain and ground at the position.

We always used camouflage nets and did our best to disguise our position. The men provided themselves with adequate slit trenches. The position was improved from day to day. Small streams were handy for washing clothes and bathing. Improvised showers were always erected.

Personal and camp sanitation was of utmost importance in keeping down the sickness rate. Fly-proof latrine boxes were carried wherever we went. When possible, portable screened kitchen and latrine houses were brought up.

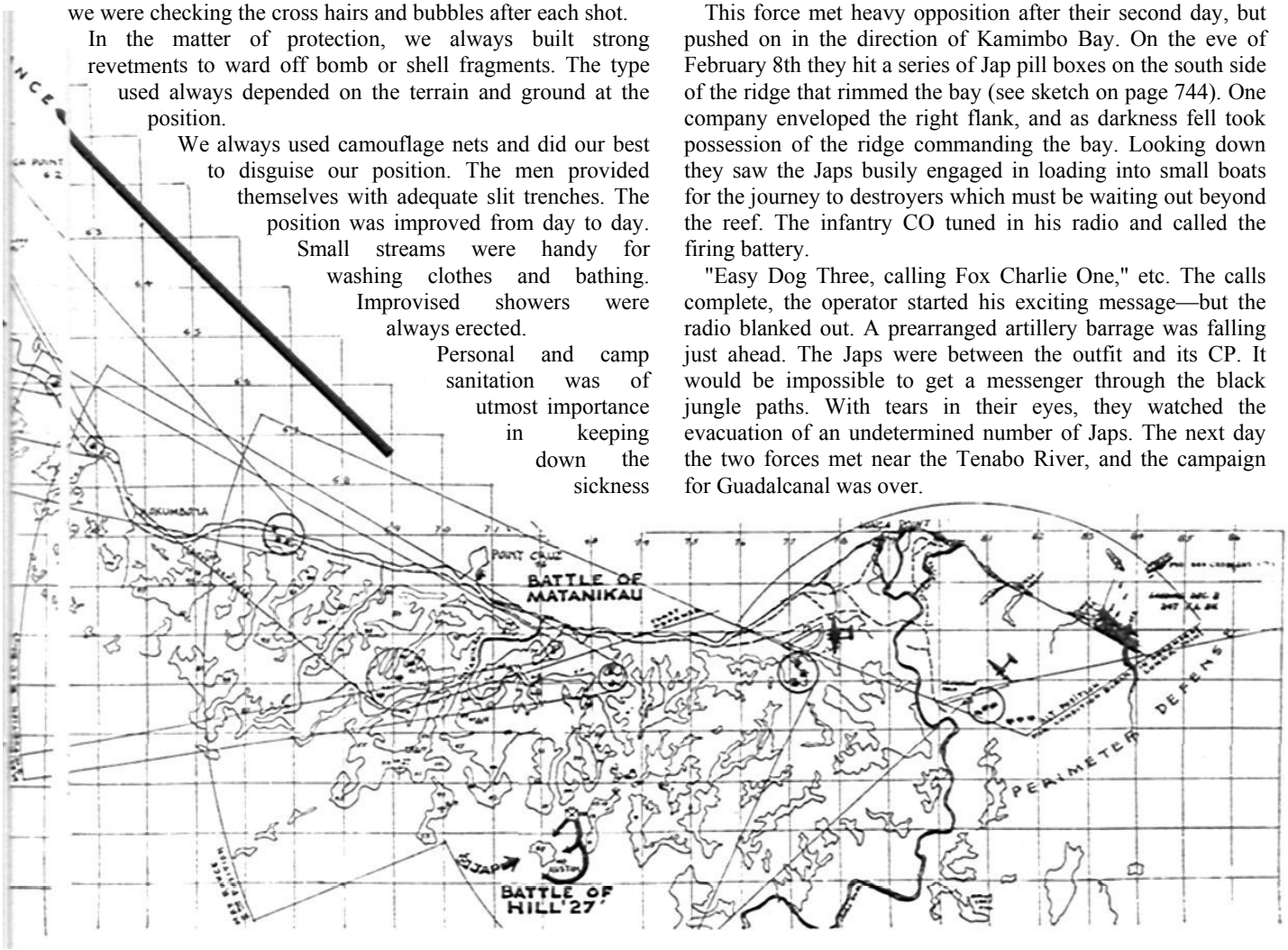
An intensive police of an area was instituted as soon as it was taken over. All dead were given proper burial. All refuse was burned. All puddles were oiled. Sanitation is as important as fighting. Without health, fighting efficiency is greatly impaired. Sump holes were dug according to specifications. All garbage and tin cans were burned. Latrines were burned out daily and oiled. Personal cleanliness was carefully watched. Kitchen utensils were scrupulously cleaned. Three buckets of boiling mess kit water were provided, and all men—no matter what the hurry—washed their mess kits before and after eating. Results: the Army had practically no dysentery on the "Canal."

The enemy made their last real stand at the Bonegi River. By this time, it had been decided to discontinue the push through the hills, as no Japs had been encountered for several days. The pursuit was up the coast, two battalions in line.

A reinforced battalion of infantry and one battery of Marine 75-mm pack howitzers were landed on the southwest side of the island. Their mission was to wipe the Japs off the western tip of the island, pushing around to Cape Esperance, where the main body would meet them. As the battalion advanced along the coast road, the 75s followed them up where bridges made it possible. In other instances they were loaded on LCT boats and carried up the shore to a new position.

This force met heavy opposition after their second day, but pushed on in the direction of Kamimbo Bay. On the eve of February 8th they hit a series of Jap pill boxes on the south side of the ridge that rimmed the bay (see sketch on page 744). One company enveloped the right flank, and as darkness fell took possession of the ridge commanding the bay. Looking down they saw the Japs busily engaged in loading into small boats for the journey to destroyers which must be waiting out beyond the reef. The infantry CO tuned in his radio and called the firing battery.

"Easy Dog Three, calling Fox Charlie One," etc. The calls complete, the operator started his exciting message—but the radio blanked out. A prearranged artillery barrage was falling just ahead. The Japs were between the outfit and its CP. It would be impossible to get a messenger through the black jungle paths. With tears in their eyes, they watched the evacuation of an undetermined number of Japs. The next day the two forces met near the Tenabo River, and the campaign for Guadalcanal was over.



The 105s stood up very well during the firing, although one outfit had the right trail crack while it was firing high angle fire. Ordnance welded it but it broke, and the gun had to be replaced. Moisture seeped into a couple panoramic sights, fogging up the lenses on the inside. Unfortunately ordnance did not have any sealing cement, so the sights also were replaced. The usual number of lanyards broke.

Some of the cartridge cases had been rebored and were a trifle large for the tube. When they stuck, one man held the rammer against the shell case while another batted it into the tube with the flat side of an axe. This method got results—and quick. Many cartridges became dented in transit, but the ammo section was able to smooth out most of the wrinkles; when they failed, the above mentioned process was used.

Once or twice we fired prepared barrages on flare signal. Prepared shells were close at hand on the ready line. When the guns were cold, we loaded with correct shell and charge and were all set for the flare. If the guns were hot, the shell was placed on the ground just to the rear of the breech and a man stood ready to ram it home as soon as the sentry reported the flare.

Snipers, enemy infiltration, and aerial bombardment increase the difficulty of providing adequate battery and battalion local security. Snipers who infiltrated through the lines between Hill 31 and Hill 27 disturbed the 25th Division Artillery for 12 hours and seriously hampered their supply lines. Wily Japs all but disrupted the operation of a medium artillery battalion with a few well-hidden snipers. A light field artillery battalion moving up in the wake of the infantry killed upward of 10 snipers and stragglers in their first 24 hours in position. Some of Tojo's commandos infiltrated through the perimeter defense, past artillery positions, and planted time bombs on equipment. These are isolated cases to illustrate the problem.

Guards were never put on post alone. There were always two who stayed together. Guards remained stationary and concealed. Dugouts with field of vision and sound were provided for each post to protect the soldiers during air-raids.

When infiltrators were numerous it was sometimes necessary to surround the battery position with a series of foxholes. All personnel not necessary on guns and phones lived in the trenches. Every other man was alert at one time; at the end of two hours, he would wake his neighbor. The Marines used this system in early operations.

As rapidly as possible the position was surrounded with barbed wire entanglements. When the outfit was isolated, booby traps would bar natural paths of ingress. CP and GP dugouts were dug, with alternate wire lines. These artificial barriers could not be constructed in a day, and often there was no time for them at all. However, it was a vital part of position improvement and gave the men a sense of security.

Our battalion did not receive its full quota of .50-cal. machine guns until just before we headed for the "Canal." Each battery had three .30-cal. MGs for ground protection, the antitank platoon in headquarters battery had no 37-mm antitank guns, so all the .50s were placed on dual mounts and turned over to the antitank platoon. The officer in charge of the platoon placed his guns so as to protect the whole battalion against tank or aircraft attack. Crews were attached to the nearest battery for rations. A communications network was established between the crews. This system worked well, and the crews got several hits on bombers in a low altitude daylight raid.

The .30s were available for close-in battery protection. A series of criss-crossed fire lanes supplemented by barbed wire eliminated a good many guard posts. The machine guns were of course dug in to provide protection from the air.

This was admittedly a freak set-up but I think had particular merit in this type of warfare. The light machine gun is fine against personnel, and infiltrators were one of our main problems.

The chattering and rustling of the jungle at night are enough to make an old soldier jittery. Great care had to be taken that guards did not open up on imaginary foes and thus wound their own men. Our guards and machine gunners were instructed in the art of parrying bayonets and in general rough-and-tumble fighting. They were ordered not to shoot until contact had actually been made, and then only when it was absolutely necessary.

In conclusion, we found three items which would enhance the efficiency of an artillery battalion. A small bulldozer is invaluable in difficult terrain. A water trailer per battery cuts down transportation and saves time—the Marines had them and we eventually acquired a few. The last item is the collapsible saw mentioned above.

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

In compliance with Article VII, Section 1, of the Constitution, notice is hereby given that the Executive Council has fixed 5:30 P. M., Monday, December 13, 1943, as the time of the annual meeting of the Association to be held at the Army and Navy Club, 1627 Eye St., N. W., Washington, D. C.

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

TACTICAL USE OF BASE-EJECTION SMOKE SHELL

By Lt.-Col. W. Burrell, RA

In May, 1943 the JOURNAL *published a technical description of our M84 base-ejection smoke shell. As its tactical handling differs greatly from that of the traditional WP, one of our British friends has prepared this article for the benefit of U. S. artillerymen. Tactical problems common to both WP and BE are not covered herein.—Ed.*

White Phosphorus, which bursts on the ground, produces an intense heat. The resultant column of hot air causes "pillaring" of the smoke even if ground and air temperatures are fairly low.

Base Ejection smoke, to the contrary, is generated in containers which are cast loose by an air burst of the projectile; these emit a cooler mixture which has no tendency to pillar. Smoke developed in this way seldom rises above 50 feet from the ground. It seems to be slightly hygroscopic, since a better effect is obtained on damp days—a useful feature in Europe—but the screen is adequate even on hot, dry days.

With WP the simplest procedures can be used during adjustment. Trouble comes in waiting to see when an effective screen develops.

Other complications arise with BE, but there is more certainty as to the screen's final effective pattern. In addition to the common problems of time fire, consideration must be given to terminal velocity, the difference in weight from HE, correctness of site, the bouncing or burying of the smoke containers, and the time taken for the smoke to develop.

Fig. 1*a* shows the 25-pdr shell, Fig. 1*b* that for the 105. In both cases the powder-burning time fuze ignites the burster charge, which in turn ignites the containers and blows off the base plate, allowing them to escape. The containers approximately follow the trajectory, but if released very high or against a strong head-wind they will fall short. Ideal height of burst is 2° 30′ (44 *mils*).

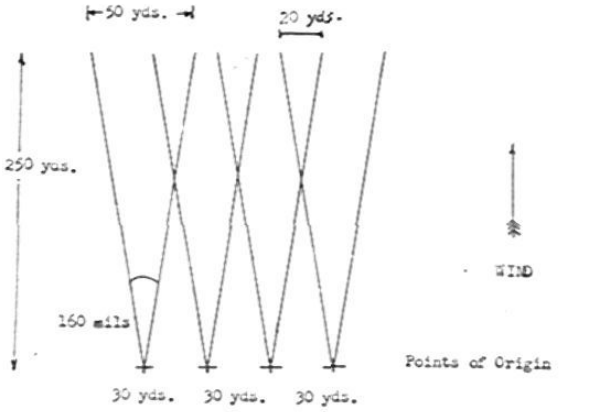


Figure 2

Figure 3

Fig. 2 indicates the width of screen from one Point of Origin (PO), and the overlap required. A cross-section of a screen appears in Fig. 3.

A round of 25-pdr BE smoke shell burns from 1¼ to 1½ minutes, giving maximum emission 30 seconds after ignition. A good guide to the proper "rate of feed" is:

Wind Velocity	*Rate of Feed per Point of Origin*
5 ft/sec	1 round per minute
15 "	1½ " " "
25 "	2 " " "

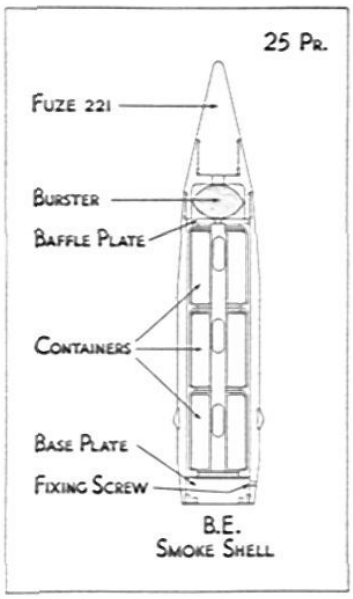
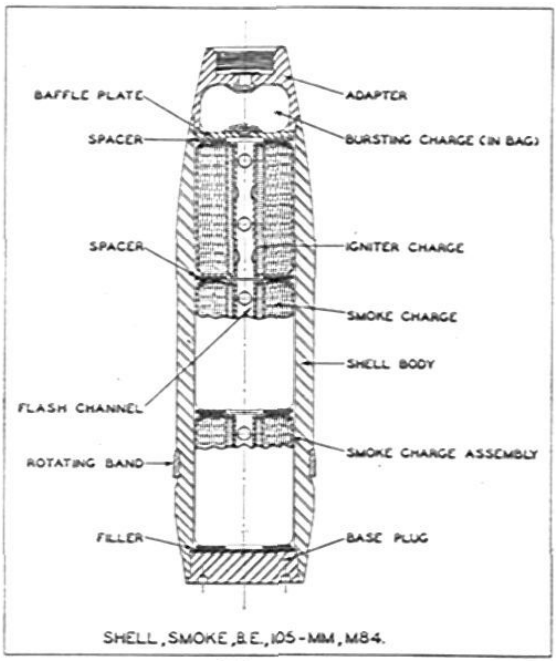


Figure 1a, above
Figure 1b →



A 100% favorable wind allows points of origin to be up to 400 yards apart, but the up-wind PO should be *at least* 100 yards up-wind from the area to be blinded (see Fig. 7).

As smoke shell's weight differs from that of HE, a false range must be used. British practice is to make its application the responsibility of the battery executive, not of the officer conducting the fire. This results in a lower range at short ranges, and a higher one at long ranges. Using Ch II with the 25-pdr, for example, it works out like this:

HE Range	*Smoke Range*	*Plus or Minus*
2000	1875	—125
4000	3900	—100
5500	5500	Same
7000	7225	+225

Firing Tables give fuze settings for bursts 44 mils above the line of sight.

A Fuze Correction Table for abnormal conditions is also provided. It covers abnormal muzzle velocities; barometric differences; air, fuze, and charge temperature; and the data required for lowering or raising the height of burst by changing fuze settings. These corrections are not normally used for observed fire.

To start the screen at least 2 rounds must be fired as quickly as possible on each PO, followed by rounds at the required interval (suggested above). A wind speed above 25 ft/sec makes production of a screen very expensive in ammunition, or even impossible—but as this type of smoke is *very* much more effective in wet or humid weather than in dry atmosphere, rain or mist may make a screen possible even in a high wind. One caution, though: the canisters are apt to smother in snow. If there is any doubt of the efficiency of smoke in any particular case, be sure to arrange an alternative plan using HE instead.

Inexperienced officers frequently forget that time must be allowed before H-hour for the screen to move from the upwind PO to the area to be blinded, and between POs. Example:

Distance between POs: 400 yds (1200 ft)
Wind speed: 5 ft/sec
Time to fill gaps: $\frac{1200}{5}$ = 240 secs = 4 minutes

Practical Notes

Use the lowest possible charge to avoid bouncing or burying the containers on hard or soft ground, respectively.

Give the Executive as much time as possible to prepare ammunition. Send a warning order before starting the adjustment, giving the number of rounds required and the approximate range; this will let ammunition handlers set the fuzes roughly, and place sufficient smoke shells at one or two guns, as required.

One gun may fire on two or three POs, if the rate of feed permits and sufficient ammunition is available; this will probably require special dumping at its position.

As the containers closely follow the trajectory, "approved" practice is to alter the height of the burst only by changing the fuze setting. If ordered during the firing of a screen this will, however, involve a pause and produce "windows." A change in site causes no delay and often produces the desired result, but changing the fuze setting is probably the "safer."

If a screen is required at a range just beyond the maximum for a given charge, the higher charge's low angle of impact and high terminal velocity will often cause considerable ricochet of the containers—up to 400 yards, in fact. In such case the range must be decreased to balance this effect, whenever the ground permits.

If the containers bury themselves in boggy ground success may result from firing with a very high site and reducing the range. The canisters (being lighter than the projectile) will fall short and steeply, and so lose some of their velocity (see Fig. 4). This, however, is a quite unofficial solution.

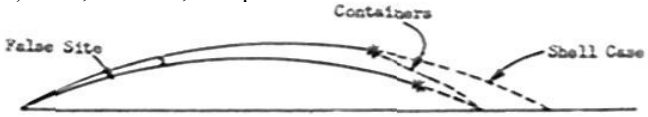


Figure 4

Adjustment is usually with HE (1) to ensure surprise, (2) to save ammunition, and (3) because HE's smoke and dust usually give sufficient indication of the direction and speed of the wind in the target area. Adjust on the up-wind point of origin.

Types of Screen

A *deliberately planned screen* requires no special change from planning for WP, except that time must be allowed for preparing the ammunition and fuze corrections may be required for abnormal conditions.

A *quick screen* should be effective about 10 minutes after the target is pointed out, if the area has been registered in or a nearby target already engaged. To avoid delay in setting fuzes and applying deflections to individual guns, the rough range and the dispersal (or concentration) should be ordered initially. If, for example, the line of the screen is about 45º from the line of fire, the wind favorable from the right, the screen about 1200 yards long, and the range about 6000 yards, commands should be:

Battery adjust.
Prepare 15 rounds smoke at rough range 6000.
Base deflection left 340,
On No. 1 open 40.
No. 1 adjust.
Shell HE,
Charge V,
Site 350,
No. 1, one round,
Elevation 370.

During adjustment the Executive has the fuzes set for 6000. After adjustment the officer conducting the fire orders,

Battery right at 5 seconds,
No. 1, 370,
No. 2, 352,
No. 3, 336,
No. 4, 320.

He then makes any necessary adjustment in the deflection or range of Nos. 2-4, and orders,

Shell Smoke.
Battery 2 rounds, at my command, etc.

When the Executive reports "Ready" (after the pieces are properly laid), the command to fire is given. This is followed by commands for 12 rounds, to be fired at 30-second intervals.

Adjustment to the nearest 100 yards is usually sufficient, and if the zone is well known the salvo may be fired without first adjusting one gun.

With up-to-date metro data a *predicted screen* may be fired on reasonably flat terrain. Plot the line of the required screen and allot POs to batteries. But as the number of POs

will vary according to the final direction of the wind, assign POs to guns spaced throughout the line and *not* adjoining each other (see Fig. 5). Thus, if the wind is unfavorable all guns fire, if semi-favorable one battery can be taken out, and if favorable only one battery is required. Therefore only one deflection and range need be worked out for each gun, and alternative tasks can be allotted—except that No. 1 gun of A Battery has an alternate PO for a favorable wind in either direction.

POs are plotted 30 yds. apart to allow for the most unfavorable wind; only 3 guns per battery are allotted POs, one being kept in reserve in case of a casualty. Fig. 5 shows 4 batteries on a 360-yd. screen.

Figure 5

Mathematically, only 2 guns are required for a 90º or 270º wind and only A Btry for a 45º wind, but as the screen may be unobserved and the wind not exactly as in the metro message it is advisable to double the estimated number of guns required.

Bearing of Wind	Bty to engage	Code for layout
From 360º or 180º	A, B, C, D	W
" 45º or 135º	A, C, (using A1*)	X
" 225º or 315º	A, C, (using A1)	Y
" 90º or 270º	A (A1* for 90º)	Z

Div Arty Comdr orders the final layout, after receiving the latest metro data. The rate of fire is based on the wind speed at 5 seconds time of flight (British message) or shown on Line 0 of the U. S. message.

Rolling flank screens will provide a continuous flank screen to a tank (or mixed tank and infantry) force throughout its attack. A semi-favorable or favorable wind is essential. Such a screen is often preferable to an HE barrage—moving in front of the attack, the latter fails to neutralize AT guns sited in defilade on the flanks, and an HE barrage on the flank is both hard to produce and very costly in ammunition.

To develop this type of screen, first plot the line of the required screen. Mark in the POs, as determined by the wind direction. Allot enough guns to engage the POs required to cover the flank of the attacking force *at any one period*. By comparing the speed of the advance with the distance between POs, calculate the length of time for which each PO must be fed (see example, below). As the attack progresses the rear PO can be omitted, and the gun engaging it moved to a more forward PO; as this method entails moving guns only 2 or 3 times and at several minutes' interval, it is simple for Chiefs of Section to handle. If the wind is very favorable it may be possible to screen both flanks.

Example. A flank screen is required to cover a tank attack moving in 2 waves, 800 yds. in depth. Wind is favorable, blowing in the direction of the attack. The attack is to move 200 yds. per minute. Objective is 2500 yds. from the line of departure.

Schedule for No. 1 gun of A Btry would be:

From H— 2 to H+ 4, engage PO A1
" H+ 4 to H+10, " " A1′
" H+10 to H+16, " " A1″

No. 2's schedule is similar, but it moves 1½ min. (300 yds) after No. 1.

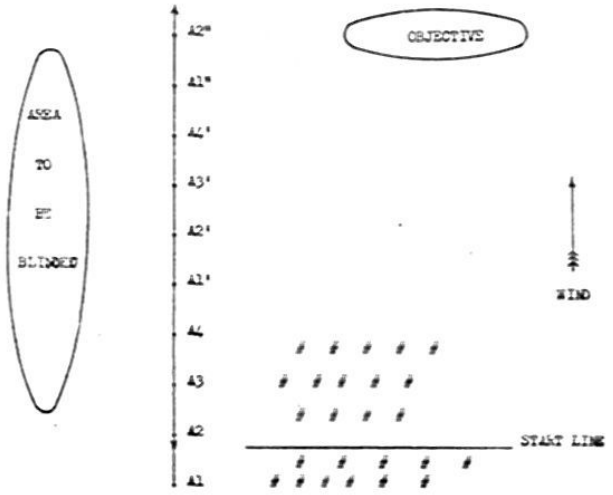


Figure 6

Deflections and elevations are measured from a 1/25,000 plot. Ammunition is prepared and laid out on the ground so that each gun has the correct number of rounds with the correct fuze setting.

If possible use only 3 guns per battery, keeping the 4th one as a spare, ready to take the place of any piece which goes out of action.

Emergency withdrawal of the battery under its own smoke may become necessary, owing to infiltration of enemy patrols or tanks. By setting the fuzes at .3 (or even at zero) and firing at the lowest possible range with Ch I, a screen can be put down 500-800 yds in front of the guns.

In this case all guns fire until the prime movers are on the position. The Executive then orders 3 guns to withdraw and himself takes charge of the 4th, which feeds the screen until the position is cleared and then gets out as quickly as possible. Chiefs of Section must be trained to use their own judgment as to where and how fast to fire, and guns should be boldly switched about to fill any "windows" that might develop. An occasional round of HE fired into the screen should deter infantry from coming through it, and tanks will be unwilling to blind themselves or to be silhouetted against the screen.

It is difficult to put down the screen closer to the gun than about 800 yds, due to the tendency of the canisters to bounce even if fired into the ground immediately in front of the guns.

With the 25-pdr, if Ch I is used shots can be fired even after the piece has been coupled.

TRAINING HINTS

Before a guaranteed smoke screen can be produced, the LnO or FO must obtain the following information:

1. Position of own forward troops.
2. Area to be screened.
3. Area to be blinded.

} Pointed out.

4. Time for which screen is required.
5. Whether screen should be started or become effective at H-hour (surprise element).
6. Whether testers may be fired (surprise element).
7. H-hour.
8. Alternative HE task.
9. Signals.

(10. If possible, arrangements for FO to accompany the attack and control the screen; it is difficult to spot "windows" when observing from an OP to the flank of the advancing troops.)

Unless the position is absolutely fool-proof the observing

officer should draw a picture. This takes only a few seconds and may save many lives. (See Fig. 7.)

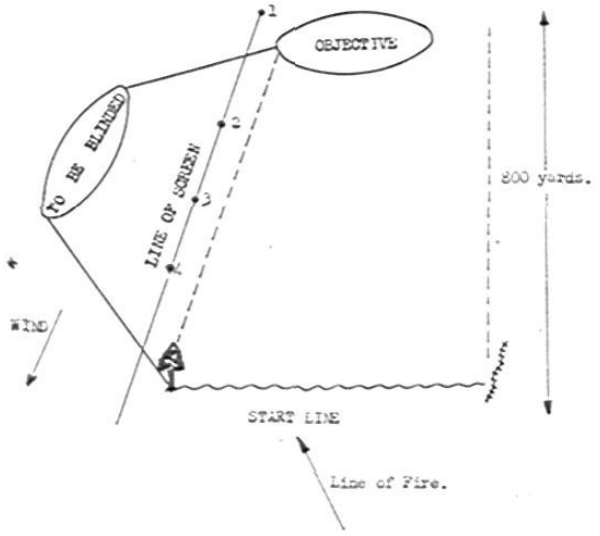


Figure 7

A screen should be as far from the enemy as possible to avoid MGs being carried through it, to obtain greater obscurity, and to minimize the area visible through a "window" (see Fig. 8).

When smoke is requested a quick appreciation of the ammunition problem is essential. Example:

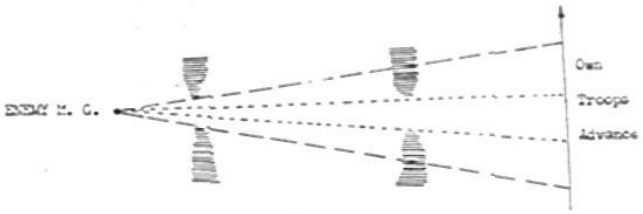


Figure 8

Data: Attack to take 10 minutes.
Screen from H—2 to H+10 = 12 minutes.
Wind speed is 15 ft/sec, therefore 1½ RGM are required.
Length of screen: 800 yds.
Wind semi-favorable, therefore 4 POs.

Decision based on: 4 × 1½ × 12 = 72 rds, or 18 rds/gun.
Is this amount available?
How much of my smoke is the infantry commander prepared to expend on this minor attack?

At certain charges and ranges a smoke shell will not clear a crest which an HE round will. Executives must consider and allow for this when ordering the false ranges required.

Author's note: Technical details herein set forth are based upon the smoke shell for the British 25-pounder. Its construction is quite similar, however, to that of the M84 base-ejection smoke shell for the 105-mm howitzer. The principles governing the use of smoke shell of this type are the same, regardless of the specific weapon considered.

GUADALCANAL LETTER

From Lt. Col. James J. Heriot, F. A.

Enclosed is my check, for which send me two copies of the latest edition of the *Field Artillery Guide*.

I have followed your articles with much interest, especially so since I am commanding a medium battalion in the Southwest Pacific. As to comments, I must add my endorsement to the Sill methods. They are fine.

From experience I know that gadgets will not function well in combat. Outside of the essentials of combat the best gadget is a well trained mind. If you can get to the front down here with a pocket compass and a pair of glasses you are doing well. We have never had TBA equipment.

I have yet to find a "typical set-up." Every situation is different, and self-reliance must be developed to the utmost.

There must be a group trained for local defense, and I don't mean static defense. This group must function like an infantry squad, to go out and root out snipers.

We have a home-made grid sheet made of white linoleum on plywood. It is the best thing that we have developed, and I can recommend it very highly for the FDC. Ours is large enough, very accurate, and durable. We build up our maps on it. Having two, we are all set for movements. Ink can be washed off. I believe that all units in this sector should have something similar. We would like to have a circular graphical firing table.

I am definitely sold on the Navy's spotting system; it seems superior to our air observation method. Giving the corrections seems more logical, eliminates a common source of error, and allows for easier cooperation with the navy and the marines.[1] Despite the trouble of changing over, the results would probably be well worth it.

We here all agree with Col. Gjelsteen that with the medium battalion, all adjustments should be made with a 200-yard sheaf, using only the two interior pieces during adjustment.

In short, Book 161[2] is swell. A battalion trained in these methods, keeping all SOP simple, resisting fancy innovations, and above all training all personnel to use their judgment freely and confidently, will have no trouble in combat. To tell the truth, I think that combat firing is a lot easier than training.

A lot of words to say little, but out here in the sticks we have little to do but wonder what the chances might be of getting home for a short time, where in the world all this USO equipment that we hear about can be (we see very little of it), and figuring out a way to get a bottle of beer from the navy or the marines. Incidentally, every effort should be made to give each battalion a couple of movie projectors and a generator, and to develop a sturdy, all-wave radio receiver operating from a 6-volt battery—every artillery battery should have two of these.

While it may seem strange to talk of such things out here, morale is of vital importance. Here we have lived on field rations, no hope of a break, and darned little in the way of recreation, so we would like a little something. Softball helps, but that is only a drop in the bucket. While we were in the line these things never came up, but it seems a long time between fights.

Don't think that we feel sorry for ourselves. I believe that our morale is higher than any outfit's in the States, in spite of shortages—and what a fighting bunch these redlegs are! The finest group of men that I have ever seen.

As I say, a lot of words to order a couple of books.

[1]See also Capt. Casey's comments, page 563 of the JOURNAL for August, 1943, and Lt. Col. Gildart's on page 739 herein.

[2]Now replaced by FM 6-40, which covers the same ground.

ROUTES INTO EUROPE

A Study in Terrain

PART V — ITALY

By Col., Conrad H. Lanza

Italy, the central peninsula of the Mediterranean, has an area (exclusive of adjacent islands) of just about 100,000 square miles. Five-twelfths form the plain of the Po River and are a part of the main continent of Europe; the rest form the peninsula. Italy's maximum breadth in the north exceeds 350 miles, but the peninsula itself is in no place over 150 miles wide and averages about 100 miles. The Po plain is around 140 miles from north to south; the length of the peninsula, measuring from south of the Po area to Taranto, is nearly 500 miles. The heel and toe of the Italian boot extend further by 100 and 200 miles, respectively.

Markedly different characteristics are found in the plain of the Po and the peninsula.

The Po area is extremely fertile, densely cultivated, and thickly inhabited. At the foot of the mountains near the French border, at the city of Torino (Turin), the elevation is 825 feet; at Milano it is 400 feet, then declines rapidly to slightly above sea level. This valley is full of rivers, canals, and irrigation ditches which are natural antitank obstacles. Though there are no forests or woods, there are innumerable orchards. According to the Italian custom grape vines are planted within orchards, the vines going from tree to tree and forming an impediment to cross-country movements. They also so limit the view that over large areas satisfactory OPs can not be found. Walls and hedges, with or without adjacent ditches, border fields and orchards. To ride horseback through this country requires constant jumping, and is the reason why the Italian cavalry was specially trained in jumping. Rice fields are numerous, and at certain seasons are under water to form another military obstacle.

This territory has always been difficult for maneuvers. There are only a few places where large bodies of troops can be deployed. Consequently, in the past two thousand years the battles fought in this area have centered around the same relatively few places where there was space to maneuver. These will be considered later but in general they consist of a series of complicated and connected defiles.

The peninsula of Italy is dominated by the Apennine Mountains. In the north this chain borders the Gulf of Genova (or Ligurian Sea) on the west side but after passing Spezia the mountains recede from the coast, while on the east side they approach and closely follow the border of the Adriatic Sea from just south of Rimini. On the west there are beaches and possibilities for invasions southward from Spezia (exclusive) to Napoli (inclusive). Fertile areas in rear of this stretch of coast afford opportunities for military operations.

In general Italy's coast is not favorable for debarkations. North of Rimini its larger part is marsh or swamp, and much cut up by canals and rivers. South of Rimini the coast is almost perfectly straight, the Testa del Gargano being the sole cape. The mountains closely approach the sea and limit the space available for maneuvering troops. There are few harbors. The sea off shore, contrary to the west coast, is so shallow that transports and supporting naval vessels must anchor a considerable distance off the land. Currents and winds are at times difficult and uncertain. If both sides of the Adriatic are held by the enemy, as is the case at present, an expeditionary force venturing into the Adriatic will be subject to air attack from both flanks.

Southward from a line extending from Spezia on the Ligurian Sea to Rimini on the Adriatic, Italy is a peninsula whose dominant feature is the Apennine Mountains. Along this line the Apennines cross Italy, nearly separating the valley of the Po from the peninsula. The mountains then extend down the peninsula, the watershed being in general between 30 and 40 miles from the Adriatic and parallel thereto, and twice that distance from the Tyrrhenian sea.

The two sides of the Apennines differ: on the east side, offshoots extend at right angles to the axis of the chain, ending on the Adriatic Sea; on the west side the mountains are in ridges, parallel to the main axis, with deep valleys in between. Due to this difference, stream lines on the east side of the peninsula are normal to the coast. On the west side, in their upper courses stream lines are parallel to the coast, which they reach by sharp turns at points where they break out of the mountains.

Due to the closeness of the mountains to the Adriatic coast there are comparatively few cities on this side of Italy, and no important military objectives except the ports. The west side contains Roma, Napoli, Firenze (Florence), Livorno (Leghorn), an extensive agricultural area, and numerous industries in the cities; it is the side which is naturally attractive to an invader.

LANDING AREAS ON THE WEST SIDE OF ITALY

From the French border to Spezia the shore borders the Gulf of Genova. It is almost an are, with Genova at its center. This city has an excellent port with accessory establishments and is in every way suitable as a major base. The coast to the east is known as the Riviera di Levante and that to the west as the Riviera di Ponente. Genova has been damaged by the British fleet and air forces, but could be reconditioned within a reasonable time.

This entire section of the coast is bordered by the Ligurian Alps on the west and the Ligurian Apennines on the east. Spurs from the mountains extend toward the sea, ending in abrupt promontories which divide the shore into a series of small areas.

West of Genova there are only three beaches suitable for landing large forces. These are near Alassio, near Savona, and at Sestri (just west of Genova). From Alassio passes lead directly across the mountains into Piedmont. The passes leading northward out of Savona will be remembered as those

made famous by Napoleon in his campaign of 1796. From Sestri and Genova lead the passes across which the main railroad and road lines extend to the valley of the Po.

Between mountains and sea are only occasionally found a few square miles of land. The mountains back of the shore are not very high and can be crossed, but they afford opportunities for serious resistance. The capture of Genova is a prerequisite to an invasion on this part of the coast.

East of Genova, as far as Spezia (inclusive) the coast is much more abrupt. There are no ports or beaches suitable for landing large forces, and only a few for small forces. These are Rapallo, Chiavari, and Levanto—small fishing ports having restricted beaches. The mountains are close to the sea, and space for debarked troops would be very limited. At the end of this section is the Gulf of Spezia, an excellent landlocked harbor and a major naval base. It is remarkable for being a large, deep harbor without a river running into it. A pass leads across the mountains to Parma, but it is long, tortuous, and difficult. This section of the coast is not suitable for a major expeditionary force.

Along the entire coast from the French border are an excellent road and a railroad. The latter, electrified, is generally close to the sea, with long and numerous tunnels. The road is sometimes along the coast but in places goes inland and has steep grades crossing the mountain spurs. This coast is thickly populated, and despite the rough terrain the slopes of the mountains are cultivated. Orchards, walls and hedges, and small towns form nucleii for possible centers of resistance.

South from Spezia the character of the coast changes. The mountains commence to recede inland and the shore becomes low, flat, and often marshy. For over 50 miles from opposite the towns of Carrara and Massa (which are a few miles inland on the mountainside) as far south as Cecina (exclusive), there are numerous possible landing places. Included are the small port of Viareggio and the good one of Livorno. At about the center of this strip are the mouths of the Serchio and Arno rivers, about 7½ miles apart; this section is swampy. North of Livorno the sea is shallow offshore and transports may have to anchor some miles out. South of the Arno deep water is close to the shore.

A landing in this area would be directed primarily against Livorno, which would be a suitable base, with Viareggio as a secondary one. Livorno may be attacked by landing north and south of the city, and by direct assault on the city itself. A landing at or near this city directly threatens Tuscany and its principal city of Firenze. Occupation of Tuscany must precede an advance across the Apennines from the south into the valley of the Po. Even if landings are made further south, the occupation of Tuscany will be facilitated by debarkations at or near Livorno.

South of Cecina the mountains again approach the coast. Twenty-five miles south is the promontory of Piombino, rising 650 feet out of the sea. Six miles away offshore is the island of Elba. This island is very rugged, but it has two good ports suitable for minor bases—Portoferraio on the north and Porte Longone on the east coast.

Extending in an air line 50 miles further toward the south is a stretch of coast formerly renowned as the home of malaria and still highly unhealthy. The center part of this coast is swampy and the two ends rocky. No worthwhile military objectives exist in this area and landings along it are not to be recommended, although they are possible.

South from Mt. Argentario the coast is low again. Landings may be made here. Forty miles away is Civitavecchia, a defended port. The permanent batteries are not very important and could readily be overcome by modern shelling and bombing. Civitavecchia was the point of debarkation of the French in their advance on Roma in 1866. It is a small port originally built by the emperor Trajan, whose sea walls are still in use. Good roads extend from here toward Roma and the intervening country is suitable for military operations. It is full of obstacles, however—small hills, stone villages, walls, ditches, etc.

South of Civitavecchia the coast continues to be low but interrupted by occasional marshes. A small port (Fiumicino) exists at the mouth of the Tiber. It is practicable to land south of the Tiber for quite some distance, as beaches extend all along this coast. Marshes which previously filled this area and caused extraordinary prevalence of malaria have been largely drained and are now cultivated fields. They form the Campagna di Roma and can be crossed by military forces.

For a direct attack on Roma landings may be made north and south of the Tiber, but Civitavecchia is the only available port and its capacity is limited. Anzio is a minor port 28 miles south of the Tiber.

Thirty miles below Anzio is Cape Circeo, 1600 feet high and rising almost out of the sea. Twenty-five miles away, across the Gulf of Terracina, is Gaeta. Both the town of Terracina (on the gulf) and Gaeta are small ports. Here the coast has beaches, but the mountains are so close that the beaches resemble defiles. Great battles have been fought at the ends or in the center of this defile, from 315 B.C. (Romans vs. the Samnites) to 1860 (siege of Gaeta). It is not suitable for an invasion force.

It is 40 miles from Gaeta to the Canale (Strait) di Procida, connecting with the Golfo di Napoli. Nearly all of this coast is available for landing invasion forces. Troops may turn south over open, cultivated, and heavily populated territory toward Napoli, or swing north with Roma as an objective. In the latter case there is another route besides the one which leads through the coast defile of Terracina. This involves first crossing the Volscian Mountains (also known as the Monti Volpini), a large and rugged mass with elevations up to 5,000 feet; it is parallel to the main Apennine range, but separated from it by the valley of the Garigliano River and its tributaries. This is a broad valley with a railroad and good roads leading right to Roma, and until recently was the main route between Napoli and Roma.

South of the Canale di Procida is the Bay (more properly Gulf) of Naples. This is a magnificent harbor and a first class base. It is not defended from the sea side. It would be entirely practicable to land invasion forces right in Napoli or in its suburbs, on a 25-mile front. Beaches are good, but are almost solidly lined with stone houses which could be converted into centers of resistance. Napoli has all the facilities required for a base for a large army. Once taken it would be hard for the enemy to retake it, as all land lines of approach arrive through valleys and passes which could be defended by minimum forces.

An attack on Roma might well begin with the occupation of Napoli and an advance overland over the two available routes. If the enemy's resistance is such that it can not be easily overcome, landings can be made in his rear at any desired place as far north as Livorno. Thereafter any enemy position further south could be taken in reverse. This is the reason why the German High Command suggested the abandonment of Italy south of Livorno as undefendable with the forces at the disposition of the Axis. It can in fact be defended only if the defending force is able to meet the maximum forces the invaders may land at all landing places. According to Axis dispatches such a force was estimated as 40 divisions, which is the number of Allied divisions the Axis had identified as in the Mediterranean area at the end of June and which presumably might be concentrated in the same region.

South of Napoli are only a few possible landing places. There are no objectives in this area warranting any large expedition. At Salerno, 30 miles from Napoli, beaches exist. This area is separated from Napoli by a spur of the Apennines forming the high and steep Sorrento peninsula. It would be easier to land right at Napoli than to attempt to approach it by a landing near Salerno.

The enemy has certain airfields near the toe of Italy, in Calabria. Should minor expeditions be required in this area there are practicable landing places in the Gulf of St. Eufemia and in the Gulf of Gioia.

LANDING AREAS ON THE SOUTH SIDE OF ITALY

The Strait of Messina is bordered on its mainland side by a narrow strip of ground between sea and mountains. It was important in that it contained batteries which covered the Strait. The strip is highly fertile and well cultivated, mostly with vegetation which conceals the ground. A road and a railroad are everywhere close to the shore.

At the north end is Villa San Giovanni. A railroad ferry connected this place with Messina just across the strait, here about 3 miles wide. Eight miles further south is Reggio Calabria, a long, straggling town with a good port which normally has ferry service to Sicily. All this part of Italy was visited in 1907 and 1908 by unusually severe earthquakes which destroyed nearly all towns. The present ones are the rebuilt towns.

Seven miles further south is Pellaro, which ends the Strait of Messina section. It is possible to land almost anywhere along this coast, but the only objectives are local ones for want of maneuvering space.

The toe of Italy ends in a mountain about 6,000 feet high. The Province of Calabria is mountainous, rough, and devoid of worthwhile objectives. Landings may be made on the south side opposite Catanzaro, 65 miles north from Cape Spartivento. At this point Calabria is less than 20 miles wide and has a pass to the Gulf of St. Eufemia on the north side—the preferable side for an invasion, as the beaches on the south are poor. Both sides of the toe of Italy have a railroad, but only the north side has a good road, leading to the tip of the toe. An advance against the toe would naturally follow the north coast. An initial invasion in the Gulf of St. Eufemia would be facilitated by a secondary attack from Catanzaro.

Thirty-eight miles further north along the coast is the small port of Crotone. Here is an important air base which might warrant a minor landing expedition. The town has less than 10,000 people, and is built on a peninsula jutting out into the sea. It can be attacked by landing on both sides.

North from Crotone commences the Gulf of Taranto. On nearly all its shore landings are practicable, the coast being low and accessible, but for 120 miles from Crotone the mountains are not far from the coast, and good landing places occur only at intervals. There are, however, no important objectives in this sector. Commencing near Metaponto, the mountains recede into the interior, leaving the country open and favorable for maneuvers, although there are numerous marshes and malaria is prevalent.

At the head of the gulf is the one good port—Taranto. It is a first-class naval base, with an excellent harbor. The town is on a rocky island connected by a long bridge to the mainland, where the railroad and warehouses are. The Gulf of Taranto is west of the town and the naval anchorage (which has an area of nearly 10 square miles) is in a sheltered bay on the east side. West of the town is a smaller bay, covered by two small fortified islands about 3 miles offshore. This outer bay is also available for shipping, but could be shelled in part by naval vessels out at sea. On the inner bay is the naval establishment, capable of taking care of the largest ships. It is the major Italian naval base. Nearby are first class airdromes.

Taranto is suitable as a base for an invasion force. It is possible to land on either side of the port. This place is 40 miles by road from Brindisi, an excellent port on the Adriatic. The capture of either of these ports will afford a land base for an attack on the other. The control of both of these ports is essential as a preliminary move to entering the Adriatic Sea.

Taranto is one of the few places in the Mediterranean where there is a tide. It is the home of the tarantula (from which pest it is named) and is famed for its oysters. Malaria used to be indigenous, but recent drainage works have about removed serious danger on this account.

The heel of Italy lies south of the line Taranto—Brindisi; its axis is about 60 miles long. The shores are generally flat, offering no obstacle to debarkations other than some swamps which obstruct part of the coast. The heel ends at Cape Santa Maria di Leuca. Between this point and Taranto is one small port, Gallipoli. This is on a small island, connected with the mainland by a bridge across which is the railroad and an extension of the town. Gallipoli could be used as a provisional base for an advance on Taranto and Brindisi.

Landing Areas on the East Side of Italy

As already mentioned, the east coast of Italy is not favorable for debarking major invasion forces. Except for a few ports which have military value there are no objectives on this coast.

North of the tip of the heel is the small harbor of Otranto. This is a very small port, but could be useful for initial debarkations for an advance on either Brindisi or Taranto. Landings at both Gallipoli and Otranto are indicated if direct attack on the main ports is desired through landings made some distance away.

Brindisi is an excellent port and base. Its outer bay is covered by islets, which are strongly fortified. The inner port is supplied with quays alongside which large ships can lie. There are good railroad and warehouse facilities. Airfields are adjacent.

Brindisi was the main base for operations against Albania, whose main ports (Durazzo and Valona) are less than 100 miles away. If Albania is held by the enemy while invasions against the east side of Italy are attempted, hostile air fleets may be based from that area. Unless an invasion of the Balkans is made simultaneously, hostile air interference from the east side of the Adriatic must be accepted and met from fields to be established in Italy. This condition is general for any operations in the Adriatic.

The occupation of the area Taranto—Brindisi, the Italian heel, is essential to any further operations within the Adriatic. This area has ample facilities for assembling troops, and good roads and railroads, and would be useful as an Allied base for operations against Greece, Albania, or any place on either side of the Adriatic. The enemy has three lines of railroads from this area to Napoli, and one—a very good one—along the east coast of Italy to the Po valley. There are good motor roads through this territory. The enemy, having made appropriate preparations, could move troops in and out of this area with considerable facility. He is likely to make a serious defense.

Best method of capturing this important base area would be to land simultaneously on both sides of Taranto and on both sides of Brindisi. Invasion forces would have two tasks: one the reduction of the defended places of Taranto and Brindisi, and the other the isolation of the entire area from relieving forces. Initially the latter would be the major mission.

There is no specially good line on which to cut the Italian heel from the boot. The shortest line would be from the head of the Gulf of Taranto northeast to the Adriatic, and would be at least 30 miles long. This would indicate about 10 divisions just to hold this line, to which must be added the forces required for investing the two fortified places and a reasonable reserve. In all, perhaps 20 divisions would be needed. Unless the enemy has a comparable force already there at date of invasion, which is not the case at date of writing, it would not be necessary to land 20 divisions at one time. The invading force could be built up gradually in proportion to the enemy's ability to concentrate against it. Care must be taken to ascertain whether the enemy garrisons at Brindisi and Taranto at the time of invasion contain regular divisions capable of assuming the offensive. Experience in Sicily indicates that the

Italian Coast Divisions charged with protecting the coast line have little if any transportation and are not trained for duties other than manning the fixed defenses and minor accessory weapons. Serious counterattacks are not to be expected from these, but regular divisions, if included in the garrisons, could be expected to attack.

About 70 miles up the Adriatic from Brindisi is Bari, a large city of 125,000 people. Like many other cities in this part of Italy, it is built on a peninsula extending into the sea, supplemented by a modern addition which has spread out over the mainland. Bari is an important road and railroad center, but its port is small and shallow. As a base it would have but a mediocre value.

Proceeding northward along the Adriatic coast, there is a good sized town about every 10 miles. The intervening shore is almost a straight line and the coast is low. Landings can be made at any town or in the intervals. There are no good harbors in this sector. An invasion landing might be necessary in this area, if Allied forces should be held by superior enemy forces across the neck of the Italian heel. In this case a landing in rear of the enemy's main line may be required. The enemy's left, resting on the Adriatic, would be the flank more easily turned: the terrain on this side is favorable for landing and for marching on into the interior. Turning the enemy's right would involve landing in the Gulf of Taranto, south of Metaponto. It would then be necessary to advance through hilly and difficult country, with stream and ridge lines at right angles to the direction of attack; this would afford the enemy numerous opportunities for defensive positions. Landings on the Adriatic will encounter open country, with inconsequential stream lines all of which would be parallel to the direction of attack.

Among the small ports which would be available for a landing of this nature are Trani (25 miles from Bari) and Barletta (10 miles further); medium transports could enter the latter. Just north of Barletta is the Ofanto River, beyond which the coast changes and ceases to be suitable for invasion purposes for a long distance.

North of the Ofanto River is the Gulf of Manfredonia. The south part, bordered by lagoons and swamps, is unsuitable for landings, although one could be made at the small port of Manfredonia at the head of the gulf. An invasion was landed here in 1860, in the war against the Kingdom of Naples. The landing space is restricted by swamps on the south and rocky cliffs on the north and is suitable only for a small expedition. A road and a railroad lead from here to Foggia, where there are important railroad junctions.

The north side of the Gulf of Manfredonia is the promontory of Gargano, a huge limestone mountain. Its maximum elevation is only 3,460 feet, but it is of a karst formation and forms a rough and serious military obstacle. Its stream lines do not run into the sea, but disappear into subterranean channels. Large and extensive caves abound. Part of the mountain is densely timbered, but other parts are bare and of fantastic shapes with steep slopes. The north side of the promontory is bordered near its base by lagoons and is unsuitable for landings.

From this promontory as far northward as Ancona (180 miles away) the Apennine Mountains approach the coast, which is generally high. There are no objectives in this area. Towns, which are small ports, are small. Sand bars normally obstruct access to them from the sea, which moreover is shallow for a long way out from the shore.

Ancona is an excellent port. It is located on a bay, surrounded by hills which give it the appearance of an amphitheater. The city has a population of about 100,000. It is fortified on the land side by a double line of works. The main line of resistance was only three miles out from the city, but it is probable that in view of recent developments a new line has been laid out at a greater distance. The entrance to the port is covered by coast artillery. The city has the usual facilities of a port, and would be a suitable base for an advance either toward Bologna or southwest toward Roma. If Ancona is seized before central Italy is occupied, it will be necessary to cover an expedition advancing northwest from a possible counterattack from the southwest or south, and vice versa.

Best landing place for an invasion having the capture of Ancona as its primary mission would be about 10 miles south of the city, where there is a good beach. As this is the only beach in the vicinity it must be expected to be defended. Thereafter an advance toward Ancona will encounter several hill and ridge positions which would afford good defensive positions.

A landing north of Ancona is possible, provided the weather is good and the sea not too rough. This shoreline is high and rocky, and landing of tanks, guns, and motor equipment (while not impossible) would be subject to considerable delay. This type of shore continues as far as Rimini, 60 miles from Ancona. At this place is a magnificent beach, and it would be possible to land very large forces over it. It would be a suitable place for an advance northwest on Bologna or south toward Ancona. But there is no port at Rimini, and the shore descends into the sea by so imperceptible a grade that ships must remain many miles offshore. Weather and sea on this coast are frequently rough. For any operations of magnitude into the interior of Italy a port and base would be necessary, and Ancona is the only one south of the Po River.

Good beaches extend along this part of the coast for 35 miles north of Rimini to beyond Ravenna. This city of nearly 100,000 people used to be on the Adriatic but now is over 5 miles inland. As at Rimini, ships can not come close to the shore. In the vicinity of Ravenna are numerous small rivers, canals, and irrigation ditches among a densely cultivated country. These lend themselves to defensive positions which are hard to discover from the air, due to the large number of trees in very many scattered orchards.

North of Ravenna is the delta of the Po River, extending 65 miles to Venezia (Venice). This section is low, swampy, and impracticable for landings.

Venezia is a city of about 300,000 people, is a first-class port, a secondary naval station, and a suitable place for a base, but it is not suitable for assembling troops. As is well known, it is composed of numerous closely contiguous islets, densely built up. Its water supply normally comes in an underground (and partly underwater) aqueduct from the Alps. If Venezia should be captured by the Allies while the enemy still held the mainland in front of the Alps, he might cut off the water. A plan for occupation of Venezia should provide for furnishing water to the occupation forces.

Venezia is separated from the sea by a series of long, narrow islands with narrow passages between them, all heavily defended. These islands contain many sand dunes and have excellent

beaches directly opposite the city. Commencing at the Porto di Malamocco, which is the first sea passage south from Venezia, the islands are protected by enormous stone breakwaters averaging about 30 feet in height above sea level and 30 to 50 feet thick; these form a decided obstacle to landings. There are five sea passages through the belt of narrow islands, of which three are practicable for large ships. All are heavily defended.

It is doubtful whether it would be worth while to attack Venezia from the sea. It would be difficult to advance from there onto the mainland, from which it is separated by marshy lagoons. If the mainland is otherwise taken, the city will be cut off and must eventually fall. On the mainland opposite Venezia and under control of its commandant is a bridgehead to prevent capture of the city by an attack from the land side; this consists of a number of small works which have good fields of fire over the surrounding terrain. Until recently they did not have much artillery and were more suitable for stopping minor forces or raiding parties than for offering serious resistance to a well organized army.

Beyond the Venetian area is a 50-mile stretch of coast (as far as the Isonzo River) which is low and cut up by numerous rivers and canals. Lakes abound, most of them salt. It is not a suitable area for invasion purposes.

East of the Isonzo is the Gulf of Trieste, 12 miles wide. At its head is the city of the same name, a first-class port and naval base. It has a population of over 250,000 and all the facilities needed for a base. There are unusually good piers and wharves.

The shores of the Gulf of Trieste east of the Isonzo are mountainous limestone, covered in part with red clay. In the limestone are extensive caves, which have been utilized for military defense. On the side facing the Isonzo is the famous Carnaro, where between 1915 and 1918 most bloody battles were fought. The defenders, in that case the Austrians, placed batteries within caves on sides of cliffs. This idea has since been developed. Batteries so sited can not be reached by bombing. They can be reached by the attacking artillery, but require a direct hit on the embrasures of the guns to put them out of action. As the embrasures are camouflaged, this usually requires firing of a large number of shells to secure one probable hit.

The coast around the Gulf of Trieste is indented by narrow valleys which are diminutive fjords, with high steep hills on each side. There are a few places where infantry could be landed, but no suitable site for troops of all arms.

The peninsula of Istria is of lime karst formation, very difficult to campaign over and highly favorable for defense. On the west side are two small ports, Parenzo and Rovigno, where small forces could land. From neither of these places is there a suitable avenue of approach into the interior.

At the south end of the peninsula is the important port of Pola. This is a first class naval base but is not a suitable one for initiating an invasion as the routes into the interior are difficult and could be defended through the karst mountains by a relatively small force. Pola would be of value if the entire back country were occupied, for it has excellent facilities for handling ships. There is also a good beach here. Pola is strongly fortified on all sides and if defended would require a major expedition to take it. It probably wouldn't be worth while.

On the east side of the Istrian peninsula are a number of very good beaches which are normally resort centers. These lie close to the mountains, however, there being but a narrow strip of territory close to the sea. If the enemy held the heights it would be difficult to maintain troops on the coast.

At the end of Italy (that is, at the boundary of 1939) is Fiume. This had previously been the main port of Hungary. It is a good commercial port and would be suitable as a base for invasions directed toward Hungary—for there is a pass in the mountains in rear of Fiume giving easy access to the interior. It is not a suitable base for an attack upon Italy, as in this case it would be necessary to fight across difficult mountains to reach that country. The enemy has roads and a railroad down the center of the Istrian peninsula which will facilitate his defense of that area.

* * * * *

The east coast of Italy, then, lends itself to invasion at but two places—*first,* south of Manfredonia with a view to reducing the Brindisi—Taranto strongholds; *second,* between Ancona and Rimini to attack toward either Roma or Bologna, according to the situation at the time.

Interior Defense Lines

No discussion of the invasion of Italy is complete without considering interior lines of defense, for the enemy may elect not to defend the coast but rather to retire to a line away from it.

The most important line is that of the Etruscan Apennines, extending from the Golfo di Genova near Spezia to the vicinity of Rimini. These mountains are continuous over the entire distance, with altitudes of over 6,500 feet in the west end to less than 4,000 south of Rimini. Although there are a great number of passes through these mountains, they are a serious military obstacle. It is the line which was apparently recommended to Hitler and Mussolini by the conference of generals which met at Verona between 17 and 19 July. The refusal of the Italians to withdraw to what may be known as the Etruscan Line while there was time to do so was the immediate cause of the downfall of Mussolini.

The Apennines here traverse Italy from coast to coast, forming a barrier about 50 miles deep across the head of the peninsula. Against an enemy coming from the south it presents a front of about 140 miles. This is much shorter than the line of the Po River, and 10 miles shorter than the line of the Alps east of Switzerland alone. It can not be easily turned by amphibious operations directed in rear of its flanks. On the Adriatic the only section favorable for an invasion is the Ravenna—Rimini area, which is just in rear of the Etruscan Line and close to where enemy reserves could be expected to be. On the Golfo di Genova (as already discussed) landing places are restricted and an advance from them into the interior is at once confronted with difficult terrain.

Mountains on the Etruscan Line are of volcanic formation, with hot springs, mud spouts, and sulphur exhalations still on the active list. Their heights north of Lucca exceed 7,000 feet. From there they decline eastward to around 5,500 feet between Arezzo and Forli. Passes average around 3,000 feet high.

Northern and southern slopes differ materially. On the north, ridges extend outward at right angles to the main chain, separated from each other by deep and narrow valleys having torrential streams; roads or trails are on the ridges, with no

communication between them until after they emerge from the mountains. On the south, secondary chains are parallel to the main one, with deep valleys in between. Critical points on the north side are the exits of the roads from the mountains. On the south they are the entrances into and out of the valleys. The lower slopes of the chain are covered with dense forests of chestnuts, oaks, and beeches; upper slopes are pasture land, with considerable snow in winter. The north side has zero temperatures in winter, the south side is considerably milder. Population is meager and villages few and unimportant.

Present indications are that the enemy will make his main defense of upper Italy along the Etruscan Line. It is capable of being converted into a deep defensive zone. An advance line is contemplated along the line Viareggio—Lucca—Firenze—Arezzo—Pesaro, to delay and harass attackers. If troops are available to him for the purpose, the enemy may hold Ancona as an advance post. If Ancona is not defended it should be seized with a view to initiating operations against the enemy's left flank.

A lateral line of communications, with a good road and a railroad, crosses Italy south of the Etruscan Line, passing through Pisa—Firenze—Arezzo—Gubbio—Ancona. It will be most useful to the attackers of the main position. It can be expected that the enemy's advance forces will interfere with Allied use of this line for as long as possible.

If the enemy is forced to abandon the Etruscan Line, his next natural line of defense is the Po River. Measured in a straight line it is 250 miles from the Alps on the French frontier to the delta of the Po, but following the meanderings of the river the distance approaches 400 miles. The river is itself a considerable obstacle; its width varies about as follows:

	Feet
At Torino	500
Casale Montferrat	660
Stradella	1,650
Cremona	3,000
Zibello	4,000
Casalmaggiore	650
Guastalla	4,300
South of Mantua	1,000
At Pontelagoscuro	1,000

Below the vicinity of Mantua the Po is paralleled on the north side by a number of smaller rivers which would make a crossing in this area difficult.

The valley of the Po is an extremely fertile plain and is thickly populated. Winters are not very cold, but frosts are frequent and zero temperatures sometimes occur. Minor streams and innumerable canals water the plain and transform it into one vast garden. Rice fields are common and are habitually cut up into squares surrounded by wide ditches filled with water. Hedges are a common form of fence. Orchards abound, and grape vines are strung from tree to tree. There are no forests, but the country is so thickly planted that extended views are uncommon. Maneuvers across country have heretofore been considered impracticable.

Due to the fact that the whole valley of the Po is an immense aggregation of military obstacles, battles in the past have been fought along river banks (as Arcole, Magenta) or, in the case of tributaries of the Po, within the river banks (as the Tagliamento, Piave), or at a few detached locations (such as Solferino, Custozza), or finally in the defense and attack of towns. With modern armies it would be possible to organize defended positions parallel to the Po and on either side of it, capable of causing considerable delay to greatly superior forces. If the enemy decides to hold the Po River Line he may have advance lines south of the river.

The plain of the Po is not favorable terrain for motor combat vehicles. It is difficult for artillery to locate targets therein on account of the large amount of cover the country affords. It would be possible for the enemy, if he loses the Etruscan Line, to conduct a series of actions within the Po valley, which might require a long time to overcome. To do this successfully he would need around 50 divisions, as against half that number to hold the Etruscan Line. Latest reports are that the enemy has approximately 25 divisions in north Italy now. He might have difficulty finding 50. For this reason he is likely to hold the mountain line if he can.

If in turn the enemy loses the Po Line, his next best line of defense would be (presuming that Switzerland remains neutral) the line of the Adige River, from Lake Garda to the sea. In an air line this would be 75 miles long. The left flank would rest on swamps along the Adriatic, the right on the Alps. Twenty divisions could hold it. It would be possible to arrange diagonal or cross lines of defense within the Po valley to almost any extent desired. To discuss all of these would require several books.

COMMENTS

1. The enemy has clearly indicated the Etruscan Line as his main line of resistance in Italy, regardless of whether or not Italy continues in the war. Germany has sufficient troops in sight to hold this line now.

2. If the Etruscan Line is lost the enemy may thereafter defend the Po River by a succession of lines for a considerable time, provided he has enough troops to cover a 250-mile front.

3. Adoption of the Etruscan Line as the main line of resistance in no way prevents the enemy from defending central and south Italy. If Italy stays in the war, and its troops fight with reasonable efficiency, it would be possible to greatly delay the arrival of the Allies in north Italy—for it would be inadvisable to commence a serious operation against the Etruscan Line by landing invasion forces in the Livorno area if large armies were south and north of that area.

4. An invasion landing in Tuscany would cut the direct line of communications to Roma and south Italy. There would remain the very good railroad and road along the Adriatic connecting Ancona and Brindisi, which has several cross lines of communications to the west side of the Italian peninsula. This might suffice the enemy's immediate needs.

5. The enemy's adoption of a main line of resistance means that as fast as is practicable all industries of military value, all key personnel, and all transportation capable of being moved, will be sent north of this line. Up to 1 August practically nothing had yet been done in this direction, but it may be speeded up. It happens that Italy's major industries are north of this line. Arrangements for tranferring what remains are possible. Industies moved may not locate in north Italy but rather go far back into occupied Axis territory. Naturally, all supplies possible will be moved too.

6. The defense of central and south Italy may be further protracted by defending the islands of Sardinia and Corsica, for unless these are first reduced air forces based on them might seriously harass expeditionary forces operating against west Italy.

PRESSURE

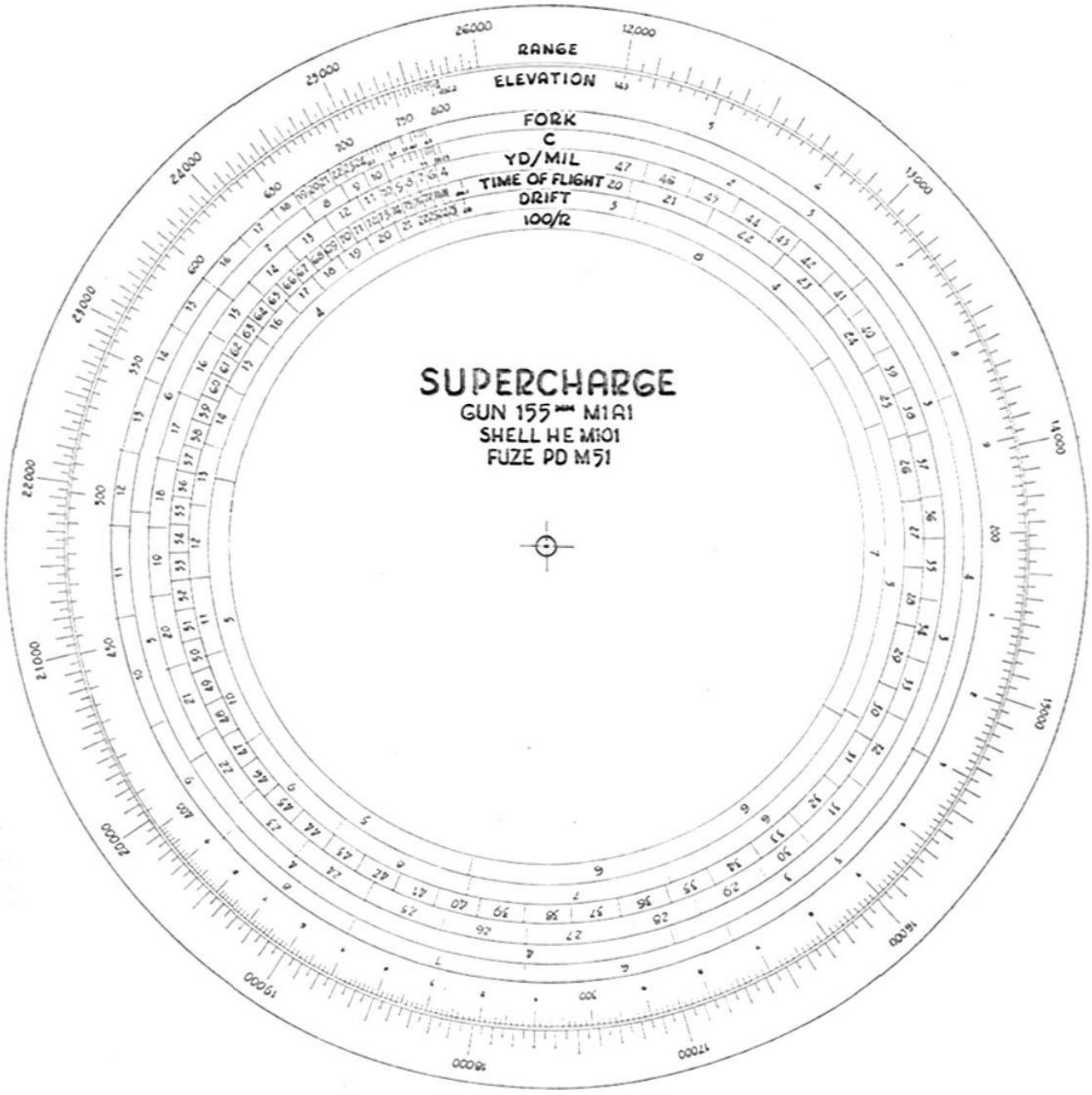
You'll find it a swell idea to keep a record of your tire pressures. If one tire consistently loses more air than the others, *take it off and inspect it carefully*. There must be something wrong with it. Inspection will save a lot of useless delay and back-breaking work on the road.

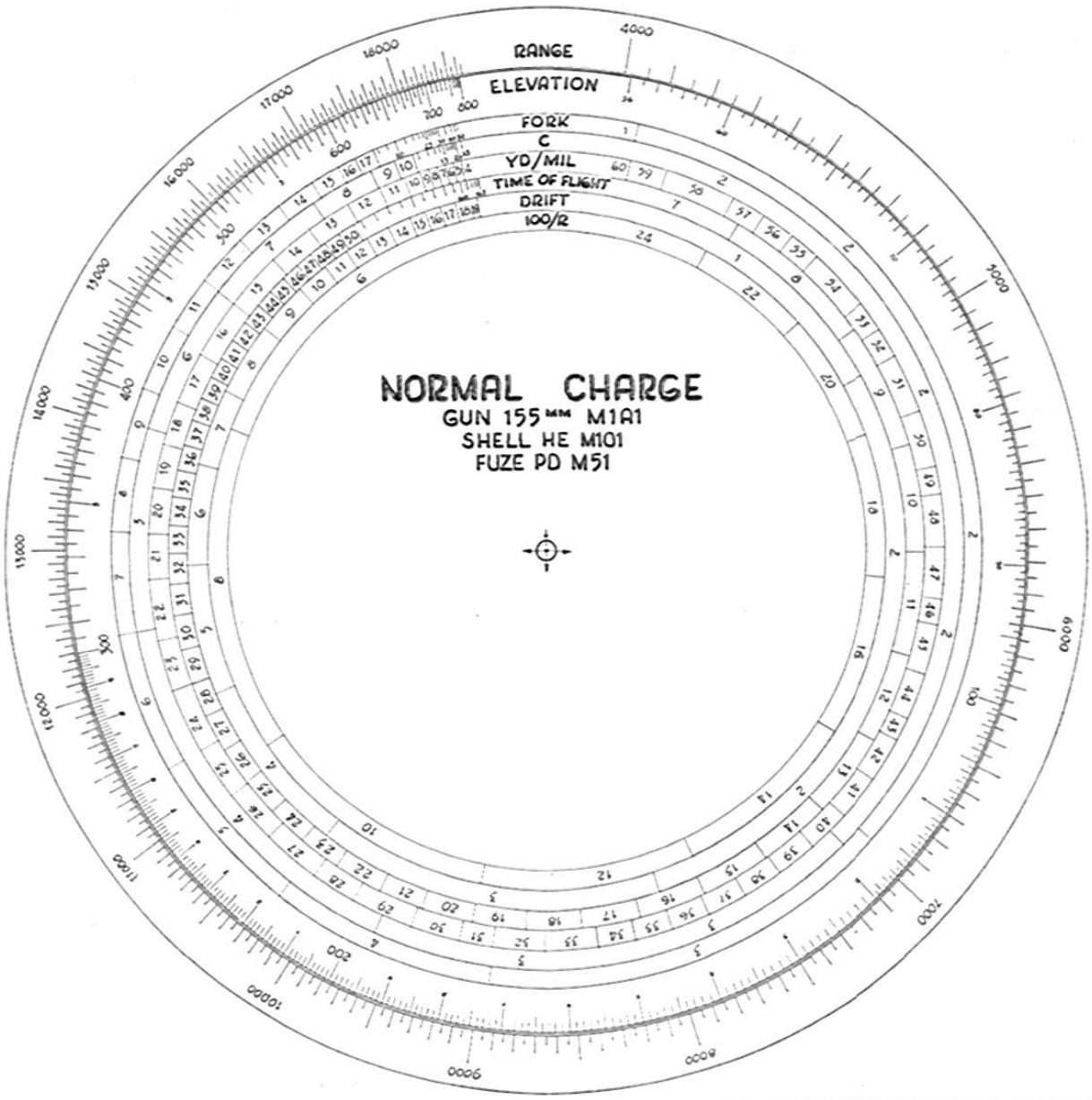
Circular GFT For The 155-MM Gun, M1A1

Larger caliber weapons have not yet been provided with graphical firing tables; these are being procured, but it will be a little while before they are distributed. Some units so armed have therefore constructed circular graphical firing tables for interim use. If the experience of the "lights" is a criterion, many of these circular tables will remain in use even after those of the slide-rule type are issued: some users prefer the longer graphs and consequently greater accuracy which can be obtained with a compact circular table.

In the hope of aiding outfits armed with the 155-mm gun (M1A1), we reproduce herewith the tables developed by Col. Waldemar F. Breidster over a year ago. On these, red is used for Fork, Yd/Mil, and Drift, to increase readability. His unit shellacs them to a 3/16″ piece of circular pressed wood, lacquers them, and mounts on each side two celluloid arms for setting off a *K*. For mounting suggestions, see page 788 herein; for details of the arms, see *Circular GFT for the Heavies* on page 611 of the JOURNAL for August, 1943.

For instruction purposes, Col. Breidster's group has mounted the original drawing on a 3′ pressed wood disc. This greatly facilitates the training of FDC personnel.





Aiming Post Solutions For The Heavies

By Col. J. F. Colter, FA

THE PROBLEM

Our new carriages (for 4.5″ gun—155-mm howitzer M1, 155-mm gun—8″ howitzer, and 8″ gun—240-mm howitzer M1) all have their sights considerably displaced to the left and rear of the piece's center of rotation. Result: a material sight displacement from the line of aiming posts when a wide shift is made. At the ranges these weapons can fire, no known error of even a mil can be overlooked or neglected, as even the smallest of errors can cause a miss on even a large target.

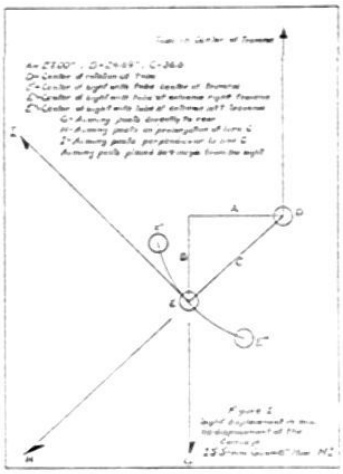
Herein is discussed only the carriage for the 155-mm gun—8″ howitzer, but the principles are equally applicable to the others.

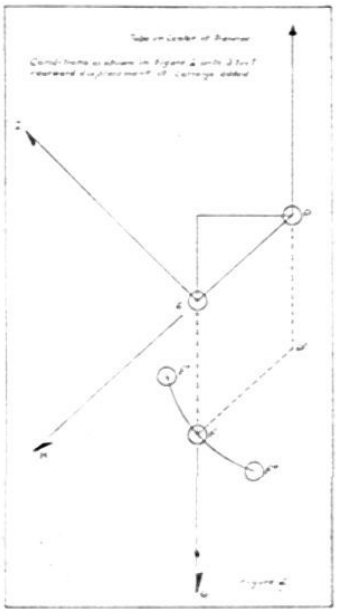
Figure 1 shows the sight displacement due to traverse only, with no displacement of the carriage itself. It clearly shows that the worst location for aiming posts is in prolongation of the line sight—center of rotation (with piece in center of traverse). Their best position, however, is perpendicular to that line; this works out that the line of posts should be about 750 m to the left front. Details of the errors resulting from different locations are:

Location of Aiming posts	Shift	Displacement of sight in mils
G	30° L.	3.95 mils (E″)
G	30° R.	2.5 " (E′)
H	30° R. or L.	5.2 " (E′ or E″)
I	30° R. or L.	1.4 " (E′ or E″)

A carriage can be expected to displace rearward due to firing. Figure 2 indicates the sight displacement due to a combination of traverse and rearward displacement. Angular displacement is as follows:

Location of aiming posts	Shift Deg.	Displacement of sight in mils
G	30º L.	3.95 mils (F″)
G	30º R.	2.5 " (F′)
H	0º	7.5 " (F)
H	30º R.	2.3 " (F′)
H	30º L.	12.7 " (F″)
I	0º	6.8 " (F)
I	30º R.	8.2 " (F′)
I	30º L.	8.2 " (F″)





Unless aiming posts are moved, least error results if they are parallel to the tube when it is in the center of traverse. Best solution is of course to place them 750 *m* to the left front, and change their location when the piece settles rearward.

But at night, or on frozen ground, it may be difficult to change the posts' location as they move out of line. If pieces are relaid by compass the firing will be delayed considerably. Other solutions are thus indicated.

BRITISH SOLUTION

Cross-arm aiming posts such as those shown in Figure 3 eliminate the frequent stake realignment as a result of displacement. The numbered cross arms furnish a series of auxiliary lines parallel to the original line of the aiming posts; any auxiliary line can be used by lining-up like numbers on the arms on the two posts.

Cross-arms are pivoted in the center (indicated by arrows), so they will close along the line of the post itself for strapping and easy haulage. Numbers can be white-on-black or any other color combination for good visibility in the particular terrain or foliage of the operation. Cross-arms should be mounted for sliding up or down the stake, so that both can appear to the gunner to be adjacent or superimposed.

This solution contains several "bugs," however. In certain light conditions the gunner has trouble seeing the matching pairs of lines. At night excessive illumination is required, as the gunner must determine which lines match which. For night lighting there must be some complicated wiring, or cannoneers must be posted at the aiming posts to flood-light them as required. Cross arms must be at least 8′ long to take care of the combined sight displacement and a 3′ displacement of the carriage. And worst of all, the vertical hair of the sight will frequently fall *between* pairs of parallel lines. The foregoing points are aside from the frequent errors in selecting matching pairs of lines, and the need for gunners to know an additional method of laying for deflection.

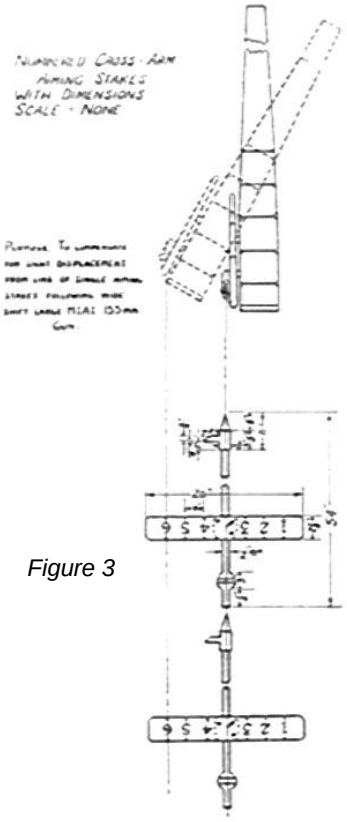


Figure 3

In short, although these posts may work well with certain British materiel, they are not the answer to our immediate problem.

SUGGESTED SOLUTION

A "goal post" type of aiming target (Figure 4) appears thus far to correct the deficiencies of both our standard aiming posts and those of the British type. One of our standard aiming posts is used at the 100-yard point, this new type at 50 yards. The sighting target is placed at any convenient level. As displacement moves the line of sight off the aiming stakes, only the target itself needs movement after the usual "refer and relay" operation of correcting for errors in deflection. No new method need be taught the gunners, and standard night lighting devices can be used.

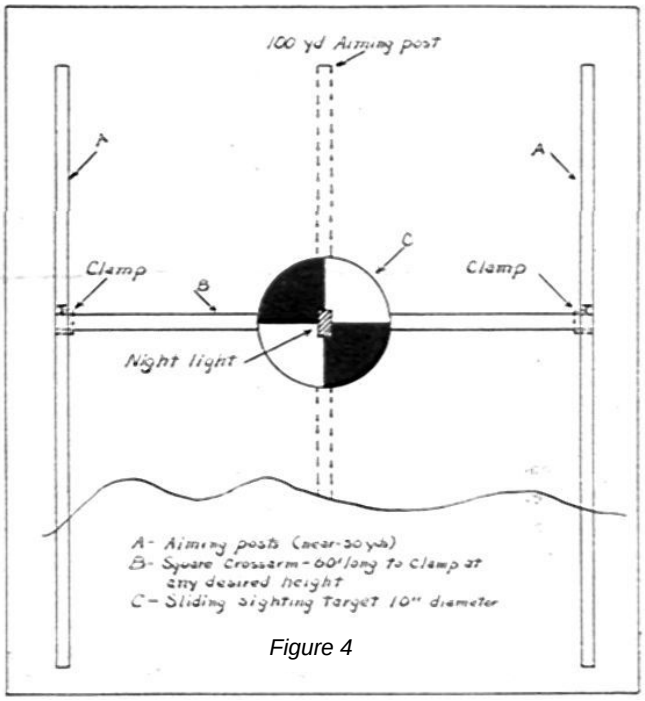


Figure 4

RAPID OFFSETS

By W. W. Edson

A simple graph will speed up calculation of offsets amazingly. If properly made, it automatically applies the obliquity factor, and is as applicable to compass data as to that derived from an aiming point.

WITH AN AIMING POINT

With instrument zeroed on the target, measure the clockwise angles to the aiming point (TOP) to the guns (TOG). Enter the chart on the circle corresponding to the O-G distance, and at angle TOG. Go vertically to the horizontal mil scale, which actually is the target offset for a range of 1,000 yards.

Lay a straight-edge (pencil, string, book, etc.) to the target range. On the diagonal scale, read the target offset (T). Note that the obliquity factor, arithmetic, and sign of offset are taken care of automatically.

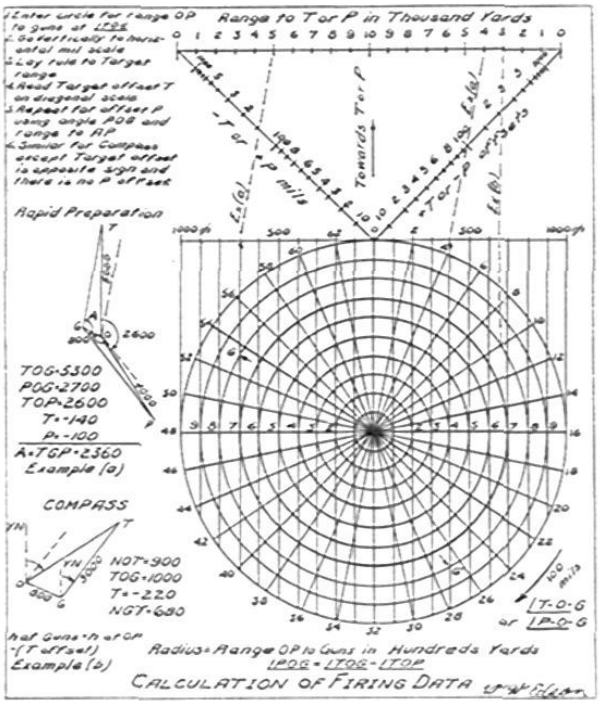
Repeat the same procedure for the aiming point offset (P), using, however, the angle from aiming point to guns (POG). POG = TOG—TOP, and 6400 mils are added or subtracted as required to give a proper positive value.

Then apply the T and P offsets (using proper signs) to measured angle M (or TOP) to obtain the firing angle A (TGP).

USING THE COMPASS

Find the target offset as above, but reverse the sign given on the chart. Add it algebraically to the target's Y-azimuth from the OP, to determine the Y-azimuth to be sent to the guns.

Note that at the OP the Y-azimuth is read directly on the aiming circle if the declination constant has been applied (instrument properly oriented). Mathematically, or when using a prismatic compass, the Y-azimuth equals the compass reading plus the declination constant.



GENERAL

For ranges above the chart, multiply the O-G and range scales by 10. The diagonal scale remains the same.

Since the scales are uniform, a chart can easily be built with any desired values. Place the scale on the diagonals by construction—that is, divide the horizontal mil scale by the range scale to determine what values to insert.

SMOKE TECHNIQUE

It was in Central Tunisia. Two American infantry divisions, with supporting corps artillery plus a group of American tanks, were launching an attack upon German-held hills. A concentration of smoke was requested to screen enemy observation while the tanks and cannon companies advanced.

The artillery of both divisions commenced the smoke concentration using super-quick fuze. Due to atmospheric conditions and no wind, the smoke rose quickly in long, narrow pillars. No effective screening was being obtained.

The officer adjusting fire for our battalion (155-mm howitzers, Corps Artillery) remembered a test we had previously conducted using delay fuze with smoke. He began his fire using delay fuze. The resulting bursts had a wide base and spread out well before rising. In a few volleys the target was effectively screened.

—LT. COL. JOSEPH R. COUCH, FA

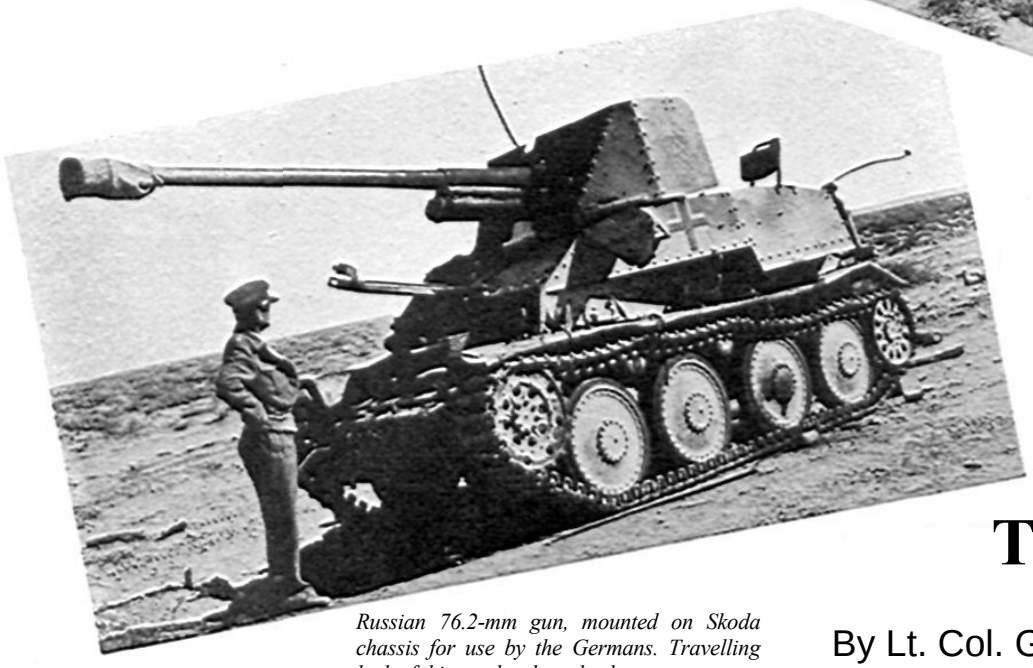
SUBSTITUTE PARTS

At the strategic moment a 105-mm howitzer can be rendered useless by a broken traversing handwheel—the result of being struck by a stout branch or small tree while moving through wooded areas. And an extra traversing handwheel is not one of the spare parts carried with the battery. This problem was solved promptly by our battery executive, Lt. L. A. Kendall, who removed the auxiliary elevating handwheel and mounted it on the traversing shaft, thereby making it possible to traverse the piece.

—LT. JEAN F. MESSER, FA

This PzKw IV fared badly, despite its 7.5-cm KWK. Its muzzle brake is the first 7.5 pattern with a single baffle only. Later versions noted in Tunisia have the double baffle effect, patterned after the original brake on the PAK 38.

This PzKw III carries the long-barrelled 5-cm KWK (Kampfwagon Kanone). *Tube of this gun is almost identical with that of the PAK 38. Both pieces use the same ammunition except for the primer; with the PAK this is percussion, but the KWK uses an electric one. Cans with white crosses are water cans, embossed* Wasser *on their sides; similar cans without crosses are for gasoline, and are embossed* Kraftstoff.



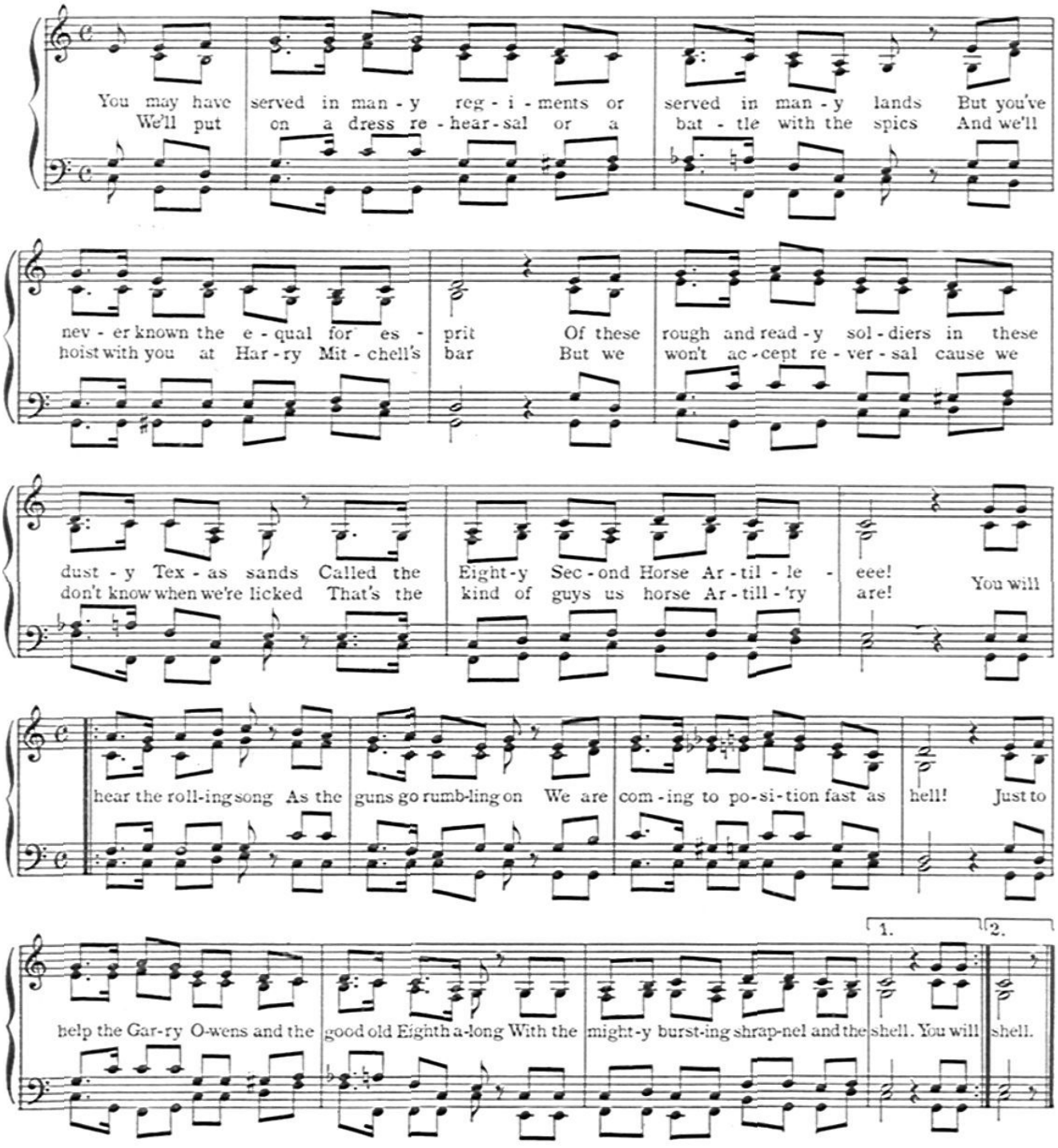
Russian 76.2-mm gun, mounted on Skoda chassis for use by the Germans. Travelling lock of this one has been broken.

TUBES ON TRACKS

By Lt. Col. G. B. Jarrett, Ord.

SONG OF THE EIGHTY-SECOND

Words by COL JOHN M. JENKINS, JR., FA
Music by MRS. JOHN M. JENKINS, JR.



Song of the Eighty-Second was written in the middle '20s for a birthday party for Col. "Old Bill" Rucker, a beloved regimental commander. The "Garry Owens" are of course the 7th Cavalry, whom the 82nd traditionally supported. Harry Mitchell owns a large El Paso brewery, and at one time had a favorite watering place in Juarez.

PERIMETERS
in
PARAGRAPHS

(Based upon latest information available at date of writing, and subject to correction as more complete reports are received.)

By Col. Conrad H. Lanza

THE WAR IN RUSSIA (July 12 to August 22, 1943)

BATTLES AROUND OREL

At the start of this period the German offensive around Belgorod had been arrested. The Russian High Command had decided that there was no further danger in that sector, and that it could safely initiate an operation of its own.

Both sides to the huge contest in Russia had massed their major forces and reserves in the center of the front, extending from the Orel to the Kharkov areas, both inclusive. Each was prepared to undertake a major offensive on short notice. At this time the line was approximately Yelnya (Axis)—Spas Demensk (Axis)—Sukhinitchi (Axis)—Mtsensk (Axis)—Novosil (Russia)—Bogodukhovo (?)—Jatchie (Russia)—Yefratovo (Russia)—Sevsk (Axis). It was strongly fortified. The Germans had prepared the villages for defense by establishing wire around them, constructing antitank obstacles, and planting large mine fields in the foreground. Land mines delayed the subsequent Russian advance more than any other single defense measure; these mines were of many types, and were planted with great prodigality. The Orel area contained large forests which were unsuitable for operation of armored forces.

The Russian High Command issued orders to attack the Orel salient on 12 July. The first day's attack was to be to limited objectives. After the results of this were known, further orders were to be issued.

The Russians had three armies available. A North Army (under Gen. Nikolai F. Vatutin) was to attack south through Sukhinitchi on a 40-km front. An East Army (under Gen. Konstantine Rokossovsky) was to attack west from Novosil. A South Army (under Gen. M. Popoff) was to attack north from Malo Arkhangelsk. Very little information is yet available as to the details of the series of continuous battles which now started, but the following has been ascertained.

The East Army, with 10 divisions in line, started its artillery preparation at 0300 hrs., 12 July. The front of attack was 30 kilometers, to cover which the Russians' artillery, organized in part in artillery divisions, according to their reports had 1850 gun barrels per kilometer of front, or 55,000 for the entire front. The Russians claim that this was the greatest artillery preparation that had ever been fired in any war. It was intended to cover every target within the enemy's lines to a depth of 6 kilometers, and in places to a depth of 8 kilometers. The unit of measure of gun *barrel*, rather than guns, is due to the increasing employment of multi-barrelled guns, now an important feature of the Russian artillery.

This unprecedented artillery preparation continued for two hours, when the armored troops led the advance. They had considerable success, and were able to occupy the enemy's forward areas without great difficulty. It was found that the artillery had flattened nearly everything within its zone of fire. As the advance had only a limited objective no effort was made to push beyond. No enemy reaction was reported. In view of this situation the Russian High Command ordered a continuation of the offensive (with unlimited objectives) to start next morning, and daily thereafter until further orders.

The Russian artillery was displaced forward. This must have been a huge task for the number of batteries in line. Each morning the artillery fired a preparation, after which the armored troops moved forward. Day-by-day details are not yet available. In general it appears that the Germans withdrew from the probable area to be covered by the Russian artillery preparation, less such centers of resistance as the defended villages. When the artillery preparation was over, both sides rushed armored troops forward. Each sent strong air forces to cover their forces and to blast a way for them. This resulted daily in a fierce tank battle on the ground, and a strenuous air battle overhead. The Germans had the advantage of the fortified villages as pivots of maneuver. They used as many as 1,000 fighters in the air at one time. The generals commanding had to coordinate the action of the ground and air troops. In this stage of the battle each side used self-propelled artillery to support its armor, which included anti-tank and anti-aircraft batteries. Other artillery was available to lay standing barrages to cover flanks of troops in action, lay smoke, and continuously interdict critical points over which it was certain its own troops were not to pass. On the whole it was a very active and vigorous battle, and required great activity, quick appreciation of situations, and very prompt action by generals. The artillery, which played a most prominent part, was required to keep track of swiftly changing positions of their own troops; locate enemy troops and recognize them in time; and deliver quick and accurate fire. As there are many woods in this area, the view from OPs was often limited or non-existent. Yet the artillery had to carry on.

In evaluating this battle, stated by the Germans as the greatest of its kind, the missions of the two sides must be kept in mind. The Germans announced theirs as the attrition of the enemy; their orders were to employ the minimum number of troops in line and to yield territory, rather than lives, provided that greater casualties were inflicted on the enemy. The Russian mission has not been announced, but appears to be to drive the enemy out of Russia.

Troops at the disposition of the Germans around Orel were:

Divisions:	**Infantry**	**25**
	Motorized	**6**
	Panzer	**21**
	Total	**52**

The front of the three Russian attacks, plus the intervals between them, was about 190 kilometers. Including the reserves this gives more than 1 German division to each 4 kilometers of front. The only information as to the Russian strength is that in attacks, very uniformly an infantry division covered 3 kilometers of front.

In attaining their attrition mission the Germans had their greatest success within the woods. Here it was impossible to locate in advance targets for the Russian artillery, and many centers of resistance escaped being fired on. Snipers, using machine guns, were posted in trees or in pits, and were hard to find. A German report for July 19th shows that in such a situation, 2 infantry divisions survived an attack by 16 Russian divisions, of which 4 were armored, on a front of about 35 kilometers.

The Russians endeavored to obtain material advantages from their guerrillas in the enemy's rear areas. Usually operating in small parties, Russian guerrillas are in uniform and form part of the Russian army. They maintain communication by radio, and receive supplies and replacements by air. They secure identifications, observe enemy movements, and (when opportunity permits) destroy bridges, wreck trains, and otherwise engage in minor warfare.

The Russian advance was not very fast, but it was steady. The greatest progress was made by the East Army. It took a week to capture Mtsensk, which was practically on the front line. It was, however, by-passed by other troops. The Russians gradually arrived outside of Orel, which they attacked on August 3d. Street fighting took all of the 4th, and Orel was finally occupied on the 5th. This was 25 days from the initial attack, and involved an advance of 55 kilometers, or 2.2 kilometers per day on the average. The North and South Armies made a lesser advance.

Both sides considered this a suitable occasion for publishing the alleged losses of their opponent. The reports cover the period July 5 to August 5, and therefore include operations outside the Orel area.

German losses reported by Russians		Russian losses reported by Germans
12,418	**Prisoners**	**69,164**
4,605	**Tanks**	**7,847**
1,623	**Guns**	**3,083**
2,492	**Planes**	**3,731**

In order to speed up the advance, the Russian High Command initiated two new attacks which were launched on August 8. The first was astride the valley of the Ugra River, starting northwest of Spas Demensk, and headed for Roslavl. It had a front of 35 kilometers, with 12 infantry divisions in line. The number of armored divisions has not been ascertained. The second (by the North Army) started southeast from Zhizdra on a front of 15 kilometers, and headed through that town toward Spas Demensk. If successful, the combined attacks would aid the East Army in its advance toward Bryansk and would later favor operations for the reduction of Smolensk.

The new attacks made progress. On the 13th, which was the sixth day of the advance, the Ugra valley offensive had gone 20 kilometers and the Zhizdra attack 17 kilometers, or an average of about 3 kilometers a day. On August 15th, the line was approximately Spas Demensk (Axis)—Zhizdra (Russia)—Karachev (Russia)—Dmitrovsk (Russia)—Sevsk (Axis). According to the report of the Russian staff, during the entire operations up to this date, only picked German troops had been encountered and but comparatively few prisoners had been taken. All these were strong and in good health, and none were over 30 years old. Some were morally shattered by previous battles and many were in great fear of the Russian artillery, particularly of Katiusha. Katiusha is the Russian name for the multibarrelled gun which plunked down three to six projectiles simultaneously around the target (or four times these numbers per battery) and apparently was the cause of cases of shell shock.

In this campaign, the Russians used many U.S. tanks, but nothing comparable to the extraordinary number of Russian tanks employed. The Russians considered their own tanks less vulnerable and more maneuverable. As a whole this campaign has utilized a greater amount of materiel, especially in artillery, ammunition, planes, and tanks, than has any previous one.

BATTLES AROUND KHARKOV

The Russian High Command initiated this attack on August 4th by a large scale offensive toward Belgorod, starting on the north side. This took the Germans by surprise, and the Russian armor broke through late in the day to make a 10-km gain. Next day the Russian armor kept going, went forward another 25 kilometers, and (closely followed by 2 infantry divisions) reached and occupied Belgorod. This Russian force of about 3 divisions was a spearhead going through a gap. It did not cut off any Germans, but did cause their line to go back.

On August 7th a new Russian major offensive was launched northwest of Kharkov, on the line Sudzha—Gotyna, astride the railroad. This attack again broke through the German front, but was stopped on a second line of defense which the Germans had along the Vorskla River, which averaged about 25 kilometers in rear of the front line. The Russians managed to bring up enough artillery to attack this line on the 8th and, breaking through it, advanced to another defense line along the Merla River, also about 25 kilometers in rear of the Vorskla line. This German line held.

In this area the terrain differs from that around Orel. The ground is flat steppe country, but well cultivated, with numerous orchards and farms, thatched villages, and trees along streams. Preceded by hundreds of planes which scouted ahead and bombed centers of resistance, great numbers of Russian tanks scurried over the country in all directions. Every day the artillery provided a powerful preparation for each new hop. Tanks and motorized infantry penetrated deep into rear areas, encircling and reducing strong points. The Germans at this date were in considerable confusion on this front and were taking emergency measures to stem the enemy's advance, pending the arrival of expected reinforcements. This resulted in piecemeal insertion of units in line, with intermixture of units. Technical and engineer troops were relieved from normal duty and sent into the battle.

Kharkov is not an easy city to defend, for it has no natural defenses such as forests, stream lines, or hills. Having had some previous experiences of their own around this city, the Russians assumed that it would not be seriously defended. They started an advance from the northeast and another from the southeast. Being stopped on the Merla River, they expanded outward directly to the west. This country had many wide open spaces, and was almost ideal for armored troops.

By August 15th the Russians had arrived within one kilometer of the northeast exit of Kharkov. German reserves had now arrived, and on this day and the next a strong Panzer attack was made against these Russians. They were driven back with rather heavy losses, and temporarily Kharkov was disengaged. German reports state this attack captured 1,600 prisoners, 25 tanks, and 110 guns, and that 4,200 Russian dead were counted on the field.

The Russians now decided to make their main effort on the southeast side of Kharkov, while continuing the attacks on other sectors. On August 18th this attack forced a crossing of the Donets River below Chuguev, and reached Zmiev. This had been foreseen by the Germans, but they were able only to keep the attack down to short gains per day. Thereupon (on the night 22/23 August) Kharkov was evacuated, and the Russians entered it on the following morning.

At this date, on this sector, the line was approximately Sumy (Axis)—Boromlya (Russia)—Akhtyrka (Russia)—Kotelva (Russia) — Krassnokutsk (Russia)—Bogoduchov (Russia)—Kharkov (Russia)—Zmiev (Russia)—Donets River.

COMMENTS

1. The Russians have shown an ability to adjust themselves quickly to the strategical and tactical situation. They have opened new attacks promptly when old ones appeared to be approaching their end. This requires good and timely planning and preparations.

2. The Russians have continued to use constantly increasing artillery forces. In every campaign so far, the relative and actual strength of the artillery has increased. To it the Russians attribute much of their success.

This great quantity of artillery requires new high artillery commands, corresponding to divisions and corps and independent of the artillery with divisions of other areas or their corps and armies. Its primary mission has been to, day by day, fire a preparation which will surely open a way at the selected areas for attacking armor or infantry. When the latter do go forward, they depend upon their own attached artillery for immediate support in a fast-moving battle. While this is going on, the independent artillery displaces, when necessary brings up more ammunition, and prepares to fire its next preparation.

3. In the wooded areas near Orel the daily average Russian advance was only between 2 and 3 kilometers. This would not require that the artillery be displaced forward every day. Around Kharkov advances were much greater—as high as 25 kilometers. In the open country (which was dry at this season) it was possible to advance anywhere.

4. Neither side was able to make a clean break-through. Around Orel the Russians made no penetrations. Around Kharkov they made several; these were stopped on German rear lines, which were about 25 kilometers in rear of the forward line.

It is not to be considered that 25 kilometers is the proper distance apart for successive defensive lines. It happened to be so in this case, because rivers which were suitable tank obstacles were there. The distance between defense lines is a function of the terrain.

5. As these great battles were for attrition purposes, the actual attrition accomplished is a measure of success. Each side daily gives the tank losses alleged to have been inflicted on the other side. These are the figures, given for they may be worth:

German losses in tanks reported by Russians	Period	Russian losses in tanks reported by Germans
558	16 to 20 July	1,698
251	21 to 25 "	1,341
235	26 to 31 "	764
421	1 to 5 August	820
357	6 to 10 "	1,122
280	11 to 15	1,137
552	16 to 20	1,524
2,654	Total	8,406

The number of killed has been reported by the Russians as to the Germans, but the Germans have made no statement. The Russian reports, which are not entirely consistent are:

Period from 5 July to include	No. of days	Number of Germans alleged as killed
19 July	15	60,000
22 "	18	50,000
23 "	19	75,000
24 "	20	70,000
21 August	48	300,000

6. Regardless of the accuracy of the foregoing figures, it is certain that there have been a great wastage of materiel and large losses of personnel. Both sides at date of writing are reporting the arrival of fresh reserves in the enemy's lines, so that neither side is yet approaching exhaustion. The battle goes on.

THE WAR IN ITALY (July 20 to August 17, 1943)

INITIAL SITUATION

Allies in Sicily were holding the line San Stefano di Camastra (exc.)—Mistretta (exc.)—Nicosia (exc.)—Leonforte (exc.)—Raddusa (inc.)—Ramacca (inc.)—Dittaino Rover—Simeto River.

In the center the Canadian 1st Infantry Division with the 2nd Armored Brigade (under command of Maj. Gen. Guy Simons) were opposite Leonforte. On their right was the British 8th Army (under Gen. Sir Bernard L. Montgomery) including the 5th, 50th, and 51st Infantry Divisions. On the left of the Canadians was the American 7th Army (Lieut. Gen. George S. Patton) with the 1st, 3rd, and 45th Infantry

Divisions, the 82nd Airborne Division, and the 2nd Armored Division. This entire force constituted the 15th Army Group, under the British Gen. Sir Harold R. L. G. Alexander, who in turn reported to the American Gen. Dwight D. Eisenhower (whose headquarters were in North Africa).

The mission was to complete the conquest of Sicily by capturing or destroying the enemy's army.

Opposed to the Allies was a German force under Gen. Hans Valentine Hube. He had in his command the Hermann Goering and 15th Panzer Divisions, parts of the 29th Motorized and 19th Panzer Divisions, and the 1st Parachute Division (serving as infantry). Italian troops had nearly disappeared, but elements of the 26th Arrieta and 54th Napoli Divisions were present. The Italians were assigned to guard and labor duties. Total Axis strength, including services, was about 75,000 men.

The German mission was to detain as many Allied forces as possible, Germany estimated that the Allies had about 13 divisions in Sicily, with 7 in reserve in North Africa—too small a reserve to undertake a new major invasion. It was believed that if the Sicilian campaign could be kept going there would be no danger elsewhere in the western Mediterranean.

In the eastern Mediterranean, Germany estimated that the Allies had 20 more divisions. It was considered certain that the British would never denude Egypt, Palestine, and Syria of substantial garrisons. A large traffic had been noted going from the Levant to Sicily, carrying both troops and supplies. It was felt that there was little probability of a major Allied campaign being launched in the east Mediterranean as long as the campaign in Sicily remained uncompleted.

As this situation was employing only the equivalent of 3 to 4 German divisions, it seemed worthwhile to go on with the Sicilian war and thereby freeze 40 Allied divisions. General Hube was instructed accordingly.

OPERATIONS FROM JULY 20 TO AUGUST 6

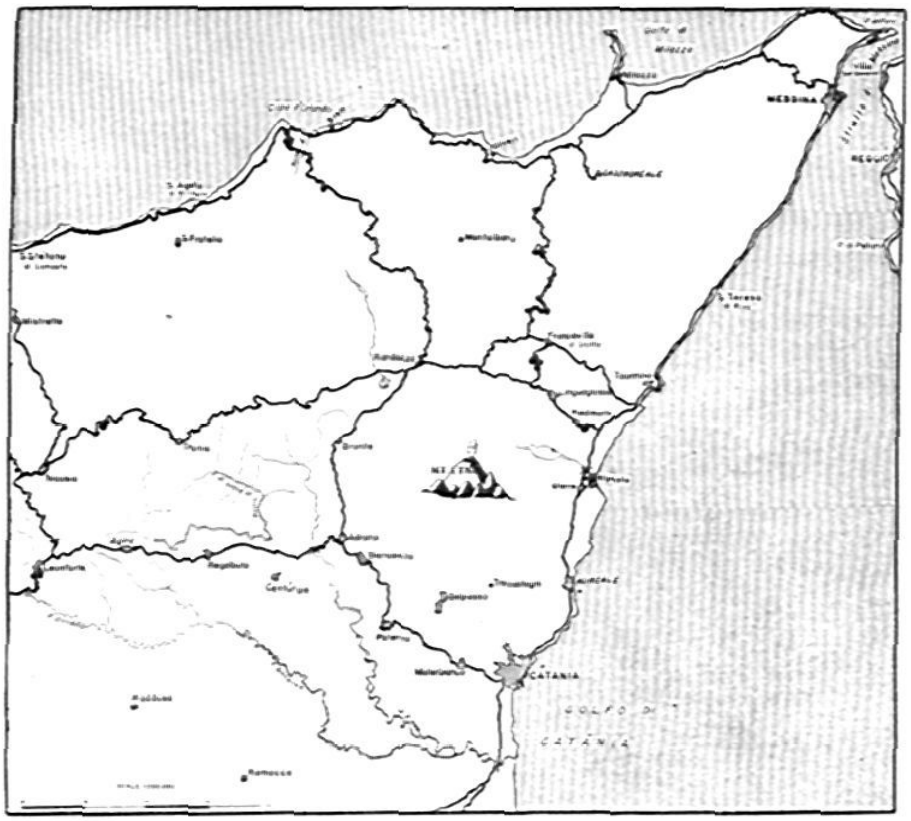
The Allies planned to drive hard along the entire front. This was to be accompanied by continuous and vigorous air and naval action against the enemy's line of communication through Messina to the mainland, to prevent his either withdrawing or being reinforced. Thus the Allied Air Force immediately undertook a destructive bombing of the railroad ferry and shore terminals on both sides of the Strait of Messina, and on the roads and railroads in south Italy over which traffic moved to the Messina area. This included nightly heavy bombing of sensitive points, and an almost daily bombing of the same places. Special attention was given to attacking locomotives, motor vehicles, and shipping.

On 21 and 22 July the British 8th Army attacked, with its main effort along the east coast toward Catania. The British Navy aided the army by constantly shelling enemy positions, as directed from OPs on shore. In spite of much hard fighting no material progress was made. Neither was there much progress when the attacks were renewed on 24, 25, and 26 July.

On the 27th the Canadians made a major attack against Agira, and the next day captured Leonforte after a fierce fight. On these two days the American 7th Army, which had been scattered throughout central and west Sicily, assembled its main force on the line Cefalu—Castelbuono—Gangi. Only minor resistance from hostile patrols was met.

On the 29th the Americans occupied Nicosia, the enemy withdrawing to a strong position on a ridge extending northwest and southeast through Troina. An attack was immediately launched against this ridge. It was necessary to cross a deep valley to get to it. There was only one road, steep and winding. The enemy had blown parts of it out where it was on the side of a precipice; in other places he had blown great quantities of hillside down onto the road. It was impossible in the mountain country to find detours practicable for artillery, so none of it got forward to support the infantry. Two infantry attacks failed, but a third attack gained a foothold on the enemy-held ridge. At the same time the Canadians on the right entered Agira. Both Americans and Canadians agreed that the enemy resistance was very strong. Next day the left of the 7th Army moved forward to the vicinity of San Stefano di Camastra (exc.).

At this date the enemy's main line of resistance appeared to be from San Stefano di Camastra southeast to Troina (inc.). The intervening mountains are very rough, with altitudes between 4,500 to 5,500 feet. The line continued on to Regalbuto and the Dittaino and Simeto Rivers. Along these



rivers the 8th Army had as yet made no material progress. Fighting occurred generally along the entire front on the 31st. The main effort was by the Canadians, who made a slight advance.

August 1st the Americans attacked over their front. San Stefano and Mistretta were taken without great opposition, but strong resistance was met from the Troina ridge. The main attack in this sector was astride the road from Nicosia to Troina. This crossed a ridge, descended into a valley, and ascended to Troina at its northwest exit. The enemy had blown out the road on the side of a precipice, and at other places had blasted the mountain down on to the road. This made first class road blocks, at points where detours were impracticable. From his OPs on the Troina ridge the enemy maintained accurate interdiction fire on parties of our engineers who were attempting to reopen the road. Until this could be done it was impossible to bring the artillery forward to within range of Troina.

On August 2nd the 8th Army's left, together with the Canadians, attacked across the Dittaino River toward Centuripe. The U.S. 1st Division started a new attack on Troina. It had no artillery support, as the road blocks had not yet been removed. The infantry came under strong and accurate German artillery fire, which was followed by a counterattack against their right. With the help of the infantry heavy weapons (which were up in part) the enemy was stopped, but all efforts to close in on Troina failed.

On the 3d the fight around Troina continued with considerable bitterness, but without material change in the situation. On the right of the Americans Canadian and British troops approached the Simeto River in the vicinity of Centuripe.

Before daylight on the 4th the 1st Division made a night advance, without firing, with a view of attacking Troina with bayonets. In the darkness the assault detachment passed through the German front line without noticing it. When dawn came the enemy was found to be in the rear instead of the front. A fierce battle developed, which resulted in the Americans making some net gains. Troina was not taken. There was still no artillery support. The troops were running out of rations, and suffered from lack of water as they were on the exposed mountain slope in a broiling sun. The best that could be done was to bring some ammunition forward and evacuate the wounded. All waited for the artillery. The engineers redoubled their efforts to get the batteries forward.

On August 5th the artillery was coming into line, and was to have 24 batteries ready to fire by afternoon. Orders were issued to attack Troina later in the day, upon completion of an artillery and air preparation. Although the artillery was not ready as early as had been expected, it was ordered to go ahead with the preparation. At this time the 1st Division had two regiments in line toward the left of Troina, who were to hold, while one regiment on the right was to envelop the enemy's left.

Troina, being on the top of the ridge, was plainly visible to our OPs. The enemy's artillery was a considerable distance to the rear, behind the ridge. The foreground of Troina had been planted with land mines which were covered by machine gun and mortar nests, and was a difficult terrain to cross. It was believed that the majority of the enemy's defenses were in the stone houses of Troina. The artillery centered on this target.

The width of Troina, plus short segments on the outside, gave a 1,500-yard front. Two battalions of 105-mm howitzers swept the target from left to right, while two battalions of 155-mm guns and howitzers swept from right to left; the fires crossed in Troina. Fire was opened at 1645 and stopped at 1700.

At this hour a wave of 12 planes dropped 500-lb. bombs on Troina. The artillery then swept the target for 5 more minutes. At 1707 a second wave of planes bombed the target as before. The alternate bombing and shelling continued until 6 waves of planes had gone over. The combined artillery and air preparation took just one hour. There had been no air opposition nor AA fire. From the OPs it looked as if Troina, which had been intact an hour earlier, had been completely destroyed and that it was impossible for any enemy to be left alive in the town. But as it was late in the day the infantry attack was called off, postponed until next morning.

During the night infantry patrols pushed forward. At 0300 a patrol reported that the enemy had abandoned Troina. Still, to make sure, a new air preparation was ordered: fighter-bombers attacked the town at 0715. Our OPs were unable to see any reaction, so the infantry was directed to advance. It walked into the town without opposition.

To everyone's surprise it was now discovered that the town was full of women and children. An assumption had been made that the population had been evacuated. No report has yet been noted as to how many civilians were injured by the artillery and air preparation. As there were plenty of cellars, casualties may have been small. No enemy wounded were found. About 100 Italian deserters and stragglers were picked up, and a single German. There is no explanation as to how he happened to be there.

On the 3d and 4th of August the right of the 8th Army delivered strong attacks against Catania, meeting very strong resistance against which they made a slow advance. The British Navy supported the attack, its fire being controlled by the regular artillery OPs on shore. The latter reported that the naval fire thus controlled was accurate and was delivered promptly. This fire was facilitated by the broken character of the coast terrain which gave numerous reference points easily identified from the sea. Ships could tie in their positions by intersections with minimum delay.

During the night 5/6 August the enemy abandoned Catania, and next morning the British marched in without firing a shot. At this date the line was San Fratello—Troina—Regalbuto—Centuripe—Paterno—Misterbianco—Catania (all to the Allies).

THE NEW GERMAN STRATEGICAL PLAN

On July 19th Hitler and Mussolini conferred at Verona, immediately after the conclusion of a conference of military chiefs which had lasted several days at the same place. Hitler and Mussolini heard the estimate of the situation presented by their generals, and their proposed plan. This considered that the peninsula part of Italy was indefensible against an enemy having control of the sea, as the enemy could land in rear of any position the defenders held.

The generals recommended that the peninsula be not seriously

defended, but that the north part of Italy be prepared for defense. This would include the rich and populous Po valley, which was also the industrial heart of Italy. The main line of resistance would be along the mountains which crossed Italy from near Spezia (on the west coast) to near Rimini (on the east coast). This may be called the Tuscan Line, and affords a zone of difficult terrain 30 to 50 miles deep, only lightly populated, and favorable for defense. This latter could be either at the entrances or exits of the zone, or in between, as might later be determined. This Tuscan Line can not easily be turned by an amphibious expedition. The coast to the west is rocky, with only a few small beaches, and is right up against mountains all the way to the Rhone valley in France. The east coast has only one beach suitable for debarking; this is just north of Rimini, and could be readily covered.

The generals did not propose a hasty abandonment of central and south Italy, but recommended that no time be wasted in transferring to north of the Tuscan Line, depots and supplies, railroad and motor transportation, and war industries. The latter might be moved to any place within Axis areas, as might appear suitable after due investigation. Hitler and Mussolini accepted this report and recommendation.

On the date this decision was made, Rome was bombed by American planes. The local population was largely unable to "take it." Demonstrations and cries for peace quickly arose. Mussolini recommended to the Cabinet its approval of the Verona plan, but opposition arose and spread throughout official circles. It grew stronger daily. On the 24th the Cabiner was disagreed and determined to leave the decision with King Victor Emmanuel, who meanwhile had made himself acquainted with the situation.

As the result of what now appears to have been a palace plot, the King disapproved Mussolini's action and recommendation, and on July 25th demanded and received his resignation. He appointed Marshal Pietro Badoglio as his successor. It was made known that the peninsula part of Italy would not be abandoned to the enemy, and intimated that Germany had been forced to agree to this by a threat that unless this was done Italy would withdraw from the war.

This change in the Italian government may have been a surprise to Hitler but he acted promptly. He in turn convened a conference at his own CP, which met on July 29th and sat until August 5th. The Italian situation was only one of the matters discussed, but this was determined first.

It was decided that the German forces in Italy, including Sicily, would retire without delay to the rear of the Tuscan Line, regardless of Italian wishes. The Tuscan Line would be defended—with the aid of the Italians if they remained faithful to the Axis or without them if they failed (which was considered possible, and by some as probable).

As no Italian was present at this conference, as soon as it was over the German Foreign Minister (von Ribbentrop) flew to Italy and on August 6th met the Italian Foreign Minister Guariglia at Treviso. Guariglia opened the interview by stating that Italy could not go on with the war. She wished to retire, but in an honorable way. He requested Germany to release Italy from her obligations as an ally. These are defined in the treaty signed at Berlin on May 22, 1939, and provide that no party to the treaty will make a separate peace or armistice.

Among Sicilian booty was this Italian Ansaldo 90/53 gun, Model 41, which in 1942 had been mounted on a Lancia heavy-duty Diesel-powered cargo truck.

Von Ribbentrop refused to grant authority for an Italian withdrawal. Germany had stood by Italy when she had been in trouble in Greece, and in North Africa for over two years. It was up to Italy to make good and now stand by her promised word. He then stated that no matter what Italy might do, Germany would occupy the Tuscan Line; and that her troops in Sicily would withdraw from there as soon as practicable and retire to north Italy, even if they had to fight their way up the entire length of the Italian peninsula.

Guariglia seems to have accepted this German decision in a rather hopeless manner. Neither he nor his government liked it, but they did not see how they could otherwise solve their problem. The situation was complicated by Allied bombings of the industrial cities of Milan, Turin, and Genoa. As had happened in Rome, the city peoples cried and demonstrated for peace. There had long been a strong Communist element in Milan, and they took advantage of the disturbances to agitate against the monarchy. Rioting occurred, with demonstrations against the Rome government.

The day after the Treviso conference the German Chief of Staff (Gen. Keitel) arrived in Italy. The Germans quietly but firmly began to take over north Italy. The Rome government appears to have acquiesced. At date of writing it appears to fear the organization of a Republican and separatist movement, and may be glad to have the support of the German army.

THE PLAN FOR WITHDRAWAL

Gen. Hube received the order to abandon Sicily, with combat equipment, in time for him to issue his first order on August 1. He was advised that German naval forces would be sent to assist him, together with additional air forces and possibly AA artillery. These additional forces did not all arrive until the 13th.

Batteries were placed on the mainland from San Giovanni to Punto di Pellaro, and on Sicily from Punto del Faro to Santa Teresa di Riva, to drive off both naval and air forces. As there is considerable semi-tropical vegetation in this area

this was accomplished without attracting the attention of the Allies. The German Navy furnished a screen of motor torpedo boats in front of the exits to the Strait of Messina. Italy furnished air forces, particularly torpedo planes, and a strong air umbrella was formed.

The principal place of crossing selected was from Punto del Faro (Lighthouse Cape) at the north entrance to the strait, across to north of San Giovanni. This is about 1½ miles. The cape is connected to Messina by a good road and a trolley line, both continuing down the north coast to the Milazzo area.

The Navy furnished a number of Seibel ferries, which may have been improvised. These consist of two pontoons with a stout deck over them. They were of considerable size, Diesel powered, and carried armor protection and AA guns. On each trip they were able to move a battery, 500 infantrymen, or a similar unit. Their speed was 9 knots. Allowing time for loading and unloading, they could make at least 10 to 15 round trips a day. A large railroad ferry boat arrived on August 13th; it was large enough to carry the heaviest loads. There is no information as to where the German Navy found this boat.

Self-propelled barges, motor boats, and even row boats were used, sailing directly from Messina and vicinity and along the north coast from Milazzo. At one time on the 12th, air photographs showed 55 vessels engaged in crossing the strait. In view of this amount of water transportation, which operated day and night, and the air, ground, and sea protection afforded, the evacuation apparently proceeded according to plan.

Withdrawal of German troops on land toward the embarkation area was favored by the terrain. The Germans were holding the northeast triangle of Sicily, with the Allies at the base and the evacuation proceeding from the tip. As the size of the garrison decreased the base was moved backward, decreasing in length and so requiring fewer troops to hold it. The country was mountainous. Major enemy attacks were confined to three routes, one each on the north and east coasts and one around the west side of Mt. Etna. The intervening areas were so impracticable for vehicles they only needed to be lightly held. It was an almost ideal situation for a withdrawal.

U. S. artillerymen fired directly over Castel di Tusa from the lee of that village.

END OF THE SICILIAN CAMPAIGN

The period commencing August 7th is characterized by a lack of severe battles. The Germans had already begun their withdrawal, and had no further interest in holding ground except as necessary to cover their rear elements. As there were but three routes open to the Allies, extensive demolishments were made along them. Batteries, machine guns, and mine fields covered these to prevent detours and delay removal of the obstacles.

Not yet having discovered the German plan, the left of the British 8th Army and the Canadians attacked northeast from Centuripe toward Aderno (Adrano on some maps) on the 7th. Immediately after midnight an artillery preparation was fired by 45 batteries; it continued until 0330 without arousing any enemy counter-activity. At 0330 the infantry jumped off from a line 2 miles from Aderno, preceded by a rolling barrage which advanced 100 yards in 5 minutes. About 0500 the attack reached its objective. No enemy had been noted. Later, after dawn, enemy machine guns and mortars opened fire from positions about 3 miles to the north. Demolitions covered their front. On this day the British also occupied Biancavilla without opposition.

The Allied Air Force noted unusual water activity around the Strait of Messina, but the nature of the traffic does not seem to have been identified. The ferry terminal at San Giovanni was once more bombed with a view to interrupting the water traffic, whatever it might be. The German debarkation point was not at San Giovanni, however, but north thereof, and does not appear to have been bombed.

Next day the British reached the line through Belpasso, Trecastagni, and Acireale, meeting only minor resistance.

During the night 7/8 August the U. S. Navy landed an amphibious force on the north coast, southwest from Cape d'Orlando. This was unopposed, and resulted in capturing 300 Germans who were in the vicinity, and later 1,200 Italians. The expeditionary force then proceeded westward to attack the rear of the enemy's line opposed to the main American body. The enemy avoided a conflict by taking an alternative line of retreat, and made good his escape. The left of the 7th Army moved forward to San Agata di Militello.

On the 9th the Americans made a strong attack along the north coast. The enemy was found in position on a small stream east of Santa Agata. All attacks to drive him out failed. In the center, the British reached Bronte without important fighting. The Canadians were withdrawn from the shortened line.

August 10th, the Allies attacked along all three lines of approach. The British Navy aided the advance along the east coast and the U. S. Navy that on the north coast, by firing on enemy targets as indicated by shore liaison officers. Only slight advances were made.

A new amphibious expedition was debarked by the 7th Army, before daylight of the 11th, on the north coast near the mouth of the Naso River, over 8 miles in rear of the enemy's main line of resistance. This expedition met opposition from the start. The enemy was right near the landing place, on top of bluffs overlooking the beach. Part of the troops were unable to land. Those that did were considerably dispersed. They divided into detachments. One went inland and reached the bluffs, the other covered the beach and forwarded ammunition. The Navy furnished artillery support, and the Air

Force good overhead cover. Notwithstanding this aid, the troops ashore were pinned to their positions.

About 1800 the Germans launched a coordinated double counterattack from west and east, supported by armor, planes, and artillery. The OPs within the main American lines near Santa Agata could partly observe this fight, but were too far away to do anything about it. The amphibious force had severe losses, and when night came only a remnant remained. These dug in in the hills.

On the 12th both Americans and British met strong resistance from enemy infantry and 88-mm batteries covering road blocks and other obstacles. The left of the Americans were unable to advance, but the right (together with the left of the British) arrived within 4 miles of Randazzo. The right of the British were 3 miles south of Giarre.

It was definitely determined, this day, that the enemy was evacuating Sicily: it was estimated that 125 enemy batteries were covering the Strait of Messina; the enemy air umbrella was stronger and more efficient; and his naval screens of motor torpedo boats were most active. Air photographs showed extraordinary activity in the Strait, about 80 vessels (from large railroad ferries down to small motor boats) being counted, including 15 Seibel ferries.

August 13th it was found that the enemy had made another withdrawal. The 7th Army advanced along the north coast to the Naso River, rescuing the survivors of the amphibious expedition. They then went on to Brolo, while the right entered Randazzo. The British right reached Giarre and Riposto. There had been practically no resistance.

Without further fighting, other than minor actions around road blocks and demolitions, the advance reached

on the 14th, the line Oliveri — Montalbano (exc.) — Linguaglossa — Piedimonte.
15th, Castroreale—Francavilla—Taormina.
16th, Milazzo—San Teresa di Riva.

On the 17th, at daylight, Messina was entered. The German commander (Gen. Hube) had left the embarkation point, with his last detachment, at 0600.

COMMENTS

1. On July 10th, when the invasion of Sicily started, the Axis commander was stated to be the Italian Gen. Guzzoni, commanding the Sixth Army. In addition to about 4 Coast Defense Divisions, which had little or no tactical transportation, there were about 4 Italian line divisions (infantry) and 2 German Panzer divisions. The Germans were later reinforced.

The beaches and configuration of Sicily are such that an invasion would probably land on the south and east coasts, as pointed out on page 512 of the *Field Artillery Journal* for July, 1943. No matter where the invasion might be, the best place for the defenders would have been the center of Sicily, around Caltanisetta and Castrogiovanni (Enna). A vigorous offensive against the invaders before they had consolidated beach heads, from this central position, would have promised the best results. However, the Italian general made but limited attacks on the first two days only.

The reason for this lack of energy appears to have been that many Italians deserted and many others surrendered. There was some dispersion of Italian forces, which further contributed to a general disorganization. Within 10 days the Italian Sixth Army ceased to have a combat value.

2. The Axis command thereupon passed to the German Gen. Hube. His German troops had been increased to the equivalent of about 4 divisions. This was too small a force for an offensive, and he selected a defensive line which he held down to August 6.

Whether the German withdrawal from Tunisia and from Catania was voluntary and in accord with the German plan to withdraw, or was compelled by the Allied attacks, is not yet known. The Germans held the line long enough for their purpose, however.

3. From the German point of view the withdrawal from Sicily was a strategical defeat but a tactical success. The official German communique states that there were withdrawn to the mainland

10,000	**vehicles,**
350	**guns,**
78	**tanks,**
17,000	**tons of ammunition, gasoline, and supplies,**
4,000	**wounded, and several thousand American, Canadian and British prisoners.**

An unofficial German report states that the total personnel withdrawn was 65,000. No German prisoners, sick or wounded, were taken at Messina. The number of tanks and guns saved indicates that a large number had been lost in the fighting in Sicily.

4. The escape of the German garrison, practically intact, is to be regretted. But this should not detract from the broader viewpoint, that the Allies, within 39 days, captured a 10,000-square-mile island of considerable economic and military value to the enemy, and which will form an excellent base for future Allied operations.

THE WAR WITH JAPAN (July 20 to August 20, 1943)

THE SOLOMON ISLANDS

At the beginning of this period, American Army and Marine Corps troops had been landed at two places on New Georgia Island, one of the Solomons. The main expedition had landed near Zenana (6 miles east of the Japanese base and airfield at Munda), the other 4 miles northeast of Bairoko Harbor (held by the enemy, and 10 miles across very rough jungle north from Munda). The Japanese had still another base at Vila (on Kolombangara Island, just northwest of New Georgia), about 10 miles across water from Bairoko Harbor. The U. S. Navy and Air Force were patrolling this intervening water to intercept enemy attempts to reinforce or supply either Bairoko Harbor or Vila. Munda and Bairoko had been invested, and their seige was being actively prosecuted. No attack was being made on Vila.

On the night of 19/20 July a Japanese amphibious expedition approached Vila, and was intercepted by our air force. As near as could be determined at night the enemy lost 3 out of 9 cruisers and destroyers and 1 out of 2 transports, at the cost of 4 of our own bombers. None of the enemy appear to have reached Vila.

Strong bombing attacks were made almost daily against the enemy at Munda and Bairoko. Particular attention was given to bombing enemy batteries. From 60 to 180 tons of bombs were used per set of targets. Due to dense jungle, the exact effect was not determined. Ground troops attacked daily, but on an average gained only 100 to 200 yards a day.

On July 30th the Japanese counterattacked, and encircled a battalion out on our right flank. This delayed the advance two days, for it took that length of time to disengage the surrounded troops. When relieved they had had many casualties and were out of rations. At this date, the advance had made only 150 yards in four days.

The dense jungle made it extremely difficult to coordinate movement or locate targets. Groups of men went off, and

eventually ran into a similar enemy group. Then followed an individual and isolated battle, sometimes involving hand fighting. Men infiltrated into enemy territory and enemy groups infiltrated into our areas. A zone existed, with a mix-up of Japs and Americans engaged in a multiplicity of small fights.

The Americans had tanks, but in the jungle they were not very useful: they frequently bogged down or got lost. Our artillery had very few OPs, and even from these targets were seldom seen. The infantry was much on its own, although every possible aid was given it.

On August 1st, the advance on the left found more open country bordering the beach, and gained 500 yards. Continuing this advance, by the 3d the Americans had arrived at the Munda airfield, the enemy then retiring to the far side. This brought the battle out into the open for the first time.

The artillery found a suitable OP on a nearby hill and shelled the enemy vigorously. Our Air Force aided. With this assistance the infantry did better; pushing straight forward it forced the enemy back, and entered and captured Munda on August 6th. The Japanese were exterminated. No prisoners or wounded were reported as taken, but 1,671 dead Japanese were counted.

Attention was now turned toward Bairoko Harbor. As this paper closes, it has not yet been captured. Jap air losses have been very large.

NEW GUINEA

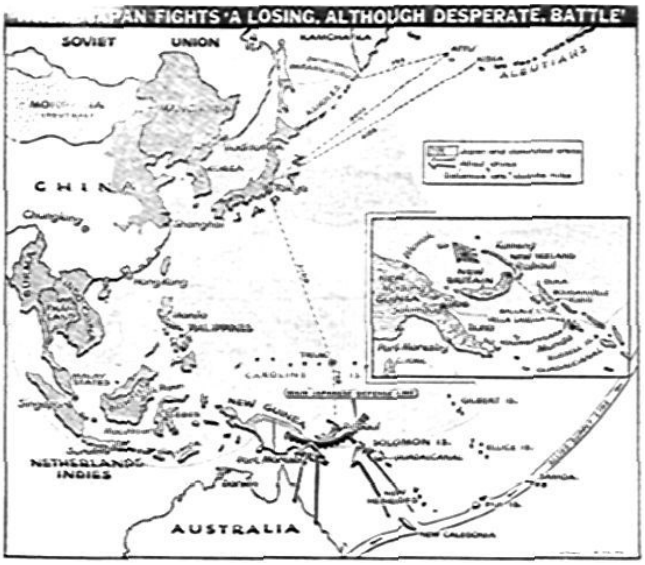
The campaign by air and land against the enemy around Salamaua has gone steadily forward. Selected targets around this place have been bombed, sometimes day after day by from 60 to 190 tons of large bombs. According to air photographs, every village in the area (and every other discernible target) has been utterly demolished. But the enemy is holding, although he has been driven back and our ground troops are slowly driving the Japanese out.

NORTH PACIFIC

The Japanese have abandoned this area. They accomplished their withdrawal from Kiska, the last base they held in this sector, at a date and by means not yet ascertained. What has been described as the greatest naval armada ever seen in the Pacific arrived off Kiska during the night of 14/15 August. Kiska was heavily bombed and shelled, following which the Navy fired an artillery preparation. U. S. and Canadian troops then debarked at several places. The island was found to be deserted—the enemy was gone.

What appears to have happened is this. Our naval communiques show that for some time Kiska has been shelled frequently by heavy naval units, in addition to the former light naval forces. The obvious explanation for having major naval forces in this area would be to protect an expeditionary force against similar Japanese naval forces. The daily bombing and shelling of Kiska, coupled with the fact that there was no other objective for our forces in this vicinity, pointed to the coming attack. The enemy may have also observed the armada through air and submarine reconnaissance.

So far there has been no explanation as to why our reconnaissance failed to even suspect the withdrawal from Kiska of the estimated 10,000 men.



GENERAL

Air reconnaissance over the Netherland Indies between May 15 and August 1 shows a noticeable increase of enemy activity in Timor, Java, Celebes, and Amboina, and a decrease in New Guinea, New Britain, and the Solomons. No naval vessels larger than a light cruiser were seen. The American destroyers scuttled in Java in February and March, 1942, to prevent their falling into enemy's hands, were observed, reconditioned and in use. Major naval bases are functioning at Singapore and at Soerabaja (on Java). The great dry dock at the former British naval base at Singapore has been raised, and must be presumed as already in use or shortly to be so.

On August 1st, with appropriate ceremonies, the Japanese Lieut. Gen. Mazigazu Kawabe, commanding in Burma, officially discontinued the military government and announced the complete independence of Burma. The new Burma Government thereupon signed a treaty of alliance with Japan, and declared war against the United States and the British Empire. This move should not be taken lightly. The Burmese are raising troops, and they can be expected to appear in line shortly.

Mr. Sun Fo, President of the Legislative Yuan at Chungking, has filed an objection to depending on reopening the Burma road as the means of saving China. The proposed campaign against Burma, even under favorable circumstances, will take all of the coming dry season, ending in May 1944. The Burma road can not be used during rainy seasons, and even if repaired will not be available until November 1944. The Chinese armies require 1,000,000 tons of supplies to equip them on a par with the enemy's armies. The capacity of the Burma road is only 200,000 tons per annum. Even if only half the estimated quantity of supplies are sent, it will be 1947 before Chinese armies will be able to undertake a major offensive. By that time China (as an independent state and ally) may no longer exist.

Mr. Fo thereupon proposes that main reliance for the war against Japan be placed on other lines of advance, to include southward from the Aleutian Islands, westward from the Hawaiian Islands, and northward from the vicinity of New Guinea.

Forward Observation in Africa

By Lt. Richard D. Bush, FA

The first day of action at Kasserine Pass marked the beginning of my tour of duty in the role of Forward Observer of the PHth Armd FA Bn.

Having been ordered to report to the commander of a tank battalion, I left the bivouac an hour after dawn and made my way with half-track and peep through the pass and out into the broad valley that approaches Kasserine Pass. The tanks were plainly visible a few miles to the east, so leaving the half-track I started forward in the peep. Proceeding cautiously and taking cover and defilade in wadis or rises in the ground, which were the only cover in the valley, I was suddenly startled (remember, it was my first day) by the appearance of 6 Italians coming toward us carrying a white flag. We herded them to the half-track and sent them back to the S-2.

Prisoners out of the way, we again went forward to the tank position through a comparatively quiet battlefield, and I reported to the CO. Nothing was in the wind, our mission being simply to hold. Base points and check points were registered in to the rear of my position, which made me wonder if it was always like that. "If so," I thought, "it's no wonder they have the standing joke of the poker table, 'no credit to forward observers.'"

High velocity guns and tanks began to shell our position, and that was the first time I realized that a tank would be a convenient thing to have. We moved from place to place dodging shells. Several guns were spotted, but our batteries could not reach them nor could they displace.

Darkness closed in and the tanks, our tanks, began to withdraw. About that time an order came over the radio for the forward observer to push forward and find the front lines. A displacement of 500 yards did the trick for me, and I was "sweating it out," in the language of the ranks, till I got word that one battery was displacing forward to shoot at the "fleeing enemy." Tanks and trucks had been retreating all day by infiltration but now it was impossible to see them. I could hear the enemy working around in front of me in vehicles of some sort. Suddenly a beautiful display of enemy signal flares or rockets lit up the ground already slightly illuminated by two burning vehicles a few hundred yards in front of my position. The CO asked for my position by map coordinates to get range, deflection already being taken care of by the convenient steady stream of enemy rockets. I was to get one air burst, sense it carefully, and go into fire for effect. This burst was easily seen and sensed in the darkness, and fire for effect was started. The flares, probably from a reclamation crew, ceased for the rest of the night. The CO directed the fire up the road through the valley by map data. The effect, as seen the following day, was really good: guns, vehicles, equipment of various kinds, and evidence of casualties were still there.

Sherman tanks advance through open country, toward Kasserine

One excellent lesson learned from the experience was that the use of flares or rockets in the initial stage of artillery adjustment is strictly and definitely out! The enemy artillery observer, machine gunner, or sniper will invariably go after an OP. Firing a rocket is Method No. 1 of giving away one's OP. Other methods follow.

The following days at Kasserine were uneventful, the only resistance being intermittent shelling by a lone enemy battery of around 75-mm. Once again I established an OP, this time ahead of the tanks, but unfortunately they pulled up to my position later. Again they were shelled by the invisible battery, but this time an enemy slit trench saved me from any uncomfortable feeling. The tanks pulled back, and that was the last enemy shot fired in Kasserine valley.

Sened and Maknassy brought a different kind of support. In the last advance on Sened from the north I was assigned to an armored infantry battalion. In an all-night meeting before the attack it was decided to walk the whole distance. My sergeant and two other men accompanied me, carrying the two halves of our radio plus two extra batteries. Incidentally, in long sieges on inaccessible OPs it is absolutely essential that spare radio batteries be carried, even if it means leaving guns or food behind; at least four extra sets should be carried in each of the forward observer's vehicles.

In this advance my section walked in the middle of the leading company, stopping at good points of vantage and then catching up when the troops stopped to rest. Only one preparation was fired; it caught the enemy flatfooted and chased him out, so no resistance was encountered in reaching the objective.

Here again, as in each battle, a new lesson was learned—carry

In the August *Journal* Capt. Casey reported on forward observation on Guadalcanal. In equally fine fashion, Lt. Bush takes us through the North African campaign. Operating conditions of these two officers were immensely different, yet their conclusions are identical: live with the infantry, live like the infantry; carry what the infantry does, neither more nor less; wear the minimum of clothes, carry a minimum of arms and ammunition, take "D" rations for several days.

what the infantry carries, nothing more or less. Wear the minimum of clothes, carry a minimum of arms and ammunition, take no "C" rations but enough of "D" ration to last for a couple of days, and lastly be sure to have one blanket and a rain cape. My section had the unfortunate experience of having to stay on the hill, which was our objective, all night long without blankets or means of keeping warm.

The advance with the infantry in half-tracks, on through Maknassy, was uneventful. I used the peep as a method of transportation, which is very satisfactory with half-tracks. The peep was my choice of transportation all through the Tunisian campaign, and proved to be the best choice in the long run in all cases but one, which will be mentioned later.

One afternoon we made our way toward the eastern range of mountains where most of the battle took place. We picked up a few targets—mostly scattered infantrymen—and fired on them. Toward dusk an infantry combat team went into position on our left. Immediately a battery, flashes plainly visible, opened fire on them and caught them in the open. I at once called for a concentration that we had previously shot-in in the vicinity of the battery. With amazing rapidity the friendly fire fell on the enemy battery, silencing it. It was then that I realized another valuable lesson had shown itself. Always, whenever at all possible, shoot-in and record all possible enemy gun positions, OPs, lines of approach, centers of resistance, and supply points. These concentration numbers have proven invaluable on numerous occasions.

Later the same night I was ordered to report to and support that same combat team. We jumped off at 2330 hours to take some hills on the right of the main road. Being a line outfit, the infantry went on foot entirely, but I made the mistake of taking the peep for a short distance. The CO requested that I stay near him or a company commander at all times—a more or less free rein, and good judgment on his part. Supporting an outfit whose CO insists on your presence at all times is not impossible, but is not efficient or desirable (proven by experience).[1]

A few hours later white tracers from machine guns and rifles pinned us down. Fire came from the vicinity of that same old battery so an adjustment on the gun flashes was made with smoke shell and fire for effect silenced them. As flashes appeared on other parts of the range of hills, the concentrated fire was shifted time and time again to allow the infantry to reach their objective and dig in. Dawn saw the beginning of a two-day siege on "Machine Gun Hill." Continually, during the day, machine guns, snipers, and enemy artillery and mortars pounded us. Every time one would raise his head a bullet would whine by, making observation difficult. That was another lesson in the war college. Never get into the thickest part of the forward line of friendly infantry to observe fire. A "pinned-down" observer is of little value.

This is the way we worked: the other FO was on the radio in a foxhole on the reverse side of the hill, supposedly defiladed. I crawled to the hilltop, using a foxhole dug by an unfortunate infantryman. I relayed by voice to the radio such missions as "enemy guns," "machine gun nest," "precision fire," until a machine gun bullet knocked out the radio. It was impossible to leave the hill to go back because the open field to our rear was effectively covered by machine guns and artillery. After seeing several troops try it and die, we decided discretion was the better part of valor and waited till darkness to replace the radio. In spite of the newly acquired knowledge, I returned to the CO on the hill and went through it again the next day. Our fire was laid down on the same type of target, but again that day the objective could not be taken.

After a day of rest I was assigned once more to the armored infantry on the left. The first day I had a fine OP, free of infantry, and picked up several targets including a battery of four 88s. They were close together in a draw to my left rear. A converged battery sheaf knocked them out of position, and some guns were towed out to another position where again we fired on them, chasing them far out toward Gabes.

That same day Method No. 2 for losing an OP was discovered. We had received very little fire all day, having defiladed the radio aerial and used voice to shout down to it. Then, I couldn't believe my eyes, an infantry company commander came striding erect up the skyline to the place where I was lying! About 30 seconds later a tank opened up with direct fire, shooting about 6 rounds per minute at the very spot where we were. He started with air bursts, all of which were slightly over us in the valley to our rear. Next came HE, which fell closer but still 60 or 70 yards behind us. Then came armorpiercing slugs, slapping into the forward slope and hitting to the left and right of the rock we were hiding behind, showering rock all over us. I believe we can thank lack of ammunition for our lives there, for certainly some time shell or high explosive where the armor piercing projectiles hit would have done some good. The officer apologized and left quickly, not standing erect or breaking defilade. How many times that same thing has happened! It's hard to shout at a colonel or anyone over the rank of lieutenant without sometimes getting into a bit of trouble, but something must be done. The expendability of lieutenant forward observers is duly recognized, but their mission is worthy of consideration!

The following day it was necessary to take up a position in the foremost wave of infantry. Unfortunately I was located between two machine gun positions, but it was the only place where necessary observation could be gained. Enemy artillery was not active, and only once (when snipers got on hills on both flanks and even behind us) were we uncomfortable. During these counterattacks close-in adjustment was necessary,

The author says:

"These experiences are written exactly as they happened, with no attempt to include the smaller details or interesting experiences not directly concerning forward observation. They deal with and apply to general situations—ones that might happen again in future campaigns. Discussions of my experiences in crawling to and from OPs to escape observation or enemy fire, using various tricks and camouflage, dodging shells, bombs and bullets has been omitted in part because these are special situations and never will be the same. Common sense plus a few lessons learned the hard way will qualify a forward observer to cope with these problems."

[1]The FO must seek the observation from which he can observe the action for a specific infantry unit. He should not be with the infantry commander, necessarily, but often the terrain will place the two together. The infantry must know the location of the forward observer if the latter is not physically present with the infantry, if the infantry is to have adequate and timely artillery support.—Ed.

Tanks, half-tracks, and jeeps of the artillery in the combat zone just south of El Guettar after the Allies recaptured Gafsa.

and I discovered that time shell could not be used; dispersion caused too many short bursts which would endanger friendly troops. Having perfect lateral observation only 300 yards away from the attacking Germans, I could plainly see both sides and the effect of the artillery. The counterattack was beaten back, the artillery killing several and our infantrymen taking some prisoners. Later in the day three PzKw VI tanks stormed the foot of our hill with the obvious intention of firing on our lines. With a previously shot-in concentration, we fired a battery converged on them. It forced them into defilade, but at least they could no longer shoot at us. One of the tanks was still visible so I adjusted precision fire on him. He was never hit effectively, although many rounds from the single gun hit near him and finally drove him too into hiding. It almost seems that dispersion continually acts in the enemy's favor in continued precision fire—all shots are just over or just short! Most of the direct hits on vehicles that I have obtained have resulted from a lucky guess in the initial adjustment or the 4th or 5th round of precision fire. If on a worthy precision target dispersion works against the completion of the mission, and the target is capable of moving, a platoon or battery converged sheaf could well be tried.

I lifted the fire from the tanks and the battlefield was perfectly quiet for some time. Suddenly, from one of our previous concentrations (number 48, I remember) a battery of small caliber, 50- to 75-mm, opened up with a "battery one round" on our position. Before that battery could fire again our whole battalion laid a concentration directly on the position without a single adjusting round. Once again I was sold on fire direction center and recording and numbering concentrations. That enemy battery was definitely destroyed. Incidentally this battery, too, was crowded together—all four guns were within a 30- to 40-yard circle.

One or two more days of firing the same types of targets followed, then we were relieved and sent off to El Guettar.

This was my first experience in support of reconnaissance. In a peep as usual, I tried to keep track of progress but finally got separated from the company I was with. Artillery and mortars were the only signs of enemy activity so far. The recon has a habit of running into the fire, then turning around to go somewhere else to see how resistance is. Wanting to locate the enemy guns, I found a small hill in the near vicinity and unsuccessfully tried to locate the batteries. Soon I again pushed forward to the tank destroyer positions. As the plan was to have recon out ahead of the destroyers, I forged out ahead of them on this assumption. I got up on a small rise and started to walk around it when suddenly a machine gun chattered from not over a hundred yards away. I dropped and crawled behind the hill to the peep. We waited a few minutes, then took off at 60 per, zig-zagging as we went. Once I misdirected the driver, so we came out of defilade and once more got the chatter and whine, but the driver (who is now probably the best dodger of bullets and shells in the army) made a quick turn and the slugs missed us once more. Moral: Don't trust that which has been previously arranged; know what is going on at all times!

That night I was assigned to direct support of an infantry division infantry battalion. Finally I talked the CO out of keeping me continually at his side, where observation was impossible, after promising to return every few hours to keep liaison. From a hill on the left I was able to definitely destroy an 88-mm being towed into position, by use of a converged platoon sheaf. Several targets—such as infantry, machine guns, and two harassing tanks—were neutralized. I returned to the CP in time to be shelled by a battery of 150-mm howitzers which knocked out my second radio, this time in the half-track.

Next day was one of precision fire, working over built-up dugouts and gun emplacements on the enemy strongpoint. Precision worked beautifully, and direct hits were scored. In one instance pieces of an antitank gun flew high into the air and men scattered like leaves. The same happened to an OP and then a machine gun. Snipers and the same 150s were the only dangers on that day. An effective preparation was fired, one that pleased the CO greatly, but at the zero hour the attack was called off.

Once more I was ordered to support the armored infantry. Patrol activity was the order of the day; so then, were targets of opportunity. It was one of those days—I moved from OP to OP; the enemy having an open season on artillery observers, shelled each and every one thoroughly. Consequently few missions were fired.

Next day I went, before dawn, to a very high peak where I was to have the best observation of my life. This OP was absolutely invisible, though on the forward slope, and was too high for even the most ambitious to visit. I could see all of our own territory, the front lines, the enemy front, and back into his supply lines far to the rear. Many targets were observed far out of range of even our 155-mm guns.

The first target was the much-hated battery of 150s. It

made the mistake of firing just after dawn, and its flashes were plainly visible. It had raised so much hell for so many days that it has the rank of my favorite target, by far. A battalion concentration applied squarely in the center of the area silenced and, I am willing to bet anything, completely destroyed it. No 150s fired at us during the remainder of the El Guettar campaign.

Targets of small antitank guns, four tanks, infantry, and many vehicles on the right flank at maximum range presented themselves. Adjustment was easy from such a high OP, and the fire proved effective. No tanks were destroyed, merely chased away to the rear, but some vehicles were hit. The following day I was called down from my grandstand seat to act as a forward observer and go with the commander of a company which was having trouble with machine guns.[2] The nests were observed and silenced, and targets were scarce from then on. A tank had spotted my walkie-talkie aerial (which I had indiscriminately flicked around) and started throwing HE in around us. Every shell seemed to hit my slit trench, but all that hit me was dirt. He did get my third and fourth peep tires and my third radio, this time my walkie-talkie. The tank was never observed. A team of two FOs, one of us in the high OP, would have been invaluable at this time. That was a system we later worked out.

The day of the tank charge came, and once more I had the high OP. The whole battle was like a small picture in the valley. Our tanks attacked in waves. Enemy tanks (invisible to anyone on the ground) came to meet them, turned, and went down the main road to a position to the right and in rear of our tanks. Only effective and concentrated artillery fire from several battalions kept them from taking a heavy toll of our tanks. I tried to get word to the rank battalion CO where they were, because even two or three from the whole battalion of tanks could have cut off those six Jerry PzKw IVs. However, they withdrew through heavy artillery barrage and went into cover. That was the end of organized resistance in the El Guettar sector.

Communications from the high OP were excellent throughout. I could reach every station, and acted in the capacity of relay station all the time I occupied this spot.

Still supporting the armored infantry, we moved into the valley toward Mateur. For two weeks the missions were always "Attack and hold the next djebel." The first attack started early in the morning. I was with the Bn CO of the infantry, on foot carrying the radio. We moved by jumps. When the infantry reached a point of vantage my section would move up to it. The process repeated twice, we moved up to the objective which the infantry had reached by this time. Mortars and small-caliber high-velocity guns were giving them hell from the front and left flank. I decided to move to the forward slope of the big hill so as to observe the guilty parties. And an enlightening experience it was! In broad daylight we reached the enemy side carrying radios (which must have been obvious to Jerry). No sooner had we set up the radios when a 47- or 75-mm gun opened up on us. The first shell was just over, and we hit the dirt. The second hit about five yards behind us, the base spray slapping some splinters into the back of my neck. A few more shells very close, and a perfect bracket, made us decide to vacate the lovely OP. We did so without further casualties. It's recommended that an FO never try to set up an OP on the forward slope in daylight, but at night forward-slope OPs can be dug in and camouflaged; in fact, they prove much better than any other type, except where withdrawal may be necessary.

The next day most of the fires were preparation fires on more djebels which were taken fairly easily. Night adjustments using smoke shell were quite often necessary. In adjusting at night smoke must be used, but even then adjustment is impossible without having first seen and thoroughly studied the ground on which the adjustment is made; the best map readers cannot imagine the ground as it actually is.

In this valley defensive fires were habitually registered in around dusk. Every likely avenue of approach and counterattack was given a concentration number, and this number passed on to the infantry commanders. More than once these defensive fires were used, and used effectively.

The stable situation of Hill 315 and "Question Mark Hill" was the next phase. I shared two OPs with other FOs. One of them, the lower one, was within shouting distance of the infantry battalion CO's radio. The upper one was a German "T" trench on a hill crest, perfectly camouflaged. One of the forward slope OPs (the best one by far) I also used in this battle. It was perfectly camouflaged by green foliage, and so invisible that it was hard to find each day. Naturally I couldn't enter or leave it by daylight, but was in constant communication with the infantry CO by means of the other FO's radio: the other FO had a telephone run to his upper OP from that radio, which was near the infantry CO.

Many preparations, and fires on machine guns, infantry, and OPs, were fired, but the most interesting were the days of enemy counterattacks.

We saw a small battalion of infantry approaching from the right flank, but weren't allowed to fire because their identity was unknown. Soon, however, they attacked in force. For hours we laid concentrations on them till the whole valley was a mass of concentration numbers. I definitely saw enemy being killed by our shells. A shell would burst among groups of from two to five men and literally tear them to bits. Either well disciplined or fanatic, they kept coming and they kept dying. The infantry gave us full credit for repelling the attack.

Then came an example of perfect coordination between artillery and infantry. The infantry was ordered to take the "Question Mark Hill," and their CO asked for a close artillery screen to advance under. First a preparation was fired. Then came the rolling barrage. As the preparation lifted the infantry came near the foot of the hill. When the next volley hit they fell flat, then got up and ran into the smoke of the bursts. The advance continued fifty yards at a time till the objective was taken. The 200-yard safety limit was disproved by the trusting infantry, who didn't keep back 200 yards, nor 100 yards, but only 50 yards from our fire! The battalion CO said, "You know, we only had two casualties in taking that hill, and they were slight wounds from our own artillery fire. Hell, the boys don't mind that — they think it's kind of friendly."

After reaching Mateur I was assigned to a tank battalion. Observation was difficult from the flat plain looking toward the enemy who had the hills. The day before I went with the

[2]This illustrates that the close support for which an FO is provided can be furnished only if he is in intimate contact with the supported unit. On his "grandstand seat" Lt. Bush was actually manning a battalion OP, not acting as a FO.—Ed.

tanks, there was a day of free-lancing. The eight-story granary on the edge of town furnished a beautiful OP, but it was too far to the rear for the next day's action, which needed close cooperation between the artillery and the tanks and infantry. The best OP I was able to find was a high tree in a grove. As the tanks went forward, artillery was laid on various calibers of antitank guns. The tanks failed due to a minefield, and also the fact that too many AT guns had as yet remained undiscovered. The rest of the day was spent adjusting time shell on dug-in infantry. Precision fire using HE, fuze delay, was also used, and several dugouts were evacuated. One sniper got in too close and a large mortar began to get our range, so we left the OP to take up another one.

Method No. 3 of losing an OP was then enacted. We had been firing off and on at infantry and AT guns when a tank destroyer CO came to the OP, set up a large 88-mm gun telescope out in the open in front of us, and began to point out targets. Deciding the artillery wasn't getting enough hits with precision fire he brought an M-10 down to within 40 yards of the OP. The combination of these two actions resulted in a beautiful enemy adjustment which chased us out once more. I'm thinking of using one man in my section to snipe at all rank coming to visit the OP! Since rank is not expendable he would necessarily miss his mark, but perhaps the bullets would prove a discouraging factor to misguided intentions.

Late the following day the tanks attacked. The artillery battalions were to team up and put down a covering barrage for their advance. Their observers, plus a division artillery officer acting as a coordinator, were on the ridge over which the tanks jumped off initially. The artillery screen effectively neutralized all AT guns and allowed the tanks to reach their objective.

In this action it was necessary for a FO to go with the tanks, but since the enemy infantry were still dug in around the objective it was impossible to go in a peep. The tankers, when they spot machine guns or dugouts, throw hand grenades into them, so one can see that accompanying them in peeps would be rather rugged. Consequently, an observer who had a tank went along with them to give them any fire needed after reaching the objective. During the whole attack we stayed on the ridge, where we had good observation and could better support the attack itself. The value of a cheerleader, as it were, to coordinate the fire of all battalions, was definitely proven here by the success of the attack.

Two days later another in which the tanks gained seven more miles took place. The tanks themselves knocked out many high velocity guns, but we had opportunities to shoot at some of them. Gun flashes were clearly visible on this cloudy day. I adjusted the 155-mm guns on an enemy battery in an orchard; four hours later, on reaching the position, I found that a direct hit had been obtained on one gun.

Two more days of advance and the Tunisian campaign ended. I was travelling in a peep, the only "soft-skinned" vehicle with the tanks; after those two days I definitely decided that when advancing with the tanks it's absolutely essential to be in a tank. Observation may be impaired, but when the CO demands your immediate presence at all times, something has to be sacrificed. A peep is by far the best transportation when advance with the first or second wave is not necessary. In hilly country, however, one must be with the forward wave continually.

155s ON "THE CANAL"

In the March issue of THE FIELD ARTILLERY JOURNAL, I came across "Notes on Artillery in Recent Operations." Having just returned from Guadalcanal, where I was the instrument sergeant with a 155-mm howitzer battery, I can appreciate the importance of the "notes"—they were very much apparent in our own battalion while in combat. I would like to add a few additional observations.

Each gun section should be sufficiently trained that it can be split to operate as two crews. This requires that there be at least three men on each section who can efficiently operate the sights. It would have been impossible to operate at times if the gun crews hadn't been able to work in shifts so that one half could rest while the others carried on.

Manuals state that three shells per minute is the maximum for a 155-mm howitzer. In combat and under pressure, our gun crews got out six and seven rounds per minute by the use of short cuts. Nor did we suffer any injuries as a direct result of this speed.*

Each battery should be able to operate as a fire direction center on instant notice that the battalion FDC has been put out of commission. This requires that each firing battery have a CP (blackout) tent, get a copy of all maps and firing charts, keep these charts up-to-the-minute constantly, and plot all concentrations accurately; that there be adequate communication between the batteries; and that battery instrument personnel know how to operate a fire direction center.

Each battery should be prepared to cope with unorthodox situations, such as an attempted invasion; in such a case the howitzers must act as coast artillery and have a plan for effective fire.

Each battery is responsible for its own security; therefore all personnel should be adequately instructed to protect themselves, especially against infiltration.

In rebuttal to those who claim the 155-mm howitzer is of no use in jungle warfare. I would like to say that our battalion operated efficiently and with great effect on Guadalcanal. The 105s preceded us and did more firing, but our shells had much more effect. Our guns were able to go into any position that the lighter 105s could enter. Nor was there too much difficulty in loading and unloading our howitzers from the transports, even with the lack of docking facilities.

—S/SGT. BARNET BURSTEIN

*Tubes might suffer, but "under pressure" theirs might be a cheap sacrifice.—Ed.

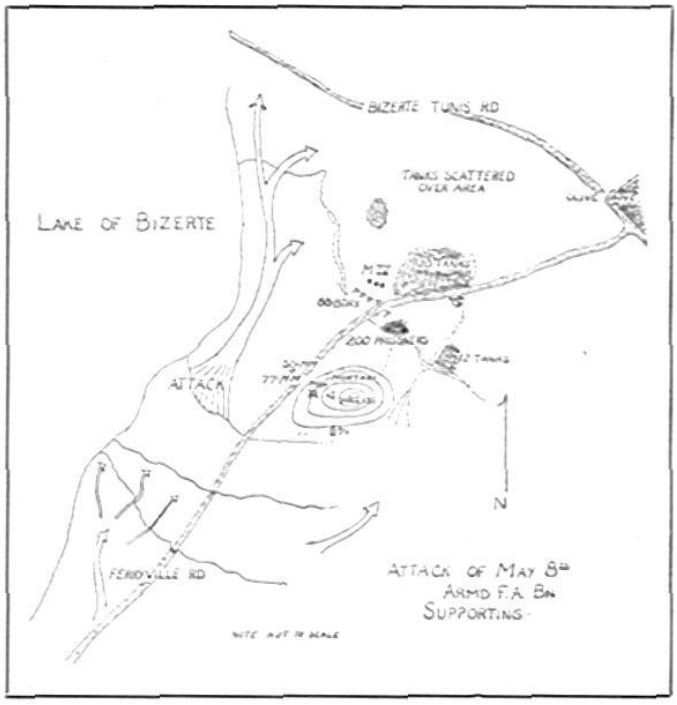
UP FORWARD

By Lt. Carl M. Johnstone, Jr., FA
As Told to Maj. Edward A. Raymond, FA

My armored artillery battalion was in direct support of a tank regiment northeast of Ferryville in Tunisia. I was acting as forward observer. On 8 May 1943 an attack was ordered. The mission was to plow through all opposition around Lake Bizerte and to make two definite breakthroughs in order to command the Bizerte-Tunis Road (see map), the main avenue of escape for all enemy troops in that section.

During the early hours, as the tanks cleared hill after hill, my FO party in its peep and half-track would move up close on their heels, using the very excellent road leading from Ferryville around the lake. Every few minutes Jerry would drop a few rounds of harassing fire along the road. It was not until we reached a point 3,000 yards west of Hill 151, the highest hill of the group and the nearest to the lake, that German fire became effective; three half-tracks were hit. Here our tank columns cut off into the large grain fields to the left of the road and deployed, with the light tanks moving forward along the lakeside, using what cover they could find. I was following these leading elements with my peep, keeping the halftrack within reach. To our right and well up in the hills I could see our medium tanks slowly moving forward, throwing out quite a lot of fire. They were being held away from Hill 151 and adjacent ridges by enemy shelling.

At 1015 we drew up in a small wadi near the lake. I went forward to higher ground, trying to spot the source of the heavy German fire, but as there were no points high enough I reported back to the CO, 1st Bn, who was planning to press the attack soon. He told me I was on my own, and was to support the mission as I saw fit. He had the objectives lined out and it was up to me to give him close support. I told him that I was going to establish an OP on Hill 151 as soon as possible. The general front had been moving up, and on checking with my CO I found that our battalion was on the road moving forward and would soon be able to fire. I asked to be notified as soon as the battalion position was reached, and moved up the road toward Hill 151 in the peep, the half-track following.



Our medium tanks were now laying down some heavy fire on the slopes and top of the hill, and two or three were moving around its base. Apparently the Germans were holding on to that last high ground for dear life. Halted on the road in front of me were several light tanks and scout cars of the reconnaissance unit; the men had hit the ditches. "Wham!" A German AT gun made a direct hit on a scout car just in front of me, causing it to burst into flames. I drove into the fields fast, managed to slip up to the base of 151, put the peep behind a protuberance, and proceeded up the slope on my stomach. There was a lot of firing down near the road and out on the flat, but I supposed that the Germans had their hands too full to bother with me, though several rounds landed too close for comfort.

On reaching the top of 151, an amazing sight met me: to the immediate front were five German 88-mm guns, separated by less than 30-yard intervals, and a number of German tanks. To an FO who usually searches out obscure targets this was a big surprise. My momentary stupefaction was broken by a sudden inferno, as two 88-mm self-propelled guns opened up on me. Apparently they were determined to prevent any observation from the hill. As I made a hasty exit I weighed the chances of our forces, advancing to my rear, against the heavy, accurate, direct fire to which they would soon be exposed at short ranges. I got to my peep, set the driver to running wire to my half-track, and tackled the hill again, laying wire as I went. I could not go back to the top, but felt sure I could slide around on the left slope about three-quarters of the way up and get observation without making such a good target of myself. This I did, and managed to hide somewhat under small clumps of grass. Several rounds landed close by, but I felt reasonably sure that my new position had not been located.

Again the sight before me held me spellbound for a few minutes. It was like a big stage covering an entire valley about ten miles wide, stretching from the lake on my left into the distant hills to the right, and the valley was alive with German vehicles, men on foot, and large convoys of trucks on the Bizerte-Tunis Road. It certainly was an artilleryman's paradise, something I never expect to see again except perhaps in a movie. The Germans were sitting out there waiting for the attack that was bound to come around that hill.

In the few minutes before my half-track arrived I took a good look at the situation. To the rear and left rear were our tanks and reconnaissance elements. The tank commander had moved out

with a few tanks beside the lake and received the full force of the 88-mm battery, point blank. I saw that their effect was not very good because the terrain was in our favor: the flat trajectory could not get our tanks, but went over instead. For the same reason our tanks could not return effective fire. I doubt that they could even see the German guns. And of all the targets available I knew that the 88-mm battery was going to be my first.

Presently the half-track arrived and I sent the first mission to S-3, using estimated coordinates only. Glancing over my shoulder, I noticed that no one had attempted to come up this far, and that those who had gained ground were being fired upon heavily by the Germans. I felt relatively safe despite the large caliber ammunition flying around, and prayed that none would land too close until we accomplished this mission. At 1157 I received "On the way" from the battalion, and craned my neck forward to pick up the rounds. I heard, but could not see them. Suddenly Sgt. Abramski, my liaison sergeant, broke in over the phone, "Sir, someone is shooting time fire at the German AT guns near the road to your left." "Someone, Hell!" I replied, "those are ours." Sensing on sound, I sent down "500 LL, 2,000 SS" to FDC. Surprisingly enough the next rounds landed over the No. 3 gun in the 88-mm battery.

This unexpected fire threw the German artillerymen into a panic, temporarily disorganizing their installation. I saw two men fall and the others hit the ground. I called for effect using time, and rounds burst 15 yards over three of the German guns. The entire personnel (about 100 men) scattered in all directions, abandoning their guns. It was obvious that they had not expected this sort of mass fire. I could see the officer attempting to get the men to return to their guns. A few returned and continued firing at our tank destroyers.

A large number of the men had run to three PzKw IV tanks, 200 yards to the rear of the battery position. In an attempt to destroy their materiel as well as their men, I called for HE for effect with a 200-yard sheaf. This fire completely covered the entire guns, over and short for range and deflection and with a direct hit on No. 2 piece the gun seemed to shatter like rock in all directions and a small fire was started. During the course of this shooting the men from the tanks made several attempts to return to their guns, only to be driven back by our fire.

All this time I was concentrating on the 88-mm battery, but as the men ran to the tanks I noticed for the first time that there were other German tanks, so well hidden that I had to look very closely to pick them up. They were my next target, so I began looking for the best place to start. There were 5 in a small cactus patch bordering the road some 300 yards to the right of the enemy battery. I called for effect on the gun position a couple of times more to put it out of use completely, and then shifted over to the cactus patch.

The first effect was evidently a hit, because the men came piling out of the tanks and took to the road on a dead run. Shells were landing all around the tanks, some not more than five yards away. The results of the fire were apparently very good, on both tanks and men. Three tanks left the rear of the cactus patch and headed for cover behind a small group of houses. Our fire caused more movement in the cactus, and I hastily counted close to twenty tanks, altogether. I kept up continuous fire and got a few hits. Only one tank started burning.

Firing had increased all around the valley, but I had been so occupied I had not been able to watch more than my own targets. The continuous whine just over my head was music to my ears. After shifting fire over to the tank assembly several men jumped out of the three tanks back of the enemy gun position. Later they brought one tank up close and the crew got out and fired the remaining gun of the battery. Battery one round, closed sheaf, on that gun caught the tank and personnel and burned some ammunition. That was the end of the battery. I shifted back to the tank assembly.

From time to time Cpl. Pitts, my liaison corporal on the other end of the telephone, would report enemy fire landing close to the half-track, but having been under fire numerous times before he assured me that they were going to stick it out. I expected a direct hit on either half-track or myself at any minute. Sgt. Abramski came slipping up on his stomach and said there were several German machine gun nests and two AT guns on a small shelf about 50 yards below us. A couple of our reconnaissance light tanks were moving in for the kill. My heart sank because we were in the middle of it. The Germans had only to look up on the side of the hill to see us. I am still mystified as to how we were able to approach our position without those guns taking us under fire. Several of our M10 tank destroyers opened up on the AT guns, and some of their overs hit in or near my position. T/5 Strom, my half-track driver, took a look at the machine gun nests shortly after the fire ceased and reported that our light tanks had wiped them out, leaving several dead. Later I found that there had been quite a number of men there, with several mortars and six 77-mm AT guns.

The German tanks were still milling around because of our artillery fire. I could see some movement directly below and short of the target I was shooting at; further inspection showed a crew trying to hook up a prime mover to an 88-mm mount. I fired only one platoon in adjustment, and hit one of the wheels on the mount. They never got it hooked. There was a large ditch nearby with a few overhanging trees and to my complete surprise about 20 Italian and 180 German soldiers came out of the ditch with their hands up. They walked around the bottom of the hill and surrendered to members of the reconnaissance element there.

A glance back along the lake showed me that our main attack was about to begin. The Germans must have guessed as much, because their tanks began to gain vantage points from which to meet our advance. When our tank group started forward they met stiff resistance from German "hull down" tanks spread over that section of the valley. Our tanks advanced a certain amount and for 30 minutes fired directly at the Germans, who answered round for round. From my position I could see the gains and losses on both sides, and began adjusting on the front line of the German tanks because they were giving the most trouble. We could have used several artillery battalions at this time—there were too many targets over too large an area for one to handle properly. It seemed that regardless of where I shot, the shells landed near a German tank. Two self-propelled 88s started firing down to my left on the side of the hill. Three rounds landed short about eight yards down the slope. It looked as though our time had come! I tried to dig into the solid rock with my hands. The next round went over my head. After a few minutes I found

that they were shooting at two of our light tanks that had ventured up the hill behind us; these disappeared quickly, and the firing shifted.

Then our tank effort redoubled. It looked as though 200 tanks went streaming along the level land beside the lake. It was quite a sight. All at once from under trees, from behind small Arab houses, German tanks appeared, getting into better positions to shoot. At times it was difficult for me to pick up my own round because of the tank and tank destroyer fire. I saw 8 enemy tanks go into a slight defilade. After adjusting and firing for effect twice, 6 of the tanks were forced out into the open, leaving one burning and another disabled by a direct hit on the track. Our tanks swept across the valley. German infantry was getting panicky and was pulling out toward Metline (on the coast) and toward Tunis, leaving only the tanks to battle and lorries to pick up stragglers. Many of our medium tanks made a right flanking movement and started up the broad valley. Several of the German tanks to my direct front had spread out and pulled back to escape artillery fire, so I had to pick out each tank and adjust on it separately.

Suddenly the Germans located my position, and began adjusting. Shell fragments were dropping all around, some hitting very close. I made a run for it. Any attempt to return brought on more fire from the Boche. Lt. Stevens, another—th Armd FA Bn observer, arrived to help me out. Together we took a portable radio and our peep drivers, skirted 151, and gained the top of the next ridge on our stomachs. There we discovered, in a group of trees about 1,000 yards to the right of my original target and at the same range, 12 enemy tanks that had not been visible from my previous position. Two of them had pulled out of the trees and were firing at our tanks, still a great distance away. Still on our stomachs, Lt. Stevens operated the radio and I observed. The first round landed 25 yards over the nearest tank that was firing. Immediate fire for effect accounted for one tank and ran the others out onto the plain. Meantime a few of our mediums had gained the top of the hill well to our right and were firing down point-blank at the tanks we had run out of the group of trees.

From then on the Germans eased out a few at a time and retreated along the road northeast into a large olive grove on the far side of the valley. By this time another battalion of artillery started firing with us. Lt. Stevens and I took turns at shooting at the retreating tanks, especially those covering the withdrawal. Though the Germans had been trying to put up a strong rear guard action they became frantic and lost control entirely. All drove for the road at one time, causing a jam of about 30 tanks and making excellent shooting for us. For the next hour we shifted fire from one tank group to another, wherever it was most profitable to shoot, until all the remaining Germans had retreated. About 20 burning tanks and numerous dead were left on the field of battle.

Our last fun was toward the latter part of the afternoon. We fired at greater range, sweeping the large olive grove. After several volleys there were two loud explosions and many fires started, so our artillery was doing good work there. The excitement of these hits almost caused Stevens to drop our portable radio down the side of the hill. Later the Germans managed to organize some artillery at a considerable range to our right front, and attempted two concentrations of mass observed fire. Fortunately, the effect was nil, landing half a mile short of our forward tank elements.

Our estimate of German equipment in the valley was around 60 tanks (of which some few were PzKw VIs), several 88-mm artillery pieces, and many smaller caliber AT guns. Germans captured here told me they could not stand the terrific fire of the American artillery and were mighty glad to be out of it. The U. S. Tank Commander and many of the tank crews, as well as crews of the tank destroyers, gave the armored artillery much credit for the success of the attack.

ARTILLERY TRACTORS

A fair proportion of all artillery will shortly be towed by tractors instead of by trucks. This change is far from a reversion to World War I, however, as our new vehicles are utterly different from those old monsters. These are speedy, flexible, and reasonably comfortable; they carry 9 men plus section equipment—and protect them from inclement weather; AA protection comes from the built-in ring mount with its .50-cal. MG. Lights, black-out devices, etc., make their use quite similar to that of trucks.

Light and medium artillery will have the M5 tractor, here shown with cover and ring mount removed. This has ammunition capacity of 60 rounds of 105, or smaller amounts of 4.5" or 155-how, ammunition.

M4 tractor is for the 155-mm gun, 8" howitzer, and the modified 240-mm howitzer. It too will carry a small amount of ammunition, in addition to crew and section equipment.

ARTILLERY TANK SUPPORT

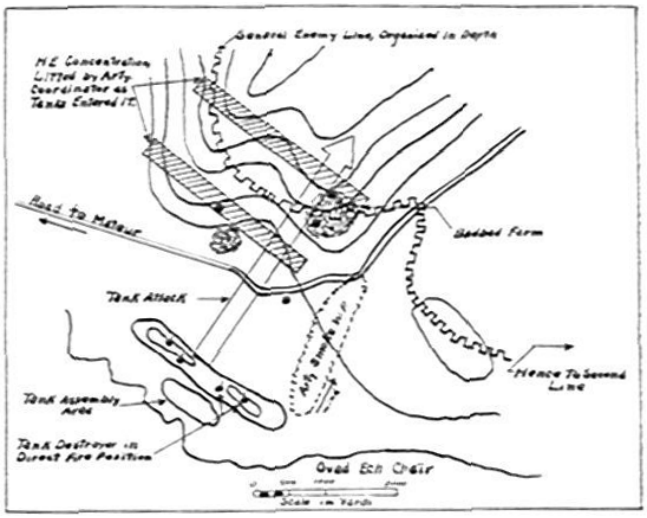
By Col. Hamilton H. Howze, Cav.

A most striking instance of the effect of artillery in support of tanks occurred about 4 miles east of Mateur on May 6, 1943. The German forces held a line extending south from Ferryville, but east of Mateur the line swung east to drop back to a line of hills that extended further to the south. This jog constituted a flank to his Ferryville—Mateur position. The northern part of his position was comparatively tank-proof; since this "flank" was not, he concentrated a large number of AT guns for its protection. The slope to his position was gradual, but the hills were high enough to give him dominant observation. A number of small farms with surrounding trees, and cactus patches, haystacks, and small folds in the ground afforded him ample choice in the location of his AT guns.

On May 5th a reconnaissance in force by Co H, KCth Armd Regt, of the same position, enabled the bulk of that company's tanks to almost reach Badbad Farm; only 3 were knocked out up to that time, but on their return trip 4 were destroyed by AT guns or mines. This reconnaissance—it amounted to a small-scale attack—was supported by 2 battalions of 105-mm howitzers, directed on targets by me. As indicated, the objective (Badbad) was almost attained with fairly small loss: 3 tanks.

Next morning at 0500 hours an entire battalion (2nd Bn, KCth Armd Regt) attempted the same objective. Due to unfortunate mischance, the forward observers of the artillery had not the proper data to fire a preparation so readjustment of fire was not possible before daylight. The enemy permitted the tanks to get almost across the flat before opening fire and then bore down hard, destroying 7 more medium tanks and forcing the balance to retire. The battalion commander's tank was destroyed and himself wounded, whereupon I was directed to relinquish my job as regimental executive and take command of the battalion in preparation for a later attack that afternoon. This instruction reached me about noon.

With 14 burned-out tanks in the field over which my battalion had to attack, there was considerable incentive to plan effective fire support. I accordingly laid out with Capt. Combs (of Div Arty) a scheme of support as shown in the accompanying sketch, and requested the support of all 3 battalions, which was granted. I also gave targets (suspected AT gun positions) to my mortars, assault guns, and several 3″ TD guns that were also behind the ridges. These direct-fire guns were instructed as follows: each company was to divide the terrain into sectors; each platoon was assigned a sub-sector, within which it selected particular targets to engage with HE: and each gun was assigned a single target, which it never left until our own tanks screened its fire.



The attack jumped off at 1700 hours. From my tank I could see the hill coming apart in front of me, while an excellent smoke screen guarded our right flank. The attack swept on without a hitch—though the enemy put down a fairly heavy concentration of large caliber HE, his AT guns short of the objective never stood a show. A few were overrun by tanks but the majority were not fired, for the gunners could not man them in the hail of HE. Some of our artillery landed close to, and occasionally even behind, our tanks, but it seemed sort of friendly.

As the tanks crossed the ridge we encountered more AT guns and our artillery, which could not see us, lifted. But these enemy guns were hastily emplaced, and the tanks blew them up in short order. We had but one tank that suffered a penetration; a few had tracks blown off by mines or enemy fire.

One action may be insufficient evidence upon which to draw a moral, but I, at least, am absolutely convinced that tanks can not penetrate an organized enemy position without prohibitive losses, except with overwhelming artillery support. The AT gunners must be driven from their guns, and kept down by all available means. This indicates that if an armored division is to attack on two fronts simultaneously, the attacks must be spaced in point of time to permit all artillery to concentrate first on one objective, then on the other. Once the tanks are through, the pay-off comes: in this instance the front folded, many hundreds of prisoners were taken, and a large number of guns were captured—including several of 155-mm and many 88-mm.

"Your FIELD ARTILLERY JOURNAL is a very interesting magazine indeed, not only for the excellent articles of special interest to the artilleryman, but also for the impartial, purely military reviews of various world situations as opposed to common newspaper sensationalism.

"One simply cannot find anything superior to the concentrated, concise rational report on the fighting fronts as contained in *Perimeters in Paragraphs*."

—"Royal Canadian Artillery"

German "Salvage" Self-Propelled Artillery

By Lt. Richard B. Kline, FA

Among our North African booty is an odd SP artillery piece which was destroyed by the Germans after being knocked out on the Tunis-Bizerte road. It combines the effective new PAK 40 75-mm AT gun with the Czech L.T.H. tank chassis. So many of the latter are on hand they are now known as the PzKw 38(t).

Most of the tank's characteristics remain the same in this new version. It is about 15′ 3″ long, around 7′ wide, and weighs either 8.5 or 9.5-12.5 tons (apparently depending on armor thickness, which varies among the several models of this

vehicle). Its 6 cylinder, 140 HP, water-cooled motor drives through the front sprocket, and yields speeds of 26 mph cross-country or 35 mph on the open road. Enough fuel is carried for 125 miles of operation. This chassis has a 1′ 4″ ground clearance, climbs slopes of 40º to 45º, negotiates 2′ 8″ vertical obstacles or trenches 6′ 5″ wide, and fords streams 3′ deep.

Primary armament is a 75-mm PAK 40. Its "loose" barrel is of monobloc construction, and presumably fitted with the standard double-baffle muzzle brake. Breech block is the typical German horizontal sliding block type. Traverse, elevation, and depression appear from these photographs to be about the same as for the truck-drawn model, for which they

are 65º, 22º, and 5º, respectively. Sights are graduated to 1970 yards for AP ammunition, and to 3060 yards for HE. Just forward of and below the recoil mechanism appears (right front photo) a barrel travelling lock, folded down. Incidentally, this same gun is also found mounted on the PzKw II chassis. It is an effective weapon, with high muzzle velocity and very flat trajectory, which simplify laying for range and "lead" and also give a high terminal velocity.

The gunner is quite fully protected, behind a shield about 15-mm (.59″) thick. To permit pintle traversing, an inner shield is mounted on the gun itself; just next to this shield (left-front photo) there appears to be a sight mount.

Secondary armament is two 7.92-mm Czech Brno machine guns mounted on the front.

489TH ARMORED FIELD ARTILLERY BATTALION

489th Armd FA Bn was originally a reserve regiment. Its coat-of-arms was approved by the Secretary of War on October 9, 1924. Unfortunately, however, the present activated organization has no record of the background of this insignia, and so asks the help of former members in obtaining both the history of the battalion and the meaning of this distinctive insignia, whose heraldic description is:

Shield: Argent a fouled anchor paleways azure, within a diminished bordure gules.

Crest: That for regiments of the Organized Reserves. On a wreath of the colors (argent and gules), the Lexington Minute Man proper.

Motto: Strike Hard.

Description: The shield is white with red border for the Artillery. The well-known Rhode Island anchor is displayed on the shield of blue.

1st INFANTRY DIVISION ARTILLERY

(MARCH 4-APRIL 8, 1943)

By Lt. Col. E. S. Bechtold

El Guettar's neighborhood contains a variety of terrain, and some odd works of man.

1. *Narrative:*

From 0001 hrs 4 to 11 March, the 1st US Inf Div Arty (less the MBth and MDth FA Bns) was in a rest bivouac area in the vicinity of Morsott, Algeria. Reconnaissance and planning for an attack on Gafsa were conducted.

On 11 March, and until the 16th, the Div Arty CP was moved to the vicinity of Bou Chebka, Tunisia, in preparation for a further southward move on Gafsa. All organic battalions joined Div Arty in that area. The KJOth CA (AA) Bn, AQth FA (less 2nd Bn), Btry A CHth FA, and a detachment of the Zth FA Obsn Bn were attached to Div Arty for the Gafsa operation and joined in this area. Reconnaissance and planning, to include advance survey operations, were carried out during this period.

On the night of March 16th, Div Arty plus attached units moved to positions northwest of Gafsa from which the attack on that place was to be launched. The new Div Arty CP opened at 0315 hrs, 17 March, and control of organic arty units was immediately established.

At 0716 hrs, 17 March, the enemy opened fire on Div Arty positions. This was immediately returned, with excellent effect. Little resistance was encountered in the operation, although many artillery missions were fired, and the air bombed Gafsa at 1000 hrs. All objectives were reached and firing ceased by 1230 hrs. The Qth and MCth FA Bns reverted to CT control. Div Arty CP remained in position until 1500 hrs, 19 March, when it moved into Gafsa Gare.

After 1600 hrs 19 March, and until 2245 hrs 20 March, Div Arty's CP and all its units remained in the vicinity of Gafsa, to defend that place against possible enemy counterattack. On the night of 20 March, Div Arty (less Qth FA Bn) and attached units made a night approach march and went into positions in the vicinity of Lortress and El Guettar, from which the attack on the enemy positions of Djebel Ank and southeast of El Guettar were launched.

That attack began the morning of 21 March, with units advancing on 21 and 22 March and achieving their initial objectives with success. In support of the attack artillery fire was delivered by all units.

On 23 March the enemy launched a strong counterattack with units of the 10th Panzer Division. At the same time, an attack by our ARth Inf was in progress to the southeast. Enemy tanks swept in behind the advance infantry battalions, across the plain toward El Guettar. A fierce battle continued all day, with three main attacks on our positions by both armor and infantry. Heavy losses were suffered by the enemy. The Oth and MBth FA Bn position areas were overrun, and all guns abandoned but later recovered. The Qth FA Bn reverted to our control and occupied positions east of El Guettar, arriving in time to definitely aid the repulse of the third and final attack at 1640. All units were under artillery fire, small arms fire, and dive bombing attacks during the entire period. All performed their missions most creditably, and under the most trying of conditions. AA protection was rendered throughout by the KJOth CA (AA) Bn in a most efficient manner. During the night 23/24 March, the Oth and MBth began reorganization, and the HNth FA Bn joined and went into position east of El Guettar. 1st Bn KGRth FA was attached and went into position northeast of Mdilla, in support of the CSth Inf in defense of Gafsa. The enemy attack was completely repulsed, mainly by fire of artillery units.

On 24 March the activity of both enemy and our own forces was greatly reduced. Btry B KJPth CA (AA) Bn was attached to the KJOth CA (AA) Bn to replace units overrun on the previous day. MBth and Oth FA Bns were reorganized, and resumed positions ready to fire during the day. In the evening an enemy counterattack on our positions northeast of Djebel Berda was repulsed.

On the 25th the activity on both sides was even more limited.

Btry B KJPth CA (AA) Bn was detached, and previously overrun units of the KJOth CA (AA) Bn resumed their missions.

26 March found activity limited on both sides. The HNth FA Bn was detached, and reverted to 9th US Inf Div Arty control.

Again on the 27th, activity was slight. 1st Bn AQth FA, Btry A CPth FA, Det Zth FA Obsn Bn, and 1st Bn KGRth FA, were released from attachment and reverted to control of KCth FA Brig.

March 28th, Div Arty supported the attack of II Corps in the 1st Div sector. Artillery units fired preparations and other missions in support of the infantry. FOth FA Bn (Armd) was attached, and assigned to support the Qth FA Bn.

Action continued on the 29th with an artillery preparation at dawn. Artillery support and general target missions were fired throughout the day.

Enemy activity was on a reduced scale on the 30th. The FOth FA Bn (Armd) was detached.

On March 31st the battle continued with no appreciable change. Div Arty CP moved to a point approximately 8 miles east of El Guettar. During the entire period, difficulty was experienced in finding the location of the 9th Inf Div units, with resulting difficulty in firing on targets in their sector which were holding up the attack of our units.

April 1st found very little activity on either side. The day afforded an opportunity for personnel to clean up and rest, and also to clean and rest the guns.

On the 2nd there was more activity than on the previous day, but there were no marked engagements. During this period infantry units advanced on their objectives slowly and steadily.

Div Arty units supported the continuation of the attack on April 3, but on the 4th activity again decreased somewhat.

On the 5th it appeared that the enemy was again reinforcing, and our artillery received more artillery fire than at any previous time during the engagement, except on 23 March. Our artillery fired primarily on tanks and vehicles, and counterbattery missions.

April 6th, all indications were that the enemy was withdrawing in the Djebel Berda—Djebel Mcheltat area, with tanks covering the withdrawal of his main force. Artillery targets generally the same as on the previous day.

Our heavy artillery barrage on the last strong point on Hill 369 caused enemy evacuation on the 7th. This front was then immediately occupied by our troops. South of Djebel Chemsi contact was gained with units of the British 8th Army.

During the night 7/8 April, enemy activity in the southeast practically vanished. Our ARth Inf, supported by the MBth FA Bn, occupied Djebel Maizila in the north with no resistance after 2230. By morning 8 April, the enemy had completely withdrawn from our front.

After aerial and ground reconnaissances of the defended area, it was found that much of the artillery fire received by our troops was from tanks. We also discovered that the position was much stronger than originally estimated, being well organized in depth and with concrete emplacements in many places. Effect of our artillery fire was clearly visible, and many enemy vehicles and tanks were found abandoned. Spots where others were hit could be observed.

2. *Results:* During the period reported on, the 1st US Inf Div Arty successfully accomplished the following:

a. Artillery support of division units attacking and capturing Gafsa.

b. Artillery support of division units in defense of Gafsa.

c. Artillery support of division units attacking Djebel el Ank, and finger of hills southeast of El Guettar.

d. Repulse of armored and infantry attack of 10th Panzer Division southeast of El Guettar (aided by 1st Bn AQth FA, Btry A CPth FA, KJOth CA (AA) Bn, Det Zth FA Obsn Bn, all attached; FTKth TD Bn and RISth TD Bn) with a loss of 12 105-mm howitzers, 12 155-mm howitzers, 22 tank destroyers, and 13 40-mm Bofors AA guns. Over 50% of this equipment (as far as AA and FA units were concerned) was recovered and placed back in action the following day.

e. Artillery support of the attack of division units on Djebel Takadelt, Djebel Mcheltat, Bou Hamran, Hill 574, Djebel Hamadi, Djebel Maizila, and Djebel Berda.

f. Artillery support for the attack of 9th US Inf Div units on Hill 369 and Djebel Berda.

g. (1) From 17 March to 23 March (incl.) an estimated 100-150 trucks and other vehicles (including armored personnel carriers) were destroyed by the fire of our division artillery and attached units. An estimated 30-40 tanks were destroyed and more damaged by our fire. Two German infantry battalions were all but annihilated by the time fire of the Qth FA Bn and 1st Bn AQth FA. An estimated 15 battery positions were effectively neutralized with probable damage and destruction, by all types of artillery fire. During this period the following units operated under Div Arty: Oth FA Bn, Qth FA Bn, MBth FA Bn, MCth FA Bn, KJOth CA (AA) Bn (attachd), 1st Bn AQth FA (attchd), Btry A CPth FA (attchd), Det Zth FA Obsn Bn (attchd). According to all reports, the 10th Panzer Division was rendered all but ineffective during this period.

(2) From 24 March to 8 April (incl.) an estimated 30 tanks and 100 vehicles were destroyed by our artillery fire. An estimated 15 battery positions were effectively neutralized with probable heavy damage. Heavy losses were inflicted on the enemy in prepared positions, with such result that the Italian Centauro division has not been seen in action since. During this period the 9th US Inf Div, KCth FA Brig, and an armored force participated in the operation, mainly on our right flank. For the most part, all units of the KCth FA Brig were under brigade control during the period.

h. Effectiveness of our artillery fire was noted from many prisoners during this entire period, as one of the salient features from their viewpoint and one which apparently contributed in very great measure to the success of the operation.

i. Results of AA operation during the period:

(1) Enemy a/c observed in the sector: 411 of all types.

(2) Number of enemy sorties (no enemy action): 20.

(3) Number of strafing attacks: 11.

(4) Number of dive-bomb attacks: 24.

(5) Number of night bombing attacks: 10, estimated.

(6) Number of observed hits (40-mm) (does not include other claims): 129.

(7) Number of probable planes destroyed: 11.

(8) Number of confirmed planes destroyed: 28.

(9) Number of planes destroyed on ground by FA fire: 1.

(10) Number of planes destroyed by .50-cal. fire: 1.

Sedjenane-Bizerte: April 8-May 7, 1943

By Col. Douglas J. Page, FA

At the conclusion of the battle of El Guettar on April 8, 1943, all elements of the 9th Div began moving to a concealed bivouac near their old march bivouac at Bou Chebka. While the outfit rested, Brig. Gen. S. LeRoy Irwin, Division Artillery Commander, went forward to the northern sector above Beja, now occupied by part of the British 1st Army but reconnoitered before El Guettar by Col. Page and Capt. Banks, and made arrangements for the relief of the British artillery.

Our NQth Inf, supported by the FNth FA Bn, relieved one British brigade the night of April 12-13 near Sedjenane, and the CSth Inf, supported by the BPth FA Bn, relieved the other two night later. Our MDth FA Bn, later joined by the PJth FA Bn, was in general support. The following units were attached to Division Artillery and served throughout the engagement: DMNth CA Bn (AA), protection of field artillery gun and CP positions and the road Djebel Abiod—Sedjenane; HSNth and FTKth TD Bns and Rth Recn Tps, reconnaissance and anti-tank protection; FBth FA (Armd), self-propelled 105-mm howitzers; Btry C, CPth FA, 155-mm rifles; AHOth FA Bn, 155-mm howitzers; and a short-base flash section from the Zth Obsn Bn. Sound was not utilized, and flash did not prove itself worth the trouble of installation, due to the nature of the terrain, defiladed enemy positions, and the difficulty of surveying in a base. The 1st U. S. Inf Div was on the right, while elements of the Corps Franc d'Afrique, landed and supplied by sea east of Cap Serrat and under command of the CG, 9th Inf Div, were on the left. The SAth Recn Sq, under division control, was employed in a narrow strip on the right flank, half of which was later taken over by the 34th U. S. Infantry Division with one combat team up.

After the March 17 breakthrough as far as Djebel Abiod following a prolonged stalemate in the north, the enemy had been forced back in four days over ground it had taken him three weeks to penetrate. This beating was administered by a British infantry division which inflicted severe defeats in the Tamera and Sedjenane areas and caused him to fall back on his old defensive positions on the reverse slope of Dj Azag ("Green Hill") and Dj El Ajred ("Baldy"), where he continued blasting and preparing stronger positions all during the relief and throughout the preliminary fighting.

Ammunition dumps were established at Djebel Abiod (corps dump with three days' average combat expenditure) and at Tamara Station (division dump, one day's combat expenditure). Light battalions were ordered by the CG, Div Arty, to have 150 rounds "at the gunsite," while the 155s (both howitzers and rifles) were to have 100 rounds. It later developed, however, that it was more advantageous to the battalions to carry greater than the prescribed load, due to the difficulty of night supply over poor trails, frequent position changes, mined roads, abnormally heavy fire needs, and dawn-and-dusk road strafing by Me-109's and Focke-Wulf 190's. All units habitually carried far in excess of their minimum requirement; the PJth FA Bn, for instance, averaged well over 4,000 rounds.

The whole action was a series of limited objectives, the monotonous taking of hill after briar- and brush-tight hill. Problems of supply were never more acute: mules obtained by corps from the French were the answer to the infantry battalion's problem over the narrow, steep, and many times booby-trapped trails, and artillery OPs and forward installations found them invaluable for supply and wire laying. The RL-31 "mounted on a mule" went anywhere that a man could climb. When our division took over the sector the English axis of supply through Beja was changed to the Djebel Abiod—Tabarka road, with main source La Calle.

Minefields were extensive and well guarded by self-propelled and individually roving 88s. Trip wire booby traps of blocks of TNT poured in concrete moulds—apparently meant to be dug in as hard-to-locate road mines with pressure igniters—and anti-personnel mines of the "Bouncing Baby" type were everywhere, especially around hilltops and other obvious OPs and along the "verges" of most roads. Potatomasher grenades set to catch the unwary were also scattered about abandoned positions.

Enemy air at the beginning was active, but it was dropped down to almost nothing later, and never at any time was one-half as annoying as at El Guettar. Straight stretches of roads were daily strafed and sometimes bombed, apparently on a regular schedule. The largest enemy flight was 25 FW-190s over the sector on April 23. Few bombs landed near our installations, although enemy fields at Mateur and later at Bizerte were only five minutes away, and during most of the first phase enemy observation looked down our throats and could easily have requested spot missions. A contributing factor to this was probably that at no time was the air able to definitely locate battalion positions as it had done at Thala and El Guettar. The man-high brush everywhere made concealment possible; however, most batteries received counter-battery at one time or another while firing. Counter-battery killed two HNth FA Bn men by direct hits in their fox holes, on April 19th and 23d.

Our own division's air OPs were used to advantage many times, especially in adjusting the 155 rifles, and they also took some good obliques with the aid of an engineer cameraman.

For three days after the British artillery was relieved, registration was not allowed except in cases of absolute necessity; our calibers and strength were not given away. The lights registered and did a little direct support firing in the first (old British) positions, but after the change to the battle positions no one registered until April 23, when the main attack began. Our 155 rifles were kept as a hole card and were opened up later on rear supply interdiction, to duel the few 170s, and to search out the 150s—at all times controlled by Div Arty (with a direct line to the AA) so that no firing was done in the presence of enemy air in the sector.

Harassing fires were fired nightly, and their effectiveness attested

to by each new batch of prisoners. Three items of interest: first, all battalions within range immediately dropped a concentration on the bombed area at any time one of our own bombing missions materialized; second, any time an observer could actually see a piece itself (not just the flash) that battery would be neutralized, then a precision adjustment made on each visible piece and continued until destruction was achieved, regardless of expenditure of ammunition; third, direct support battalions stood ready at any time to survey in (by flares) the positions of front-line infantry battalions and on call to mark objectives with smoke.

The estimate of opposing artillery made at the beginning proved to be correct: 2 batteries 105s, 1 battery 150s, 2 guns 170, 8 SP 75 howitzers, and 6 or more 88s. At first the whole battery of 150s and one battery of 105s opposed our southern forces, with the self-propelleds out in front on both sectors and the 170s far back behind the south. In the second phase, the push around the north, two of the 150s appeared there (at the same time disappearing from the south). The 170s went north also, although they continued to cover the whole front while the self-propelleds fell back gradually. Three 88s appeared in the south at the same time the 150s left. For two days three 88s operated in the north. Then the 150s and 170s disappeared. Along at the last the self-propelleds and the 88s fired an average of 75% AP or duds, although the 88s fired a lot of time fire at extreme range. No concentrations were ever fired greater than a 6-gun battery, but all artillery was obviously under one command.

Organization for the jump-off on April 25 was as follows. The North Group, following the Sedjenane valley, consisted of the MDth and PJth FA Bns and HSNth TD Bn (less one company) supporting the CSth and FTth Inf, with the secondary mission of assisting the Corps Franc d'Afrique. Supporting elements of the DMNth CA Bn (AA) moved with the units they covered, and also protected the Sedjenane—Jafna Station road and the Sedjenane River valley. The Rth Recn Tp protected the artillery by reconnaissance of the south side of the Sedjenane valley. The HSNth TD Bn provided protection by reconnaissance of the north side of the river.

Our South Group consisted of the HNth and AHOth FA Bns, FTKth TD Bn, and "C" Btry of the CPth FA (later split into platoons, with two rifles sent to the North Group).

The split between the two groups was never as distinct as at first anticipated, and the Riv Arty CP did not divide according to original plan. Mutually supporting fires were common; fires of all types had to be conducted at extreme ranges much of the time because of the difficulty of displacement over roadless djebels.

Registration was permitted at H-1 on D day. A prearranged code naming the prominent features was provided, and used exclusively for locations.

HQ Btry, Div Arty had out 255 miles of wire over a 35-mile frontage for the start. On one 35-mile line only two booster coils were available, but proved effective with only occasional relay. Radio relay was established with the left flank forces. Radio communication could be maintained solely because of a borrowed set. Frequency modulated radio sets failed at times due to intervening terrain. In one instance when the platoon of "C" Btry of the CPth FA were divided, we re-aligned their set on our channels and our plane observed their fire directly. There were also instances in radio when the forward observer of one battalion observed for another battalion by switching his set to his battalion K channel and the battalion he observed for contacted him on the observer's battalion K, thereby eliminating necessity for relay.

During the entire operation we tried to secure booster coils for our long lines. Finding none, we used in the emergency German booster coils and found them satisfactory; their four-conductor cable has splendid conductivity and tensile strength, and strong plastic insulation. Line route maps were very advantageous in laying future lines on forward moves. There were mighty few lines laid that were not used by some other unit later.

Worst fighting of the action took place on Djebel Anchouna and "Little Anchouna," starting off with a heavy group of concentrations on the point of "Little A" which left 114 German dead when the CSth Inf arrived. The commander of the infantry battalion which took the hill ran into bitter fighting, and he and his executive were killed. The regimental commander and staff, with complete plans for the objective of the week ahead, were captured just as they were moving their OP; they were recaptured later, but the plans were lost.

Minefields cost many lives; two officers and a jeep driver from the AHOth FA Bn were killed in the vicinity of Station Alouana on the Jafna road, and it was some time before they were removed because of the 88 guarding the field. (This German artilleryman and all his papers, including a well-drawn panoramic sketch with elevations to all points in the sector, were later captured.)

Bitter fighting continued until May 3, when suspicions that the enemy had completely withdrawn an unknown distance to the east were verified—just as he had slipped away from us at Thala and El Guettar.

The Commanding General, II Corps, ordered an aggressive follow-up at once, with the docks at Ferryville and Bizerte to be the targets as they came in range (dock order later rescinded), and the 155 rifles to be able to fire on shipping in Lac de Bizerte and later in the Mediterranean. Indications that Mateur was being evacuated, even that Bizerte had been weakened, later proved true.

Now the battle was really over. From this date there were no further infantry death casualties, except from mines after the fighting ceased. Two jumps were made, one last difficult bit of ground taken, and then ahead lay the broken city by the harbor, filled with time bombs and snipers and interdicted by high-velocity and rapid-firing AA weapons from across the channel in the 1st Armd Div's sector.

The colonel of the HSNth TD Bn requested permission to enter the city, and it was granted. His time of entry was later reported at 1620, May 7th, 1943, twenty minutes after the British 1st Army entered Tunis.

All battalions were given the mission of cleaning up salvage from the battlefields, and then moved for a brief period of rest and swimming along the beach.

The Tunisian campaign was over.

Have You Sent in Your Latest Complete Address?

TUNISIA'S BURMA ROAD

By Lt. B. H. Kerr, FA

The battle of Happy Valley was progressing favorably, although progress was slow at times as each hill became the day's objective. The enemy would be driven off, then counterattack, and the succeeding fighting would be hot and fierce as our infantry would slowly drive them back.

It was during the period April 22—May 2, 1943, that this action was taking place. The valley is about 8 miles southwest of Mateur, Tunisia; on either side are high hill ranges which gradually come together until only a few hundred yards separate them at the northern end. To us the mouth of this funnel-shaped valley was known as the "Mouse Trap," so named because friendly forces had been allowed to advance up the valley and through the mouth, and then been trapped by machine gun, antitank, and artillery fire.

This time the plan called for the taking of the hill ranges on both sides, as well as the valley itself. The ARth Combat Team, 1st Division, had the left or west flank, and the Uth Armd Inf, 1st Armd Div, the right, east flank. The latter had the BQth and PHth Armd FA Bns supporting it.

The initial attack into the hills went well and the artillery drove brazenly from the open plains into foothills immediately to the rear of the front line doughboys. Throughout the day the artillery roared away—softening up the Jerry trenches, neutralizing and occasionally wiping out the numerous machine gun nests, laying down smoke and time fire, and in every possible way helping our doughboys to push forward.

As the infantry advanced our problem of transportation became more acute. Supply lines to the infantry and avenues of approach for the artillery became more and more difficult as the foothills grew into large hills and small mountains. Use of the valley itself was impossible because of mine fields, and whenever a target appeared Jerry brought on antitank and artillery.

Thus through need and necessity, a mountainous road over hill, valley stream, and rocks, Tunisia's Burma Road was born. Our engineers were very limited and busy with minefields and booby traps, our infantry were footsore and battlescarred, so to the artillery came the request for volunteers for this pick and shovel detail. Out of the ranks came 100 men—men who had been firing steadily, lugging 50-pound shells by day and by night; men who measured azimuths or worked in Fire Direction Center; and some who were working in the pot and pan section. They stepped forward, armed with rifle, pick, or shovel, to do this necessary job.

The first section of the road I remember especially well. A stream wound its way out of the hills, cutting sharply between two high rocky hills. To go over these hills was impossible; the road had to go between, crossing the stream twice. After 10 hours of excavating, of carrying rocks for filling, of shovelling dirt for covering and blasting loose ledges, the first section of the road was formed. This part was called "Artillery Avenue," giving credit to work done by these sons of artillery. This job was accomplished with complete peace and quiet, for occasionally rest periods were forced on us when enemy artillery, probably sensing what was happening, dropped a few rounds of harassing fire in the area. To a sergeant and a private fell the final job of the day, the burning of a dead Jerry horse whose rapidly decaying flesh vented many unpleasant aromas during the day's work.

The next stage of Burma Road consisted of crossing a stream and cutting down the steep approach to a saddle between hills. This was accomplished in good style the following day. As the saddle was crossed, advantage was taken of a trail Jerry had started; but this "easy" section was soon discarded, due to an enemy antitank gun so placed that it could cover that stretch. This part of the road was soon called "88 Drive." Humorous detour signs were placed at both ends, and a new route found and made usable. This new section, done with one of the engineers' bulldozers, was a two lane road, one for "outgoing," the other for "incoming" traffic. Indeed, this was necessary, for the traffic on this road was enough to put some of our larger cities to shame.

Construction of the next 4 miles made all the rest seem like child's play. The road had to be built in a small, rocky valley, the only defiladed route of approach. To make the job even more difficult a little stream wound a meandering course from one end of the small valley to the other. Nine times this stream had to be crossed, so at nine places these artillery lads cussed and carried, sweated and shoveled, until the crossings were made.

Then the road took to the hills, and "Skyline Boulevard" was made. This section was along ridges screened by a large hill which was now in our possession. It is a very scenic drive, in places with sheer drops on both sides of the road. Soon it had gentle slopes where sharp inclines were before, and easy "U" and "S" curves. And in one spot where the road necessarily broke defilade, traffic moved just a little faster because of enemy shellfire's placing "No Parking" signs along the road.

This road would have gone on a few more miles and into the open plains beyond, but the breakthrough came. So out of the hills we streamed to pursue the fleeing enemy who completely surrendered a few days later.

All praise and credit are due to the builders of this road, so necessary for the success of this part of the campaign. So thanks to the few engineers who helped and advised, and thanks to those swearing, sweating, shoveling sons of artillery who made possible Tunisia's Burma Road.

PASSENGERS IN FIELD ARTILLERY AIRPLANES

Due to an Air Corps restriction on type airplane which general officers may fly, some ground force commanders are prohibiting general officers from riding as passengers in ground force airplanes. There is no restriction on any ground force personnel from flying as passengers in these airplanes.

A FLEXIBLE SMOKE-PUFF RANGE

By Capt. L. E. Pratt, FA

Col. Mellon's *Miniature Service-Practice Range* (page 137 of the JOURNAL for February, 1943) describes a range which can be used to train FDC personnel. Despite its three gun positions, however, we felt this type lacked the flexibility desirable for training in conduct of fire. We wanted *first*, a rotating yet accurate scale so that gun positions could be changed at will and without the knowledge of the students; *second*, a means for changing the range value of each unit on the scale, to be accompanied by a deflection table corresponding to each such value; and *third*, provision for the range from the center of the impact area to the guns to be variable from about the minimum to the maximum range for our weapon.

Our range is built almost entirely from issue camouflage materials. Its basic terrain (Fig. 1) is chicken wire (40′ × 40′)

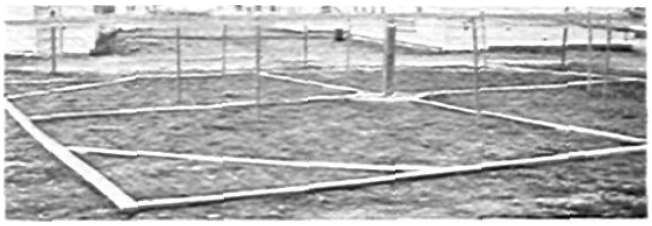


Figure 1

supported by guy wires from the center post to 2 × 4s around the edge. Hills and valleys are formed by skeleton frames of No. 9 wire inserted between guy wires and chicken wire. Over all is burlap, sewed together into one piece and painted with roads, fields, lakes, etc.; it has cedar boughs (for forests), miniature houses, machine guns, and other targets tied to it, and to prevent wind damage is kept on a 40′ pole except when unrolled onto the range for actual use.

On the ground is an independent scale which can be rotated to place the guns anywhere, making it impossible for student officers to memorize ranges and deflections. The wooden frame is strung with No. 20 wire which crosses to form 12″ grids, with each intersection securely tied to prevent distortion as the operating personnel move about. 2 × 2 supports for the guy wires are not fastened, and can be removed readily when the scale is to be rotated.

"Firing tables" were worked out for center ranges varying from 3,000 to 7,000 yards, and for three different values for the grids (Fig. 2). The instructor designates to the operators the range to be used to the center of the area, and whether each grid square is to equal 50, 75, or 100 yards; operators refer to their copy of the table to obtain deflection values, and use a plumb-bob to get the smoke puff exactly above the proper point on the scale.

Figure 3

For smoke material we obtained FM from the CWS. A small amount in a large-mouth bottle does the trick (Fig. 3). With the glass tube held against the burlap the operator blows into the other opening in the 2-hole stopper. *Caution: operators must not accidentally suck in on their tubes*, as FM is a dangerous chemical.

OPs may be placed anywhere, but a screen should obscure the operators from the students. In fact, the screen should extend even

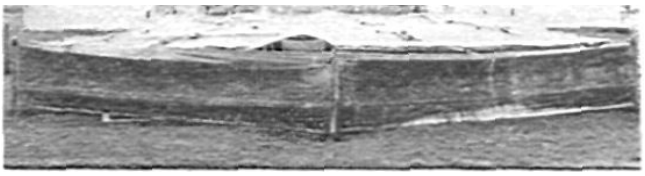


Figure 4

further than Fig. 4 indicates, so the approximate line of fire will not be disclosed. A 3- or 4-foot platform gives a better effect when FO methods are used. Air OP problems are very realistic if you use a 6-foot platform.

Varying the gun position, using different center ranges, and assigning various values per square will give plenty of variety to keep all problems both interesting and highly instructive.

DEFLECTION TABLE

Range to center of impact area:	Deflection value in mils per square, with range value per square of		
	50 yds	75 yds	100 yds
3000	2000 - 25# 2250 - 20# 2500 - 18# 2750 - 17# 3000 - 16# 3250 - 15# 3500 - 14# 3750 - 13# 4000 - 12#	1500 - 38# 1675 - 30# 2250 - 25# 2625 - 22# 3000 - 20# 3375 - 18# 3750 - 17# 4125 - 16# 4500 - 14#	1000 - 80# 1500 - 60# 2000 - 40# 2500 - 34# 3000 - 30# 3500 - 28# 4000 - 22# 4500 - 20# 5000 - 18#
4000	3000 - 15# 3250 - 14# 3500 - 14# 3750 - 13# 4000 - 12# 4250 - 12# 4500 - 11# 4750 - 10# 5000 - 10#	2500 - 25# 2875 - 20# 3250 - 18# 3625 - 17# 4000 - 16# 4375 - 15# 4750 - 14# 5125 - 13# 5500 - 13#	2000 - 45# 2500 - 35# 3000 - 30# 3500 - 25# 4000 - 22# 4500 - 20# 5000 - 18# 5500 - 17# 6000 - 16#
5000	4000 - 14# 4250 - 13# 4500 - 12# 4750 - 11# 5000 - 10# 5250 - 9# 5500 - 9# 5750 - 8# 6000 - 7#	3500 - 17# 3875 - 16# 4250 - 15# 4625 - 14# 5000 - 13# 5375 - 13# 5750 - 12# 6125 - 11# 6500 - 10#	3000 - 30# 3500 - 25# 4000 - 22# 4500 - 20# 5000 - 18# 5500 - 17# 6000 - 16# 6500 - 15# 7000 - 14#
6000	5000 - 12# 5250 - 11# 5500 - 11# 5750 - 10# 6000 - 9# 6250 - 8# 6500 - 7# 6750 - 6# 7000 - 5#	4500 - 14# 4875 - 14# 5250 - 13# 5625 - 13# 6000 - 12# 6375 - 11# 6750 - 10# 7125 - 9# 7500 - 8#	4000 - 25# 4500 - 20# 5000 - 18# 5500 - 17# 6000 - 16# 6500 - 15# 7000 - 14# 7500 - 13# 8000 - 12#
7000	6000 - 10# 6250 - 9# 6500 - 9# 6750 - 8# 7000 - 7# 7250 - 6# 7500 - 5# 7750 - 4# 8000 - 4#	5500 - 13# 5875 - 12# 6250 - 11# 6625 - 10# 7000 - 10# 7375 - 9# 7750 - 8# 8125 - 7# 8500 - 6#	5000 - 18# 5500 - 17# 6000 - 16# 6500 - 14# 7000 - 14# 7500 - 13# 8000 - 13# 8500 - 12# 9000 - 11#

Figure 2

Not in the BOOK

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.*

INSTRUMENT MOUNT FOR CONCEALED OBSERVERS

Increasing emphasis on forward observers' conduct of fire has stressed the need for a small, low mount for the BC 'scope or aiming circle to facilitate the use of these instruments while lying prone or concealed in foxholes. Two practical and extremely useful mounts have been developed by Maj. George A. Roesinger, Lt. Robert L. Feinger, and Sgt. Gale Grees.

The mount for the aiming circle consists of two brass shafts turned so that one end of each shaft when fitted together make a ball and socket joint (Fig. 1). The end of the shaft is threaded just behind the joint, and a threaded knurled coupling completes the ball and socket joint. This permits one shaft to be turned and tilted while the other is held rigid, thus providing for leveling the instrument. One end of one shaft is turned to accommodate the head of the aiming circle. The opposite end of the other shaft fits into a hole in top of the "adapter," which is a short piece of brass tube or pipe with a hole drilled in the side to accommodate a turn-screw to engage and hold fast the shaft. The tripod is constructed by drilling in the adapter three equally spaced holes into which fit three short legs. As the entire device is made of brass it does not affect the functioning of the needle; when assembled, it is quite low (Fig. 2).

Figure 1

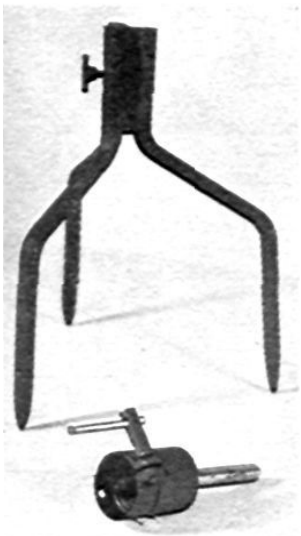


Figure 3

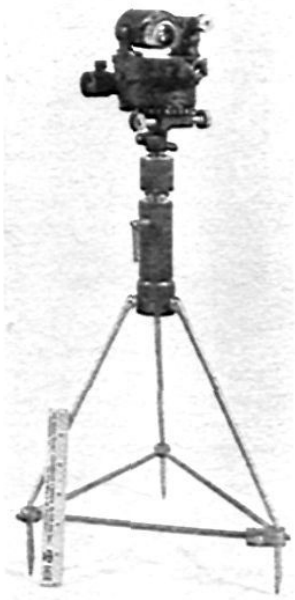


Figure 2

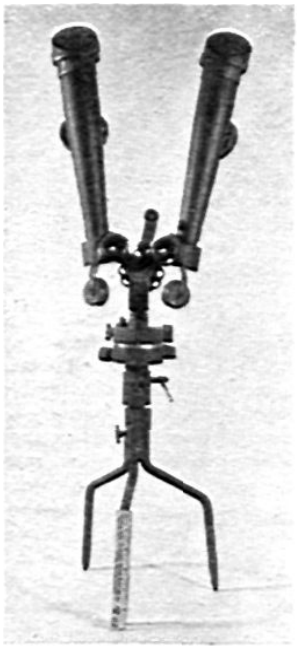


Figure 4

The BC 'scope presented a little different problem: we wanted to use the azimuth mount, and the additional weight and height of the telescopes required use of a wider base. The azimuth mount was removed from the standard type "G" tripod and an adapter designed to fit the tripod mount. It is made from a section of old steel axle turned on a lathe. A saw-cut across one side ½″ from the top (Fig. 3) gives the steel a chance to clamp in much the same manner as on the regular tripod. It was necessary to weld to the side of the adapter some tabs that could be drilled and tapped to allow for a thumb-screw to tighten the head of the 'scope (Fig. 3). The adapter (about 3″ long) supports the azimuth mount; its lower end fits into a hole in the base and is held fast by a thumb-screw. The overall assembly is about 18″ high when placed horizontal (Fig. 4).

MAJORS IVAN POGUE AND
GEORGE A. ROESINGER, FA

HIGH ANGLE FIRE

On page 340 of the May, 1943, FIELD ARTILLERY JOURNAL the increased effectiveness of high angle fire (above 800 *m*) is pointed out, and also the fact that vagaries will be encountered at these angles. One of the obvious things to look for is the sign of the correction for non-standard conditions. Below 800 *m* lowering the tube will decrease range, so (for example) if the projectile is being pushed along by a tail wind, the answer for a particular range is a lower elevation than that given in the tables. But above 800 *m* lowering the tube increases range, so to compensate for a rear wind it is necessary to increase elevation. A simple way to take this into account is to add a minus sign to the yards-per-mil value in the range table for elevations above 800 *m*. If this is done perhaps the column should be relabeled, "Increase in range for 1 mil increase in elevation."

Here are two examples firing the 105, Charge V, at 7,000 yards. The only non-standard condition is a 10 mph rear wind.

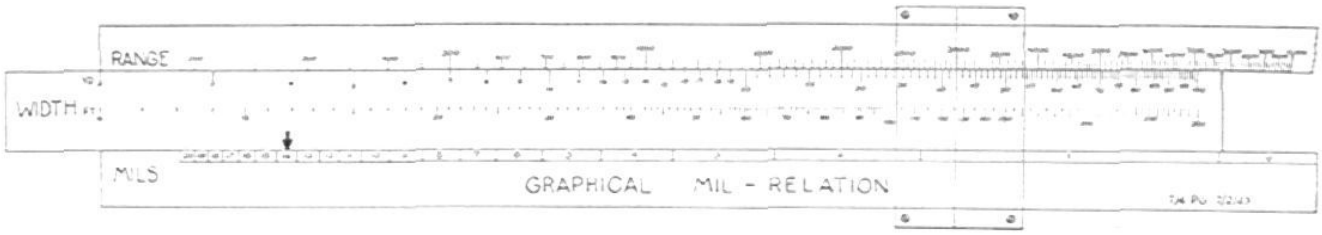
Low angle fire

Unit effect of a rear wind of 1 mph	+ 6.2	yards
Total effect (10 × +6.2)	+62	yards
Range correction	—62	yards
Yards per mil at 7,000 yards	9	
Elevation correction (—62 ÷ 9)	— 6.9	*m*
Elevation for 7,000	469.8	*m*
Corrected elevation	462.9	*m*

High angle fire

Unit effect of a rear wind of 1 mph	+ 7.2	yards
Total effect (10 × +7.2)	+72	yards
Range correction	—72	yards
Yards per mil (minus sign added)	— 8	
Elevation correction (—72 ÷ —8)	+ 9.0	*m*
Elevation for 7,000	1068.4	*m*
Corrected elevation	1077.4	*m*

CAPT. R. F. CISSELL, FA



GRAPHICAL MIL-RELATION

The VCO of this Battalion of Light Artillery makes good use of a Graphical Mil-Relation built like a Graphical Firing Table (see illustration). It was inspired by Lt. Col. Skelly's *Site Computer* (p. 534 of the JOURNAL for July, 1943); operating somewhat differently, it has given good results to date. The W Scale and R Scale are drawn in direct proportion to the "logarithmic lengths" of the Mannheim Slide Rule, but read directly to the exact yard. Angle of site is read off the arrow pointing to the M Scale. A supplementary W Scale, reading in feet, was added to facilitate the use of contour maps with foot-intervals.

To use the scale, set W (in exact number of yards) against R (also in exact number of yards), and read off the arrow the exact number of mils. In the illustration, a W of 42 yards is set against a Range of 3000; M is therefore 14.

On the back of the device is an abbreviated table of Complementary Angle of Site and Conversion Factors (not illustrated). With these and his data sheets the VCO is prepared for rapid computation of angles of site.

T 4 PAGE GILMAN, FA

TEMPLATE FOR PLOTTING FROM BASE LINE EXTENSIONS

In the FDC a coordinate square is usually used to plot forward observer's targets. Manipulation of the square takes considerable time, and is conducive to errors and inaccuracies. To facilitate plotting we have constructed a transparent, rectangular, gridded template from a section of an old range deflection fan.

General Description. The template is approximately 4″ × 6.2″. It has a 1/20,000 grid, with lines 100 yards apart. In scaled distance, therefore, it covers 2200 yards by 3400 yards.

Construction. Materials used to make the template were an old range deflection fan, water-proof ink, and lacquer.

The section for the template was cut from the fan with a hand jigsaw. Crocus cloth was then used to remove the lines and lettering on the template section, and to smooth the surface.

Points designating the ends of each grid line had to be accurately placed and marked on the template. This was done by constructing an accurate drafting-paper model, pinning it over the template with plotting needles, and using another plotting needle to prick through the model and into the template. Grid lines then were drawn with a steel straight-edge and divider points, and numbers were drawn freehand.

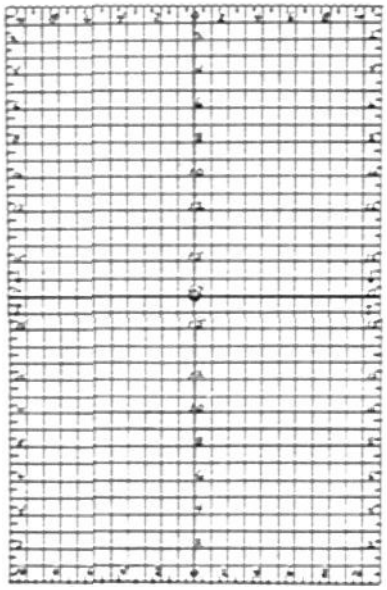


Figure 1

Grid and numbers were inked-in with water-proof ink, which of course overflowed the lines and numbers. After drying, excess ink was removed with crocus cloth, leaving the necessary amount of ink in the recesses. Each 500-yard grid line was made red, others were made black.

Numbering. The template is divided into four equal quadrants by *heavy* red lines through the two axes (see Fig. 1).

Each quadrant is numbered individually. When the template is in reading position, zeros are observed at both ends of the long axis. From either of these zeros, numbers increase laterally to right and left, and vertically toward the center of the template along the long axis.

Use. To plot, place the long axis in coincidence with the baseline. When the target designation is received, place the range sensing over the base point and plot the deflection sensing to right or left by the proper amount. Thus, if the target designation is *Base Point Is 400 Left 600 Short,* put the 600 in the upper portion of the template over the base point and plot the target 400 yards to the right of the base line (see Fig. 2). If the target designation is *Base Point Is 500 Right 600 Over*, place the 600 in the *lower* portion over the base point and plot the target 500 yards left of the base line (see Fig. 3).

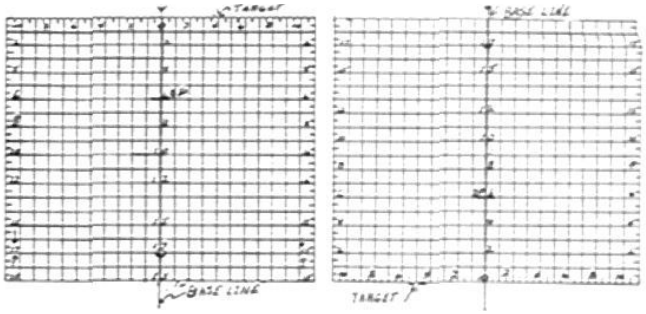


Figure 2 *Figure 3*

I believe that this instrument is more rapid, simple, less conducive to errors, and just as accurate as the coordinate square for plotting forward observer targets.

LT. ALTO E ROYER, FA

CLOTH-BACKING MAPS IN THE FIELD

In forward areas maps are almost always scarce. They should be backed with cloth and waterproofed when possible. A simple dry-mount method can be made a regular practice in almost any battalion. The only materials necessary are orange shellac (in preference to white), glycerine (usually obtainable from the Medics), an electric or gasoline flat-iron, some cloth, and a flat surface on which to work.

Coat the back of the map liberally with a mixture of shellac and about 5% glycerine (it will not penetrate through to the front surface of the map nor will it cause the map to curl or expand). Allow to stand half an hour or until no longer tacky to the touch. A second coat, especially around the edges, will provide a better seal. Spread the cloth over the surface and (starting at the center) press lightly with a medium hot iron, rubbing briskly with the hand following the passage of the iron to dissipate the heat. Caution: Too much heat or too many repeated operations will drive off the volatiles from the shellac and cause it to lose its adhesive qualities.

By this method (proved in an overseas theater) the map can be used immediately after the cloth is pressed in place. To provide more permanency, give the face of the map one coat of clear lacquer (not shellac) thinned slightly to flow more smoothly, and bind the edges with cellulose tape. The map can be rolled or folded without damage, and will resist expanding and shrinking with changes in the weather.

LT. EDWARD C. SMITH, CE

Diary of War Events

(As Reported in the American Press)

AUGUST, 1943

1st 200 U.S. *Liberators* from the Middle East deal crippling blows to oil refineries in the Ploesti region of Rumania.
Russian troops close in on German Orel base.
Allied troops push forward in Sicily.
Authorities in Berlin give orders to evacuate the city immediately unless under military order to remain.
Combined Allied air forces in Britain dropped more than 26,000 tons of bombs on German targets during July. Eighth U.S. Air Force alone destroyed 500 German fighter planes during July.

2nd Allies warn Italy that her "breathing spell" is over.
Allied cruisers and destroyers shell the harbors of Vibo Valentia and Crotone; Flying Fortresses bomb Naples.
British Eighth Army advance to outskirts of Catania.

3rd Allied forces smash Etna line in Sicily, threaten stronghold of Catania from the rear.
U.S. troops reach eastern end of Munda airfield.
R.A.F. again raids Hamburg, loses 30 bombers.

4th Russians dislodge Germans from Orel, open new offensives in the Belgorod area.
Allies continue to advance in Sicily.
U.S. troops close in on two flanks of Jap air base on Munda.

5th British Eighth Army captures Catania.
Russians take Orel and Belgorod.
U.S. forces encircle Munda airport on New Georgia.

6th U.S. troops capture Jap airfield and base at Munda.
British advance on Mount Etna, U.S. forces push toward Troina.

7th U.S. 1st Division captures Troina.
Allied fliers continue to pound Messina.

9th U.S. troops stage a surprise amphibious maneuver: land behind German line east of Santa Agata di Militello; other U.S. troops capture Cesaro.

10th Prime Minister Churchill arrives in Quebec for war conferences.
U.S. troops advance on Randazzo in Sicily.
Russians push on toward Kharkov.
British and Canadian fliers bomb Mannheim and Ludwigshafen.

11th Allies in Sicily come within sight of Italian mainland.
British bombers raid Nuremberg.

12th U.S. troops in Sicily again land in rear of German line. British forces push toward Randazzo.
Allied bombers active over both Germany and Italy.

13th Allied fliers bomb Rome.
U.S. troops capture Randazzo.
U.S. *Liberators* raid Jap naval base at Katacke Bay on Shimusu Island.

14th Badoglio tries to declare Rome "open city."
Allied troops in Sicily continue to push the Germans north and into Italy.
U.S. *Liberators* raid airplane plants in Wiener Neustadt, 27 miles from Vienna.
Allies gain initiative in submarine warfare: sink 1 per day during last 3 months.

15th British encircle Mount Etna and U.S. troops push on toward Messina.
R.A.F. bombs Milan.
Allied fliers destroy 48 Jap planes in the Solomons. U.S. troops capture island of Vella Lavella, take 350 Jap prisoners.

16th Messina comes within Allied artillery range.
R.A.F. again bombs Milan.
Allied airforce bombs 6 Nazi airfields in France: shoot down 37 planes, lose 12.

17th Allies complete their capture of Sicily.
Air and naval armadas continue to plaster the Italian mainland.
President Roosevelt arrives in Quebec for war conference with British and Canadian leaders.

18th Allied bombers raid Peenemeunde (Germany) in 24-hour assault.
Gen. Eisenhower reports Axis losses in the battle for Sicily were 135,000 captured and 32,000 killed or wounded against our 25,000 casualties.

19th U.S. Navy shells Gioia, Tauro, and Palmi on the "toe" of the Italian mainland.
Russian troops close in on Kharkov.

20th MacArthur's troops route Japs at Salamaua.
British ambassador to Spain demands that Spain adopt a neutral attitude.
U.S. naval forces capture Lipari and Stromboli, and gain control of the Aeolian Islands off Messina.

21st U.S. and Canadian troops find Japs gone from Kiska.
Maxim Litvinoff relieved as Russian ambassador to the United States.

22nd Allied fliers raid railyards in Naples.
Finland negotiates for separate peace with Russia.

23rd Russians capture Kharkov.
Allied fliers bomb Salerno and Crotone in southern Italy.
British and Canadian fliers raid chemical works at Leverkusen, north of Cologne.
British and Canadian bombers make heavy raid on Berlin; 700 planes take part, lose 58.

24th Quebec War conference ends, after reaching important military decisions concerning Japan and aid to China.
Germany places six Danish cities under martial law as riots and sabotage continue.

25th Lord Louis Mountbatten is named supreme Allied commander in Southeast Asia.
British Mosquito bombers raid Berlin.
Russian troops continue advances.

26th U.S. and Canada grant limited recognition to French Committee on National Liberation.
Large number of U.S. *Lightnings* raid Foggia, Italian east coast rail center.
R.A.F. *Mosquito* bombers raid Berlin for third successive night.
German destroyer sinks two of neutral Sweden's fishing craft.

27th Russian troops continue to push the Germans west of Kharkov.
Allies again bomb Naples.
Allied troops in the southwest close in on Japs at Salamaua.
British and Canadian bombers raid Nuremberg; lose 33 planes.

28th King Boris of Bulgaria dies; his 6-year-old son, Simeon, ascends throne.
Japs abandon Bairoko, their last hold on New Georgia.
14th U.S. Army Air Force raids Hong Kong for second time in 2 days.

29th Germany places Denmark under a state of siege. Danish navy blows up ammunition dumps, scuttles all ships unable to flee to Sweden.
Russian troops continue advances west of Kharkov and in the Donets basin.

30th Russian army captures Taganrog, pushes on to the Sea of Azov.
Riots and general strikes continue in Denmark and Sweden.
Allied fliers concentrate on tail centers of Orte and Torre Annunziata (Italy).
During August Allied fliers destroy 191 planes over the Solomons, lose 14.

31st Russian troops now within 50 miles of Smolensk.
Allied fliers in Sicily continue to pound Italy's railway lines.
U.S. planes from Britain raid German airfields in France.

BOOK REVIEWS

MANUAL FOR INSTRUCTION IN MILITARY MAPS AND AERIAL PHOTOGRAPHS. By Norman F. Maclean and Everett C. Olson. 136 Pages; index; illustrated, Harper and Bros. $1.75.

Here is a bang-up text for either group- or self-instruction. Clear, logical, and coherent, it breaks the material down into 16 teaching (or study) units; 3 of these are definitely for outdoor sessions (field exercises), the others can be handled either indoors or out. Each unit is subdivided into suggestions for preparation; explanation and demonstration, which are really expanded lecture notes—enough for self-study, but little enough that an instructor can't help avoiding "canned" language; and application and examination. Typical aerial photos are included; they are well chosen, and reproduced extremely well.

Particularly helpful for civilian instructors are suggestions about maps, texts, and equipment, and where to obtain them. It is unfortunate, however, that the bulk of the service journals and service schools were ignored, and that the authors mention only the first portion of Capt. R. E. Riggs's excellent *Approach to Foreign Map Reading* (originally published in *The Military Engineer* and republished in this JOURNAL). A novel and useful arrangement of the publishers is their supplying 2″ × 2″ slides of the aerial photos shown in the book; these are free to instructors ordering a text for classroom use, $1.50 per set to others.

All in all, this volume maintains the high standards of the University of Chicago's Institute of Military Studies (on whose staff the authors serve) and of the publisher's Geoscience Series of useful technical books.

ARMORED WARFARE. By Maj.-Gen. J. F. C. Fuller. 189 pages; illustrated. Military Service Publishing Co. $1.00.

Fourth in this splendid series of Military Classics is this timely, newly-annotated edition of Gen. Fuller's famed *Lectures on F. S. R. III*. Fuller and our own late Gen. Chaffee had much in common—both clearly saw that a new military epoch was at hand, and that it required careful reexamination of the problems of warfare and a fresh approach in solving them. Gen. Fuller raised a lone voice in the wilderness, whereas Gen. Chaffee did have a limited opportunity to work with men and machines in order to develop and test empirically.

Changes are still taking place. Neither tactics nor organization have yet crystallized, and perhaps they never will. Doctrine, however, is taking definite shape. It is of utmost importance that officers and men of all branches, and civilians in all walks of life, understand as completely as possible the questions and problems involved. *F. S. R. III* provides an excellent starting point, and Gen. Fuller himself is most willing that it be so used and subjected to searching criticism.

Written in 1932, it has some few portions that events have rendered obsolete. Gen. Fuller frankly admits this, and even calls attention to such passages in his annotation. Most important, however, is the fact that the bulk of his thoughts have stood the test of time and battle. *Armored Warfare* should be in every officer's working library, and in every day-room.

This is a good time, too, to call attention to other volumes in this Military Classics series. The publishers have done magnificently by the armed forces in bringing forth such fine material at so low a price. *Principles of war* (von Clausewitz), *Defense* (von Leeb), and *Surprise* (Erfurth) have already been published. Soon to be released are three others of special importance. Under the title *Napoleon and Modern War*. Col. Conrad H. Lanza has prepared a new annotation of Napoleon's maxims, bringing them in line and connecting them with today's warfare. *Tank Warfare* was written by that master of the Panzers, Gen. Heinz Guderian. Also on the way is a new edition of *Roots of Strategy*, which incorporates San Tzu's *The Art of War*, Vegetius's *Military Institutions of the Romans*, Marshal de Saxe's *Reveries on the Art of War*, and Frederick the Great's *Instructions* for his generals. A fine prospect!

THE STORY OF THE AMERICAS. By Leland Dewitt Baldwin. 700 pages; index; maps. Simon & Schuster. $3.50.

History is usually taught in isolated bits, and written about in the same fashion. It is generally presented dryly and factually, or overly-popularized with too great emphasis on dubious but titillating legends. Capt. Baldwin, now in Africa, sails neatly between Scylla and Charybdis; his career likely is the reason, for he is not only a scholar but has also been a practicing historian, an editor, and a librarian.

At any rate he tells a capital tale of the Americas—all of them. From early explorations to the present war, his account is well rounded. Familiar figures stalk the pages. They live and breathe, and refuse to be mere mouldy sticks. Capt. Baldwin was faced with a tremendous task of integration and of judicious pruning to stay within the limits of a single volume. He did it well, and all of us who read this narrative are the gainers.

MERCY IN HELL, By Andrew Geer, 264 pages; illustrated; end paper maps. McGraw-Hill Book Company, Inc. $2.75.

Captain Geer takes the stuff of wartime ambulance service apart and shows his readers the ingredients. Physical discomfort, danger, horror, dust, and sweat are all a part of the finally splendid whole. A member of the American Field Service Corps is not at all times the self-assured poster version of a trimly uniformed ambulance driver one might imagine. He is a human impelled by human motives, which after all is quite creditable when you see where it leads.

Into the blistering, merciless desert he goes to give his service to the wounded. Unmindful of fatigue and danger, he competes with his fellow workers for the spot where fighting is heaviest and the need greatest.

Somehow the heroic workers of the American Field Service managed at intervals to snatch a moment for lightness and banter between their more serious tasks. At such times as well as during their long, strenuous hours of work there is shown a priceless spirit of comradeship with each other and devotion to the cause of humanity.

Captain Geer tells the thrilling story of his experiences in the desert as a member of the American Field Service with a winning simplicity, in an easy conversational manner. F. E. J.

NAPOLEON III. By Albert Guérard, 338 pages; illustrated. Harvard University Press. $3.50.

Racketeer? policeman? reformer? All three terms have been applied to Louis Napoleon Bonaparte, and to some extent all are justified. But with the passage of time the man can be seen more dispassionately, and he grows in stature.

There has been no adequate English biography of France's two-decade ruler (ending at Sedan). Guérard's volume is aptly sub-titled *An Interpretation*—not a formal biography of dates and places, it relates the man to his complex scene. The author is well fitted for this task: born and educated in France but long a resident of this country, he understands both the French scene and his American audience. He gives his readers a new and better understanding of an important period.

THE THERMODYNAMICS OF FIREARMS. By Clark Shove Robinson. 175 pages; index. McGraw-Hill Book Co., Inc. $2.50.

This book is designed as a textbook for teaching the design of firearms and ammunition. The author, a lieutenant colonel in the Ordnance Reserve, is a member of the Department of Chemical Engineering at MIT and an authority on the subject. He has done a superb job in bringing us this new and somewhat simplified book on thermodynamics. As the title implies, it covers thermodynamics only as applied to interior and exterior ballistics. B. H. W.

BRAZIL IN THE MAKING. By Jose Jobim. 306 pages; index. The Macmillan Co. $3.50.

A former Brazilian Vice-Consul in New York presents a detailed and comprehensive view of the growth and development of his country's industry and commerce.—M. K. W.

GERMAN MILITARY SCIENCE. Compiled by Ames Johnston. 119 pages; vocabulary. The Macmillan Co. $2.00.

Mr. Johnson has compiled a book of readings from military books currently used by officers of the German army. The material, unchanged and unedited (although abridged), is especially useful for those with some knowledge of German who want to brush up on that language's military applications.

AFRICA: Facts and Forecasts. By Albert Q. Maisel. 304 pages; bibliography; maps. Duell, Sloan, & Pierce. $2.75.

This is a book on Africa's past, present, and future. It gives us the whys and whats,—why we were fighting there, what we expect to gain—what the people are like.

To be up-to-date on Africa, read it!

M. K. W.

HANDBOOK OF HEALTH FOR OVERSEAS SERVICE. By George Cheever Shattuck and William Jason Mixter, 213 pages; appendix; index; illustrated. Harvard University Press. $2.00.

Prepared by two doctors of medicine, this shirt-pocket-size book could prove extremely useful. It is designed for use overseas by individuals who may be remote from medical advice or assistance; they will find its water-resistant ink and paper (as well as handy format) a boon. To minimize the chance of harm from self-medication here in the States where adequate medical aid is available, sales are ordinarily restricted to those who are headed overseas. But whether you're headed for the tropics or the arctic, you will find in this *Handbook* sound, practical help and advice on diseases, insects, surgery, and health in general.

MACHINE WARFARE. By Maj.-Gen. J. F. C. Fuller, 257 pages; illustrated. The Infantry Journal. 25c.

Gen. Fuller, now retired, might be called the British counterpart of our own late Gen. Chaffee. His was a lone voice calling for modernization and mechanization of his army, in days when intertia reigned supreme. His logic was sound, his theories later proven in battle. The English edition of this book covered events to November, 1941, but Gen. Fuller has added new material which includes the period to November 30, 1942. It will be worth your while to become acquainted with his writings.

THE ARABS: A Short History. By Philip K. Hitti. 224 pages; index. Princeton University Press. $2.00.

With many of our relatives and friends in all parts of the world, it behooves us to learn something of the people that make up this "new world" that thousands of Americans are seeing for the first time.

Many have always regarded Arabs or Moslems as a backward and uncivilized race. On the contrary, they were bathing long before it ceased to be considered a dangerous practice at the University of Oxford. Then too, Arab scholars were reading Aristotle when Charlemagne was learning to write his name.

This book was written by an authority on Arab history. He gives you an excellent picture of their life, their customs, and their religion. You will enjoy this short history of a people about whom you have known so little. B. H. W.

THE DUCKS, GEESE AND SWANS OF NORTH AMERICA. By F. H. Kortright, 464 pages; bibliography; index; illustrated. The American Wildlife Institute. $4.50.

Duckhunters, conservationists, naturalists, and lovers of fine painting and printing will all be fascinated by this volume. In short, this is a water-fowler's "bible." Nomenclature, identification, life story, migration paths, etc., are given—not for just one or two specimens, but for the whole range of fowl indicated in the title. The color plates are magnificent. Drawn by T. M. Shortt of Toronto, outstanding artist and authority on the subject, they have been reproduced superbly; birds come to life on the pages.

This work is justly in its second edition. It deserves many more.

ECUADOR. By Albert Franklin. 319 pages; index; photographs. Doubleday, Doran & Co., Inc. $3.50.

Another book on our South American friends. It gives a complete description of the topography, the people, local customs, and politics.
M. K. W.

WHAT YOU SHOULD KNOW ABOUT SPIES AND SABOTEURS. By will Irwin and T. M. Johnson. 219 pages; illustrated; index. W. W. Norton & Co. $2.50.

A famous author and war correspondent joins with a writer on secret service, to give a well-rounded introduction to spies (who, what, why, and how), counterespionage, and sabotage.

SURPRISE. By Gen. Waldemar Erfurth; translated by Stefan T. Possony and Daniel Vilfroy. 200 pages; maps. Military Service Publishing Co. $1.00.

Military men, both officers and those in the ranks, can do far worse than keep up with Military Service's dollar series of military classics. Another "beat" has been scored with this first translation of Erfurth's excellent treatise. Although prepared before the current war, it is timely and accurate: it was written by the head of the historical section of Germany's General Staff. No mere pedant, Erfurth later became head of the German Military Mission to Finland.

Surprise is considered in strategy and the several phases of tactics. It is looked at both objectively and historically. Its tremendous importance is ever emphasized, as well as its relation to economy of force. Indeed, some consider it the only necessary guiding principle. And we know how the Japs came perilously close to proving that thesis.

Dr. Possony (of Princeton's Institute for Advanced Study) is doing special work for our government. Lt. Vilfroy (who will be remembered as author of *War in the West*) is now on duty in Washington with the French Military Mission. Both did a fine job in translating von Leeb's *Defense*. They have excelled in this newer translation and annotation of *Surprise*.

THE ORIGINS AND BACKGROUND OF THE SECOND WORLD WAR. By C. Grove Haines and Ross J. S. Hoffman. 643 pages; index; illustrated. Oxford University Press. $3.25.

Messrs. Haines and Hoffman have written a book that is more than a survey of the international relations of European nations during the last few decades. They have particularly aligned it to study and interpret the policy of the United States in relation to world affairs. This does not mean that the title is too broad for the subject matter. In a sober and detailed manner the authors analyze the phenomena appearing in the world during the last two decades which ultimately led to the present conflict. A great deal of space is devoted to the rise of fascism and the foreign policies that were shaped under the influence of its philosophy.—H. A.

AIR POWER AND TOTAL WAR. By Cy Caldwell. 242 pages; bibliography. Coward-McCann, Inc. $2.50.

Cy Caldwell was a flyer in World War I. Since then he has written extensively on aeronautical subjects. For a while he agreed with the Douhet-Ziff-Seversky school of thought. Developments in this war have shown him, among many others, the errors in those extremist views. Not only has he changed his mind, he admits it; and what's more, he wants to help others regain a proper perspective.

This he does admirably in *Air Power and Total War*. He looks over military aviation's history, reviews the claims of quondam prophets, does a bit of adding of the scores, and ventures some cogent prophecies. This is a fine book for "experts" as well as laymen, especially in view of Mr. Caldwell's qualifications.

PSYCHOLOGY FOR THE FIGHTING MAN. By a Committee of the National Research Council, 447 pages; index; illustrated, Infantry Journal-Penguin. 25c.

This pocket-sized book covers all phases of psychology, in their relationship to soldiers. Its parts were prepared by or under supervision of leaders of the various fields. This quarter series of books is printed on a quite light-weight paper; we hope future volumes will have their halftones grouped on a heavier, coated paper, for good reproduction.

SCOUTING AND PATROLLING. 124 pages; illustrated. The Infantry Journal. 25c.

Direct and plain-spoken, this handbook is splendidly illustrated with photos, including some by the famed Gjon Mili. Two things are unfortunate, however. One is that some illustrations show a lack

of care in preparation and checking. The other is a complete and misleading misuse of the technical term "shrapnel," a word with whose meaning military writers should be familiar.

GREENLAND. By Vilhjalmur Stefansson. 318 pages; bibliography; index; illustrated. Doubleday, Doran & Co., Inc. $3.50.

Greenland—largest of islands or smallest of continents; the land some thought should interchange names with Iceland, for proper description; one of the world's least-understood places, now an important outpost of the Western Hemisphere.

Stefansson—American of Icelandic descent; outstanding explorer; probably the greatest authority on the Arctic and the backgrounds of its peoples.

The combination—a splendid, illuminating, and well-rounded account of this ancient land, its history, inhabitants, resources, climate—all the things you could be interested in concerning it.

ALASKA DIARY. By Ales Hrdlicka. 405 pages; index; illustrated. The Jaques Cattell Press. $5.00.

Having spent ten seasons in Alaska, our author (a famous anthropologist) is a most competent authority on our vast possession. He gives us information on the Eskimo and Indian natives, their traditions, customs, and characteristics. He digresses on the bitter arctic cold, far-north travel, transportation, food, etc. A very interesting and instructive book—M. K. W.

THE SPY IN AMERICA. By George S. Bryan. 243 pages; bibliography; index; illustrated. J. B. Lippincott Co. $3.00.

Occasional backward glances into our history are stimulating, refreshing, and helpful. *The Spy in America* deals not with this war; indeed, it closes with the end of the last one. Of course it tells of John Andre and Nathan Hale; Aaron Burr flits through its pages; Maj. Tallmadge, Allan Pinkerton, Lt. Rowan, and notorious spies of the Central Powers—all play their parts.

Here is good reading, especially since the backgrounds are well sketched in to help maintain proper relationship and perspective.

FALANGE: The Axis Secret Army in the Americas. By Allan Chase. 270 pages; index; illustrated. G. P. Putman's Sons. $3.00.

Well under the thumb of Gen. Wilhelm von Faupel, Hitler's Gauleiter in Spain, the fascist Falange works for the Axis wherever Spanish is spoken. Starting by fostering grievances and discontent, it ends as a full-blown "fifth column" (present-day politeness for "gang of traitors"). It is the wedge by which the Axis hoped and still hopes to pry the Americas apart. It has been active not only in so-called Latin America, but in these United States as well.

Mr. Chase declared his own private war on the Falange some years ago. Now he details its operations, which are as fascinating as a detective-thriller. Wherever you dip into his book you find yourself turning back at least to the beginning of that chapter in order to grasp the amazing details. His positive statements about operations in Manila help to explain the astounding collapse of that city's civilian defense organization when its real test arose. Unquestionably the Falange helps the Gestapo, and had much to do with last year's Caribbean sinkings. It is still active, but the understanding we gain from such books as this will steadily reduce its effectiveness.

CONFLICT: The American Civil War. By George Fort Milton. 356 pages. The Infantry Journal. 25c.

RIFLEMAN DODD. By C. S. Forester. 209 pages. The Infantry Journal. 25c.

These two little paper-bound books are available in this edition only to members of the armed services. The first of them is a history, the second a novel of Wellington's Peninsular Campaign.

THE WAR IN MAPS: An Atlas of The New York Times Maps. Text by Francis Brown, maps by Emil Herlin and Vaughn Gray. 167 pages. Oxford University Press. $2.00.

Revised and enlarged, this second edition remains the finest graphical outline of the war—from its background, on through Poland and later campaigns, to our North African conquest. Each map is accompanied by a clear, brief description of the operations (land or sea) illustrated there.

Mr. Herlin suffered a most untimely death about the time the first edition of this book was publisher. His work is ably continued by Mr. Gray, who assisted with the first edition and now applies both new maps and revisions of some old ones.

I SEEK MY PREY IN THE WATERS. By Squadron-Leader Tom Dudley-Gordon. 297 pages; illustrated. Doubleday, Doran & Co. $3.00.

Britain's Coastal Command is responsible for the convoying of all shipping going to or leaving Great Britain. The authors (actually Commander Gordon Campbell, Squadron-Leader Dudley Barker, and Squadron-Leader Tom Guthrie) of this factual account have been on the scene when the Bismarck was caught in the Atlantic—when the Lutzow was torpedoed—and when the Coastal Command watched over the ships bringing back the Army from Dunkirk. It is a day-by-day tale of the lives of the men who face peril every day in their determination to smash the U-boat.

M. K. W.

GOING TO OFFICER CANDIDATE SCHOOL! (Third Edition.) Edited by Maj. Nelson A. Voorhees, WO (JG) Martin Goldenring, and Lt. Tino Suarez. 199 pages. Military Service Publishing Co. $1.00.

Since OCS courses have been lengthened and classes curtailed, it is more than ever important that prospective candidates choose their courses carefully and prepare themselves as adequately as possible. With that in mind, this helpful book has been revised to June, 1943, to reflect the latest available information. A section on aerial observers has been added, too. The editors tell you how to choose your OCS and how to apply for it. Even more important, they give the requirements, courses, and text references of each OCS. Good stuff.

TORPEDO 8: The Story of Swede Larsen's Bomber Squadron. By Ira Wolfert. 127 pages; endpaper illustration. Houghton Mifflin Co. $2.00.

Ira Wolfert experienced the Guadalcanal fighting from October, 1942, on. His dispatches won him a Pulitzer Prize in Journalism, and his *Battle for the Solomons* is a magnificent book.

Before returning to the Pacific in April, he completed this startlingly vivid account of the men, planes, and fights of one of our navy's finest torpedo-bombing squadrons. At Midway it was practically wiped out in a few minutes—only 3 out of 45 men returned. But immediately it was thrown into the Battle of the Solomons, manned by two Midway veterans, some remnants who had not seen action there, and replacements. Its slogan was changed from "Attack" to "Attack—and Vengeance."

And vengeance it exacted! In three months and a week, in 39 missions, they were credited with two carriers; they hit a battleship, five heavy and four light cruisers, a destroyer, and a transport; to help balance their 42 lost at Midway, they must have slain thousands. They fought ashore and at sea, on the ground and in the air—and heir revenge is epic, and fittingly recorded.

SECRET SOURCES. By Wythe Williams and William van Narvig. 326 pages. Ziff-Davis Publishing Co. $3.00.

About four years ago a newcomer among radio's commentators zoomed into national prominence because of his startling and amazingly accurate forecasts. Days or weeks before news was conventionally

released, he would state it as positively having happened. It seemed as though he must have had a pipe-line into Berchtesgaden.

He had. It was established through the help of van Narvig, whom Williams first met in 1915 while European correspondent for the New York *Times*. Van Narvig fought with the Russian Army, later served with the Finns, knew Russia and Germany intimately, and had close contacts in high places of both governments. He found anti-Nazis in Karin Hall, Berchtesgaden, the Wilhelmstrasse, and the Gestapo. A small but tight and quite effective organization was established, which sent amazing intelligence through a shadowy and important figure who appears as Klausmann in this account.

For two years the system worked, and it even drifted on into 1942, although its effective end came in the fall of 1941. *Secret Sources* primarily gives the most interesting and important of the communications received via this grapevine. Undoubtedly names, places, and perhaps even sexes have been altered to avoid reprisals against those of the ring who are still under Nazi rule. Nevertheless, *Secret Sources* is fascinating, thoroughly plausible, and a fine source of background for either refresher or study of the unfolding of events.

REMEMBER GREECE. By Dilys Powell. 206 pages; index; maps. Hastings House. $2.00.

THE GREEK MIRACLE. By Stephen Lavra. 144 pages; map. Hastings House. $1.50.

Miss Powell first lived in Athens in 1926, in the shadow of the last war which never quite lifted from Greece. She knows intimately both the country and its people, and loves them both deeply. Without sentimentality she recreates the life and customs of the south Balkans and the Greek campaign, in a way that makes the reader well appreciate this past (and future?) battleground of this war. *Remember Greece* was first published in England in 1941; this first American edition has been brought down to date, with details of the Axis occupation.

Mr. Lavra's book begins with the background of Italy's invasion of Greece. It carries through to the end of April, 1941, when armistice negotiations were opened with the Germans—who had been forced to come to the rescue of their partners in crime. David Walker's English translation was first published in 1942. Its excellence led to this first American edition.

STUDIES ON WAR. 158 pages; maps. The Infantry Journal. 25c.

This little book takes up European military thought and practice, economics, and warfare, and the United States Army (past and present). Not too "easy-reading." M. K. W.

THE NEW WORLD GUIDES TO THE LATIN AMERICAN REPUBLICS: VOLUME II. Edited by Earl Parker Hanson. 876 pages; maps. Dwell, Sloan & Pearce. $2.50.

Sponsored by the office of the Coordinator of Inter-American Affairs, this series aims to present reliable background and travel information. This second volume covers the South American countries. Treatment of each is similar: a general description, including history and geography; art and architecture; considerable practical information (economics, health, clothing, sports, transportation, etc.); a regional guide ("Baedeker"); and an index. The *Guide* is a fine contribution to a rather neglected field.

EXPERIMENTS IN ELECTRONICS AND COMMUNICATION ENGINEERING. By E. H. Schulz and L. T. Anderson. 381 pages; index. Harper & Bros, $3.00.

Here is a laboratory text prepared by members of the electrical engineering faculty at Illinois Institute of Technology. It was developed under the supervision of Colonel Charles N. Sawyer for the Army Signal Corps. It contains 108 experiments ranging from simple direct current measurements to complete video amplifiers.

B. H. W.

GLOBAL WAR. By Edgar Ansel Mowrer and Marthe Rajchman. 125 pages; index; maps and charts. Wm. Morrow & Co. $1.00.

This book contains 70 maps and charts, geography of the great powers in 1939, waterways, landways, and natural routes of invasion. It is a thoroughly worthwhile book to have at hand. M. K. W.

THE TWO MARSHALS: Bazaine-Petain. By Philip Guedalla. 346 pages; index. Reynal & Hitchcock, Inc. $3.00.

Two French leaders who between them covered French history from Waterloo to the present, make a fascinating story. Bazaine commanded the last French army to hold out against the Germans in 1870. He was made the scapegoat for the whole war, court-martialed and sentenced to death. Petain's story is shorter, but it is commonly known to all how he turned traitor during the last fall of France.

The book has a threefold purpose: it is a biography, a history, and a sidelight on national philosophy. It is most interesting.

B. H. W.

REVEILLE. By Members of our Armed Forces. 244 pages; index. A. S. Barnes & Co. $2.00.

These poems reveal the spirit, philosophy, and humor of our fighting men. They were sent in from every corner of the globe by members of our Navy, Army, Air Corps, Marines, Merchant Marines, WAC, and WAVES. A good gift for those in the service.

M. K. W.

THE MORALE OF THE AMERICAN REVOLUTIONARY ARMY. By Allen Bowman. 160 pages; references; index. American Council on Public Affairs. $2.00.

In bringing us this book the author has assembled many years of research work conducted by Professor C. H. Van Tyne. It is based not on sundry memories, but actual facts substantiated by complete references.

At this time when morale is so vital to our complete victory, and when the Axis is doing so much to try to lower it, it behooves everyone to educate himself in the art of boosting morale to the highest degree. An excellent book, and interesting reading. B. H. W.

HOW THE ARMY FIGHTS. By Capt. Lowell Limpus. 372 pages; bibliography; index; illustrations. D. Appleton-Century Co. $3.00.

This complete book on the technique of modern warfare and the latest equipment of the U. S. Army gives America's military problems, the tools with which we fight, use of the new tools, methods of modern warfare, supplying fields afar, and what the future holds.

M. K. W.

HANDBOOK OF ELEMENTARY PHYSICS. By Robert Bruce Lindsay. 382 pages; index. The Dryden Press. $2.25.

A book designed to help anyone grasp a better understanding of physics. It is divided into three parts: (1) a primer of the essentials of elementary physics; (2) an illustrated dictionary of terms commonly used in physics; and (3) an appendix that lists formulas, and mathematical and physical tables.

An excellent book for college students or for reference.

B. H. W.

SONGS OF MANY WARS. Edited and Arranged by Kurt Adler. 220 pages; index. Howell, Soskin, Publishers, $3.00.

Come and get 'em—words and music of 65 battle and wartime songs from *The Black Troops of Florian Geyer* (about 1525) to *Hey, Mr. Hacha* (the 1942 song of protest of the Czech students)! Some are familiar and some are newly revived, but most have a swing and a lilt that set your toes to tapping and your head to bobbing.

THE UNION OF SOUTH AFRICA. By Lewis Sowden. 271 pages; endpaper map; photographs. Doubleday, Doran & Co. $3.00.

As related by Mr. Sowden, the story of the Union of South Africa is a lively tale that brings to the reader a feeling of friendly acquaintance with its people. The prejudices, fears, blunders, inconsistencies, and occasional crisis-saving astuteness of the Unionists combine to give them a familiar, human quality.

Against the uneasy background of their earlier contests the Dutch and British settled down with a sprinkling of other European strains to develop the Union into a limited political entity. Unlike national characteristics and the echo of old animosities colored the political and social development of the Union in a large measure. Bitter memories of the Voortrek and the Boer War persisted in the Dutch mind against all gestures of British victor generosity. This honest but retarding sentiment was translated into political capital by unscrupulous factions; had these attained the political dominance they sought the results might have gone far toward turning the course of the war in favor of the Axis Powers. The Afrikaner's animosity toward the British, heritage of the Boer War, had the effect of driving him against his inherent principles to a negative sort of endorsement of Nazism simply because of its anti-British aspect. Fortunately the wisdom and political acumen of leaders such as "Field Marshal General" Jan Christian Smuts triumphed over the more reckless elements and succeeded in bring the forces of the Union into coordination with the Allied Powers.

The problems of the Union do not end with the opposing political parties. South Africa has a race problem based on a white numerical minority. In the words of the author: "Nowhere can there be found two million white and eight million non-white people with so many problems . . . the output of problems per thousand head of population is greater than anywhere else in the world." This sounds like a large claim, but as the theme is developed in more detail one could hardly charge that it is an overstatement.

Global war, so it seems, is beginning to bestow chance recognition of human value on natives of colonial outposts. Mr. Sowden significantly recalls the passive attitude of the natives of the East Indies territories during the Japanese assault, and observes that this was not a strong argument for the brand of democracy they had experienced. They appeared willing to take a chance on Japanese exploitation's being no worse than what they had already known. Insofar as the condition of South African natives is analogous, this constitutes a grave warning which may yet be turned to account before it is too late.

Under the stress of war the Union is making quickened strides toward social maturity. The author expresses doubt whether all gains will be permanent, but it appears certain that many restraining influences are fading into significance.

Mr. Sowden has a way of relating events, even in remote South Africa, to what is going on in the rest of the world and to their effect on the reader's own destiny. F. E. J.

PERISH BY THE SWORD. By R. Ernest Dupuy. 293 pages; bibliography; index; illustrated. Military Service Publishing Co. $2.50.

Shortly after Germany dismembered Czecho-Slovakia, Col. Dupuy put together a remarkable tryptich—the true account of our expeditions to North Russia and Siberia in 1918-20 and the Czech anabasis from the Volga to Vladivostok. From it emerges the part the United States played in forging the Czech republic, as well as fresh light on many a little known or misunderstood event of that period. Attention to this facet of military history should yield dividends in the not too distant future.

KILL OR GET KILLED. By Major Rex Applegate. 175 pages; illustrated. Military Service Publishing Company. $2.00.

An excellent manual of hand-to-hand fighting, which offers sound and essential methods of self-defense and why they should be mastered by everyone. All methods of self protection are fully illustrated. B. H. W.

ANGEL OF THE NAVY: The Story of a WAVE. By Joan Angel, Pharmacist's Mate, USNR. 201 pages; line drawings by Betty Utley St. John. Hastings House. $2.00.

Inevitably, Joan Angel will be called the "Hargrove of the WAVES." That term compliments both. Both have a discerning eye, a delicious humor, and the gift of making a reader live the experiences of the writer.

Medical assistant to a doctor, Miss Angel was among the first to enlist in the WAVES; after boot camp and further medical training, she was assigned to the Philadelphia Naval Hospital. *Angel of the Navy* tells all—it's a grand yarn that mixes serious business, straight fun, and plain-talk facts. It's a "must" book for everyone with a relative in the WAVES, the SPARS, or even the WAC. Betty St. John does her full share, too, with her both-blunt-and-sly sketches.

THE FIGHTING AMERICAN. Edited by F. Van Wyck Mason. 747 pages. Reynal & Hitchcock, Inc. $4.50.

Here is a book you will want to read and re-read. Its title tells just what it is about—fighting Americans. This volume is a compilation of many of the outstanding episodes concerning our fighting spirit.

The stories here selected are accounts from the French and Indian War, the Revolution, the War of 1812, the Mexican War, Indian Wars, the Civil War, War with Spain, and World War I. Each story was picked by a man who has proved that he knows what Americans like to read. They are all full of action and color that will hold you spellbound. B. H. W.

ENGLISH FOR THE ARMED FORCES. By Lt. Col. A. G. D. Wiles, Lt. Arlin M. Cook, and Lt. Jack Trevithick. Foreword by Gen. Charles P. Summerall. 252 pages; index. Harper & Bros. $1.50.

This book was written to present English as a practical tool and a weapon for the fighting man to carry with him to the battlefront. Every officer is likely to be called upon to write important orders, reports, and letters. By study he can greatly improve his ability in writing or speaking. M. K. W.

BUT SOLDIERS WONDERED WHY. By Frank Gervasi. 267 pages. Doubleday, Doran & Co. $2.75.

Mr. Gervasi has done an excellent job of compiling fact. This book discusses many important matters that have been skirted or omitted by others who lacked the information and courage to face them.

After 50,000 miles of traveling since the outbreak of the war, Mr. Gervasi is certainly well qualified to discuss his subjects. You will agree, too, that his opinions are not just out of his imagination, but instead are based on sound and logical reasoning and the experience which he has acquired throughout his travels. B. H. W.

THE PSYCHOLOGY OF EFFICIENCY. By Arthur Gilbert Bills. 351 pages; subject index; author index. Harper and Brothers, 1943. $2.75.

Efficiency does not just happen; it is induced by the application of knowledge gained through intelligent study of the numerous interacting factors entering into performance. Some of the ways in which this is accomplished are set out in *The Psychology of Efficiency*.

The author, Professor of Psychology, University of Cincinnati, describes the things that go on in the human machine under the stress of daily work. He leads to conclusions of how to exercise controls and direct energies so that a maximum of efficiency may be achieved at a minimum of wear and tear.

In a general sort of way much of the subject matter is common knowledge, but it takes on a fresh vitality and interest under the author's discussion. The text is direct and authoritative without scholarly heaviness. It deals specifically with work problems that are widely familiar and with the means for their solution. It is a book well worth reading at any time, and especially recommended by the present conditions that demand the utmost in the economic use of manpower. F. E. J.

THE BATTLE IS THE PAY-OFF. By Capt. Ralph Ingersoll. 217 pages; end maps. Harcourt, Brace & Co. $2.00.

The author writes this book as a soldier, committed to the ultimate reality of combat. He became a soldier the tough way, through basic training, officer candidate school, and on to the battlefield. The fighting that is described took place on a few square miles of Tunisian mountains, but the battle whose reality is on every page is the battle being fought today by American soldiers in every part of the globe.

M. K. W.

THE LEGACY OF NAZISM. By Frank Munk. 282 pages; index. The Macmillan Company, 1943. $2.50.

The post-war world is undoubtedly one of the uppermost subjects in the minds of all civilized mankind today. It is frequently an escapist concept meaning many different things to different individuals. The enslaved peoples who would take mental refuge from their hard lot probably visualize it as a world of simple well-being, a sort of utopia, in which justice and respect for human rights will be universal. The Axis peoples doubtless see it as a vast territorial acquisition with populations helplessly subjected to their tyranny.

Many people think of it vaguely as a "return to normalcy," when the more-or-less orderly ways of our pre-war existence will be picked up where they were left off. Still others look forward to it as a dazzling era of mechanical magic and fabulous push-button ease when we may become a little drunk perhaps on luxury and leisure.

Dr. Munk penetrates the subject of the post-war world with keen economic understanding, and his conclusions have scant room for the more popular and superficial notions of what is to be. The legacy of Nazism is a social, economic, and political reality that must be taken into account in re-shaping the world after the war. Totalitarianism will have set in motion forces and counter-forces that are bound to work revolutionary changes in social structures, and plans for rebuilding must accommodate themselves to this fact.

The post-war period will bring with it problems no less than those of war. Dr. Munk has anticipated some of these problems, analyzed them in the revealing light of contributing causes, and brought his knowledge of world economics to bear on the discussion of them. His book is a wholesome antidote for the plentiful lay predictions of a post-war world bristling with glorified gadgets in which the old economic structure is supposed somehow to come through right side up.

F. E. J.

OTHER BOOKS RECEIVED

PERSONAL LEADERSHIP FOR COMBAT OFFICERS. By Lt. Prentiss B. Reed, Jr. 116 pages. Whittlesey House. $1.50.

Good stabilizer for junior officer or NCO, especially when first handling men.

NAVIGATION. By J. C. Kingsland and D. W. Seager. 95 pages; illustrated. Oxford University Press. $1.00.

Basic and background material, designed for the prospective flyer.

HOW TO CONDUCT ARMY CORRESPONDENCE. By Henry C. Coleron and F. Allen Burt, M. Ed. 119 pages; appendix. Harper & Bros. $1.50.

A very handy little book for any administrative officer or clerk.

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