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PART ONE: GERMANY

Section I. HOW THE ENEMY DEFENDED THE TOWN OF ORTONA

Toward the end of December, 1943, a Canadian infantry outfit attacked and captured the town of Ortona, in Italy. A Canadian officer who took part in this action gives the following account of how the Germans planned and executed the defense of the town.[1]

The German defense of Ortona was well planned. The defensive layout was based on an intimate knowledge of the town, the approaches, the streets, the alleyways, and the best routes from street to street, building to building, and even room to room. With this detailed knowledge, the enemy sited his weapons and carried out a determined defense, the outstanding feature of which was acknowledged by our [Canadian] troops to have been "sheer guts."

The enemy had chosen a "killing-ground," and all his weapons were sited to cover this area. Where the approaches to the "killing-ground" could not be covered by fire, the Germans had demolished buildings so as to create debris obstacles. The enemy could, and did, cover these debris obstacles by fire. Groups of machine guns were always sited so that the fire of one supported the fire of another.

[1] Ortona is a town of well-built houses and narrow streets. Most of the houses have cellars leading out into underground passages under the street; such a passage may link as many as six houses. The southern part of the town is more modern. There the streets are wider, and there are numerous squares. It was in the southern area that the Canadians encountered the heaviest opposition.

Figure 1 shows a typical German defensive position at the intersection of a street and an alley.

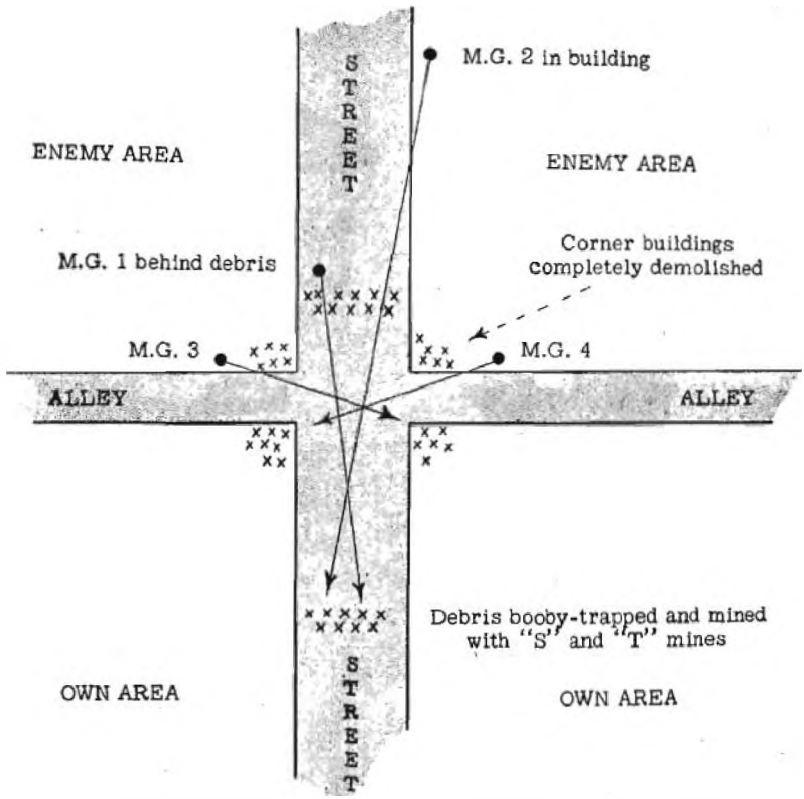


Figure 1.—Typical German Defensive Position at Intersection of Street and Alley.

In this instance, machine gun No. 1 was sited so as to cover the crest of the pile of debris which had been created in the main street on the other side of the alleyway. Machine gun No. 2 was sited high up in a building so as to fire over the top of the debris pile—that is, so as to cover our approaches to it. Machine guns No. 3 and No. 4 gave supporting fire and also

had the mission of intercepting any of our troops who might contrive to get past the pile of debris and attack machine gun No. 1. (In almost every case, the piles of debris had been booby-trapped and mined with S-mines and Tellermines.)

The enemy made use of flame throwers, although not extensively, employing them for missions similar to those of supporting machine guns. In the few instances in which flame throwers were used, they were sited at ground level behind piles of debris, so as to cover the approaches to the street crossings.

The enemy's antitank guns had been well sited so as to cover the approaches suitable for tanks. These guns were cleverly camouflaged, and each was provided with all-around defense by light machine guns, heavy machine guns, and snipers.

The Germans did not use mortar fire extensively. When it was employed, firing was not observed, but was placed on parts of the town behind those areas where our troops were committed. There were several instances in which the enemy placed mortar fire on his own areas.

The enemy used snipers to support machine-gun and antitank positions.

The corner buildings of major road intersections were invariably demolished so as to create debris obstacles, up to 12 feet high, which were to be impassable to tanks. These obstacles also provided the enemy with good ground cover.

As the enemy was driven back, he carried out a planned demolition of buildings. In certain instances, he had prepared buildings for demolition and blew them after they had been occupied by our troops.

At no time did the enemy make a determined counterattack to retake the buildings that we had occupied. However, he immediately reoccupied any building which had been captured by our troops and later evacuated to permit our tanks and antitank guns to place fire on adjoining buildings.

He surrendered none of his positions readily. They had to be knocked out one by one, and, if our troops did not get forward and occupy them promptly after disabling the German holding force, the enemy would reoccupy them almost at once.

It was a grim and bitter defense, and a very costly one for the Germans. The enemy frequently replaced personnel in positions as often as four times before our troops were able to occupy and consolidate the ground or the building.

Since the enemy was thoroughly familiar with the layout of the town, he was able to use this knowledge to advantage. As he was forced back, he chose his successive "killing-grounds" and sited his weapons accordingly. It was only by attacking with the greatest determination that we were able to win these areas from the enemy and, by so doing, eventually complete the occupation of Ortona.

Section II. A GERMAN DEFENSE AREA ON THE ANZIO FRONT

1. INTRODUCTION

The preceding section, which discusses the German defense of Ortona, mentions the use that the enemy made of the debris of destroyed buildings in preparing his defenses. A Fifth Army report from the Anzio front offers an unusually graphic illustration of this German practice—with the difference that in Ortona the Germans performed their own demolitions, whereas in the instance described below they made use of the collapsed walls and general debris of houses shelled by the Fifth Army.

On the road to Carano, the enemy held houses A and B and their immediate surroundings (as shown in fig. 2) with 50 to 80 men—or about two platoons. Previously, both houses had been reduced to rubble by Fifth Army artillery fire. In this debris, and in the area immediately surrounding it, the Germans had prepared a formidable strong point to cover a small road bridge over a stream. Fifth Army troops subsequently attacked and captured this bridge.

2. HOW HOUSE "A" WAS DEFENDED

In the case of house A, it was observed that all the

machine guns (34's) were emplaced in the house itself or in its outbuildings. Machine gun No. 1 was fired from a table in the ruins of what had been a room; the gun's direction of fire was through a hole in the main wall and then through the archway of a cowshed. By

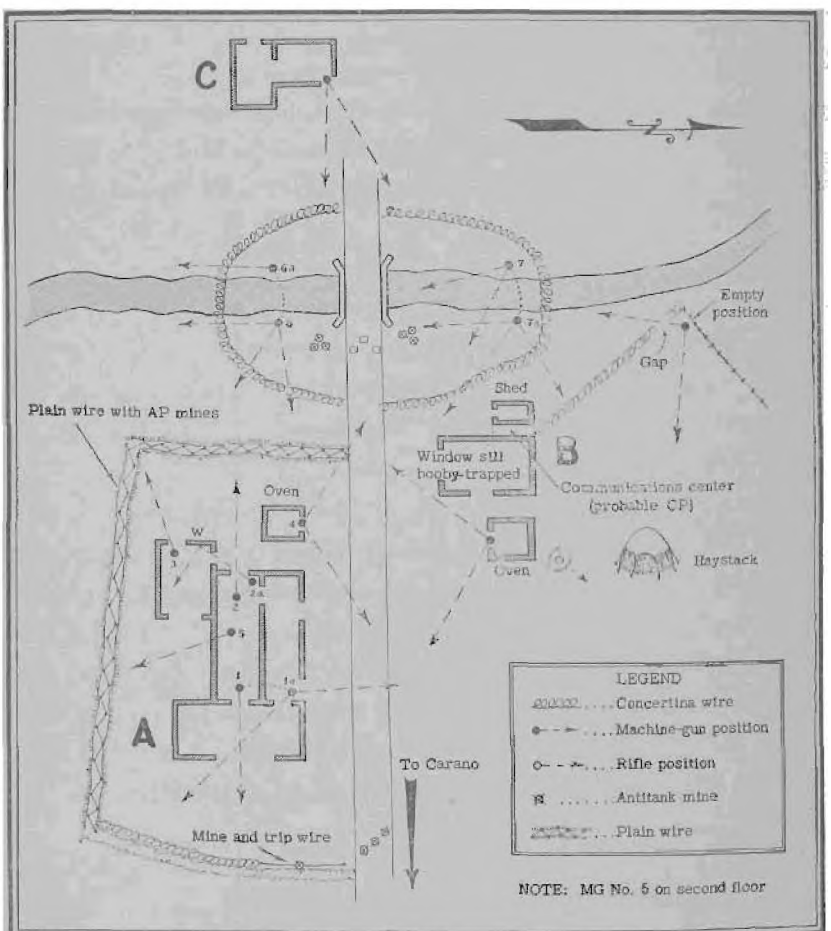


Figure 2.—A German Defense Area on the Anzio Front.

emplacing the machine gun in this manner, the Germans concealed its muzzle flash from all directions except to the front, and even from that direction it was not conspicuous. The gunner was well protected from small-arms fire and grenades, and was not exposed when he moved to his alternate (1a) position. From position 1a, the gunner was able to cover an additional area to the front and also to protect the flank of the strong point against any attack from the road. Three Mauser rifles loaded with antitank grenades were found leaning against the wall to the left of the doorway.

Machine gun No. 2 was in position inside the same room, and was sited so that it could be fired through a window facing the stream. It is interesting to note that when our forces secured the south side of the building and attempted to toss grenades through the window at machine gun No. 2, the German gunner ricocheted bullets off the wall (W) in an effort to forestall the grenade fire.

Machine gun No. 3 was sited in a corner of an adjoining room, where the walls were still standing. This gun was so sited that its plane of fire was close to the ground; during the course of the action, the gun delivered continuous fire, ankle high, toward the stream and, alternately, to the south. The walls afforded protection from the south and west. (This gun was finally knocked out by rifle grenades.)

The siting of machine gun No. 4 shows how the enemy utilizes the characteristic Italian outdoor oven as a machine-gun emplacement. By siting his weapon

in the part of the oven normally used for storing wood, the gunner protects himself against small-arms fire from the flanks and rear, and enjoys a certain amount of overhead protection against artillery fire. During the action, the No. 4 gun delivered grazing fire ankle high. (Hand grenades and rifle grenades wounded the two-man crew of this gun, and destroyed the gun itself.)

The No. 5 position, in the remnants of a second floor, was occupied by a German soldier who was armed with a machine pistol. Selecting a number of suitable points, he delivered close-range fire from them during the attack, and had good concealment. When our forces succeeded in reaching the southern wall, he delivered plunging fire over the wall. (However, grenades lobbed over the wall put an end to this.)

Concertina wire, in poor condition, was found about 50 yards from the house, on the west, south, and east sides. Smooth wire with antipersonnel mines attached to it had been staked along a narrow irrigation ditch on the west and south sides. Three or four blocks of explosive with a pull-igniter served as concussion mines. Antitank mines had been laid in the Carano road east of the house. A Tellermine with a push-pull igniter, attached to a 20-yard length of smooth trip wire, was found in a hedge 50 yards east of the house.

3. HOW HOUSE "B" WAS DEFENDED

The house B area evidently contained the communications center (and probably the command post) for

this strong point. Between the house and a nearby shed on the west side, a small dugout had been prepared. Its roof was constructed of heavy beams and was covered with earth. A standard German field telephone, a complete set of pyrotechnic equipment, and a Very pistol with a grenade launcher attached were found in the dugout.

An M.G. 34 was in position in house B's outdoor oven. This gun, mounted on a tripod, could deliver grazing fire to the southwest, toward the bridge. Alternately, it could deliver fire down the Carano road to the southeast, thereby giving mutual-support fire to house A. Furthermore, the gun was protected by a rifleman, who was dug in on the north side of the oven.

Concertina wire with concussion-type antipersonnel mines attached to it had been stretched from house B to the northwest for about 100 yards. At this point, where there was a slight gap in the wire, an unoccupied machine-gun position was found. From this position the wire continued for about 300 yards to the northeast.

A concussion-type booby trap was found on a window sill of house B.

4. HOW THE BRIDGE WAS DEFENDED

Holes, each about 1 cubic foot in size, had been prepared in the road on the eastern side of the bridge, and Tellermines, ready to be placed in the road, were found alongside the bridge. An inverted U of concertina wire protected each side of the bridge, as shown in figure 2.

Machine gun No. 6 was inclosed within one of these U's, and machine gun No. 7 within the other.

South of the bridge, machine gun No. 6 was in a prepared emplacement on the eastern bank of the narrow stream. It could fire down the stream and to the southeast across the field. Its alternate position, No. 6a, was on the western bank.

North of the bridge, machine gun No. 7 (a heavy machine gun) was on the western bank of the stream. It could fire along the stream and also support the defense of house B. Its alternate position, No. 7a, was on the eastern bank.

Both of these machine guns were destroyed by artillery fire.

(*Note:* In siting their machine guns, the Germans obviously had paid careful attention to the problem of providing mutual support. Throughout the attack, each position was able to assist and support a complementary position, and, later, house C supported a German counterattack with machine-gun fire.)

Section III. FLAME-THROWING Pz. Kw. 3

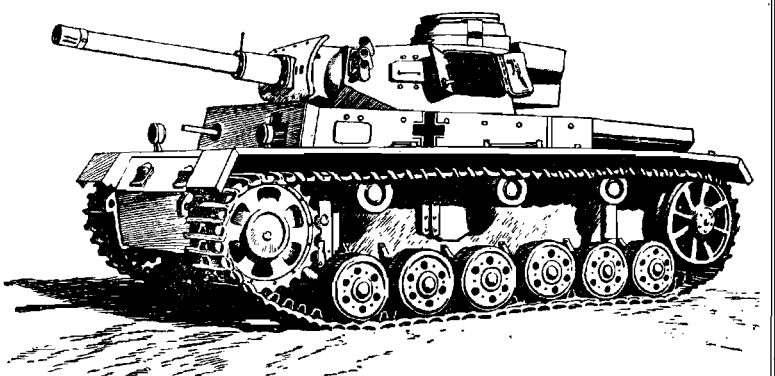
The German flame-throwing Pz. Kw. 3 (see fig. 3) appeared for the first time during the early fighting in Italy. This tank is a standard Pz. Kw. 3, Model L or later, with a flame thrower mounted in the turret in place of the normal 50-mm Kw. K., Model 39, which it resembles outwardly (see fig. 4).[1] The two machine guns, one coaxially mounted in the turret and the other in a ball mounting in the front of the superstructure, are retained.

The flame projector has a limited elevation (from —10° to 20°), while the turret has the full 360° traverse.

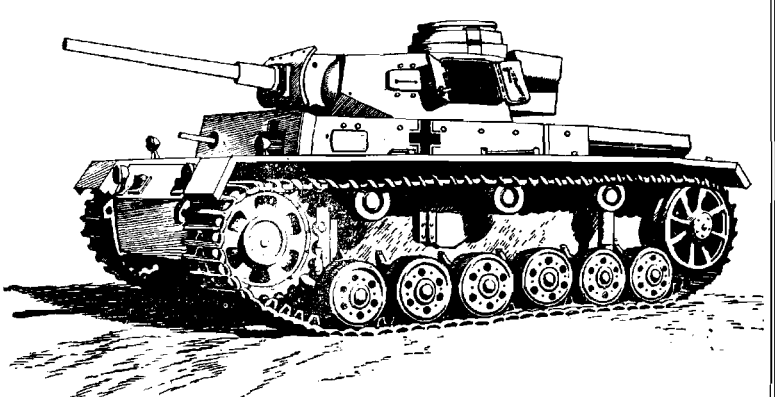
Fuel (225 gallons), contained in two tanks stowed internally, is propelled by a centrifugal pump driven by a small gasoline engine mounted in the engine compartment. Using fuel of the type thus far encountered, the flame thrower is believed to have a maximum range of about 55 yards and an effective range of about 40 yards. However, they have been used mainly at ranges of 20 to 30 yards.

In the flame-throwing tank, the crew is reduced from five to three. The flame thrower is aimed and operated by the tank commander, who has two pedals—the right controlling fuel emission and the left firing the coaxial

[1] Kw. K. (*Kampfwagenkanone*) = tank gun.



FLAME THROWER ON Pz. Kw. 3



STANDARD Pz. Kw. 3

Figure 3.—Comparison of Flame-throwing Pz. Kw. 3 with Standard Pz. Kw. 3.

Figure 4.—Pz. Kw. 3, Model L, with Flame Thrower.

machine gun. The gunner and loader are dispensed with, and their crew space is occupied by the flame thrower's fuel tanks.

As might be expected, the normal smoke equipment is retained—that is, triple smoke pot dischargers on each side of the turret.

The following is a recent instance of the tactics of German flame-throwing tanks against U. S. infantry:

Two German flame-throwing tanks, together with three other tanks, supported a German platoon in an attack on a forward position occupied by a platoon of U. S. infantry. The attack was preceded by an artillery and mortar barrage which continued for 1 hour.

The tanks moved forward, and shelled and machine-gunned the position at a range of 50 yards. When U. S. troops attempted to withdraw from the sector, the flame-throwing tanks then joined the action, using their primary weapon against the personnel. In this action the German infantrymen, equipped with machine pistols, moved forward with the armored vehicles. The flame throwers were used intermittently over a 30-minute period and were reported to have a range of 30 yards.

Section IV. MORE NOTES ON MINES AND BOOBY TRAPS

1. MINEFIELDS IN ITALY

Military observers point out that German minefields in Italy often have certain surface characteristics which can serve as useful clews for the alert U. S. soldier. For example, low wire may be stretched along the U. S. side of a German minefield. Small skull-and-crossbone flags on short pickets may indicate minefield boundaries.[1] The word *Minen* painted on boards or scratched on the ground often has been intended to serve as a warning for German troops, and consequently warrants investigation by an attacking force. Patches of earth a slightly different shade from the surrounding ground may indicate recent minelaying. Patches of withered grass are similarly suspect. Discovery of a blown-up vehicle at once suggests that the surrounding area may be mined, and that due caution should be observed. Also, the presence of even a single trip wire opens up the definite possibility that it may be one of a number in the immediate vicinity. Obviously, empty mine crates, steel containers, and igniter boxes indicate that minelaying probably has been performed in the general area at hand, if not close to the

[1] In recent weeks, however, the Germans have been laying antipersonnel mines haphazardly instead of according to definite patterns.

spot where the "empties" are found.

Thus far the Germans in Italy have used the three-pronged S-mine more frequently than any other. It has repeatedly been booby-trapped with antilifting devices (see paragraph 2).

Since the Germans use pull-release devices, as well as regular pull-igniters, it has been found essential to take the precaution of cutting only those trip wires which are slack—and, even then, not until it has been established that no booby traps of any description are connected with the wires. In any case, whether wires are slack or taut, it is only prudent to neutralize every igniter before touching the wires. Double leads may be electric leads. If they are, and are cut simultaneously, the wire cutters may cause a short circuit and detonate the charge.

The Germans continue to booby-trap movable objects of every conceivable kind. Jerrycans and oil drums still are favorite objects for this kind of activity.

2. OBSERVERS' COMMENTS ON S-MINES

a. Performance

Between the firing of the igniter and the ejection of the S-mine from the ground, there is a delay of from 3 to 6 seconds. Between the ejection and the detonation, there is a delay of from .4 to 1.4 seconds. In each case the variation seems to depend on the condition of the explosive and of the ground in which the mines are laid.

It has been observed that 8 out of 10 mines rise from

4 to 10 feet, and that about 2 out of 10 mines explode in the ground. (There are occasional duds.)

A dead weight of 140 pounds (approximately that of a man) will not prevent an S-mine from rising in the air before exploding. Therefore, a man who remains standing on a mine becomes a serious casualty and does not necessarily prevent others nearby from suffering injuries.

Mention should also be made of S-mines deliberately intended to be instantaneous. A number of these have been encountered in Italy. The Germans make their S-mines instantaneous by dropping a detonating cap into the center tube of the mine, as well as into two or three of the side tubes. The percussion cap of the igniter serves to detonate the cap in the center tube as soon as the mine is stepped on, and this at once leads to sympathetic detonation of the caps in the side tubes, setting off the main charge.

b. S-mine Fitted with Antilifting Device

In Italy the Germans sometimes lay S-mines with a booby trap added, in the hope that United Nations soldiers will attempt to lift the mines out of the ground without bothering to check the sides and bases of the mines for antilifting devices. An antilifting device may involve a second mine or a prepared charge with a pull-igniter.

An example of the latter method of booby-trapping S-mines is illustrated in figure 5. In this instance a stake is driven into the ground below the cavity prepared for an S-mine. A prepared charge with a pull-

In a discussion of the amphibious assault unit, the Japanese state that it was designed to counter the plan of hostile forces "to advance their bases successively from island to island and from one strategic point to another along the beaches. This much-employed tactic [of U. S. and Australian forces] is designed to establish strong air and shipping bases. A portion of their forces (usually with one regiment as the nucleus) lands against weakly defended or undefended areas, and, after the landing has been completed, their forces are gradually increased and their beachheads expanded."

2. DETAILS

The following details regarding Japanese employment of amphibious assault units are quoted from an enemy manual:

a. Preparations for Landing

Prior to movement, draw up various plans and orders. Familiarize the troops with them. Be prepared to set out on short notice.

The selection of a landing point is most vital. It must be made within the hostile landing area.

Endeavor to deploy our main forces along the front line. Attach a part of engineer, signal, and other such specialized detachments to each company so that the latter can act independently.

b. Departure and Movement at Sea

Usually collapsible boats will be securely tied to the sides of destroyers. Small motor landing craft will be hung from davits. Large motor landing craft will be towed. Landing preparations must be completed at least 1 hour prior to enter-

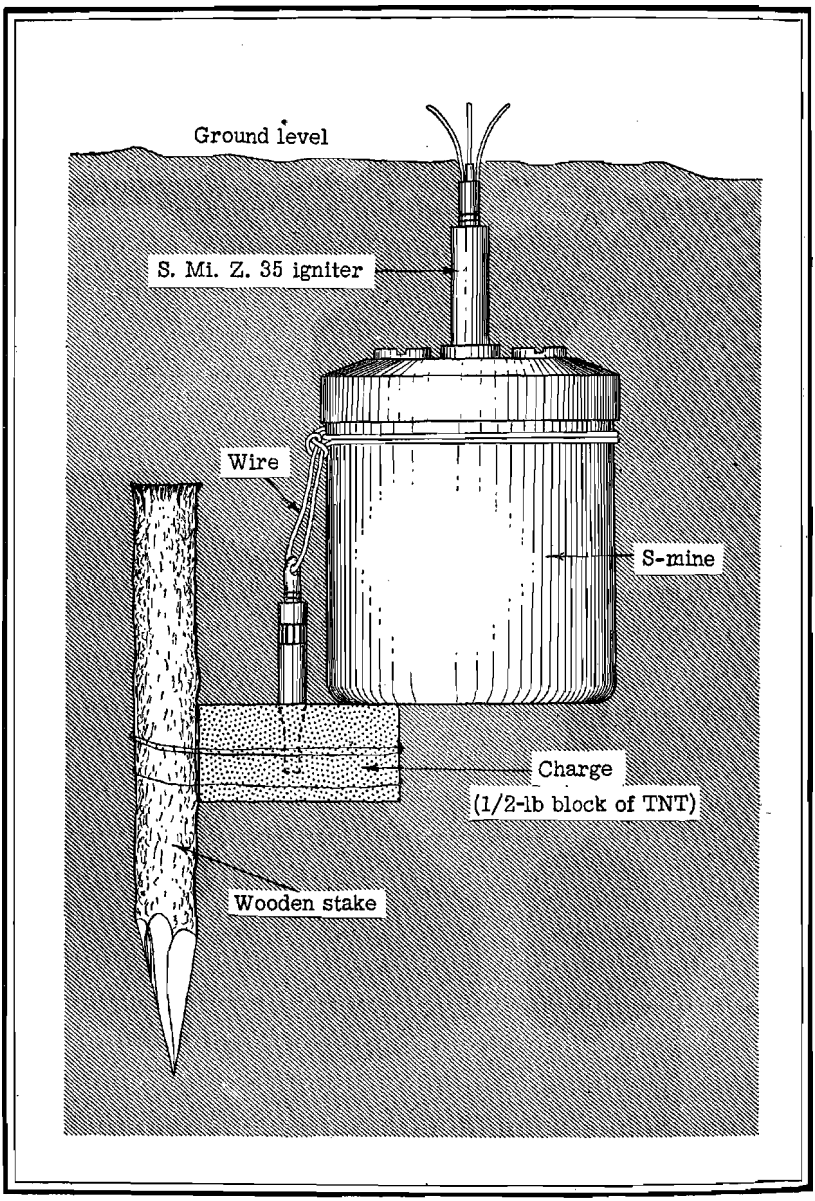


Figure 5.—S-mine Booby-trapped with an Antilifting Device.

igniter is attached to the stake, and the pull-igniter, in turn, is connected to a band of thin wire wrapped around an S-mine. The earth is then replaced around the S-mine in the usual manner, with the three prongs of the igniter showing above ground level (and sometimes camouflaged with grass, twigs, or a few leaves).

3. IMPROVISED ANTIPERSONNEL MINES

a. Warning Device for Use with Wire

Although the German improvised mine illustrated in figure 6 is antipersonnel to a certain extent, it has no shrapnel effect and is more particularly suited for use as a simple warning device.

"A German Defense Area on the Anzio Front," on pages 5-10 of this issue, mentions the use of concussion-type antipersonnel mines in connection with wire fences and entanglements. The mine illustrated in figure 6 is an example of how the Germans improvise mines for such purposes. Devices of this type are usually on the attackers' side of a fence or wire obstacle, or in the obstacle itself.

b. Fruit-can Mine

Recently the Germans in Italy have been improvising antipersonel mines out of used fruit cans. About 2 pounds of explosive are placed in one of these cans, and a pull-igniter is fitted into the explosive. The pull-igniter is held in position by means of cord or wire

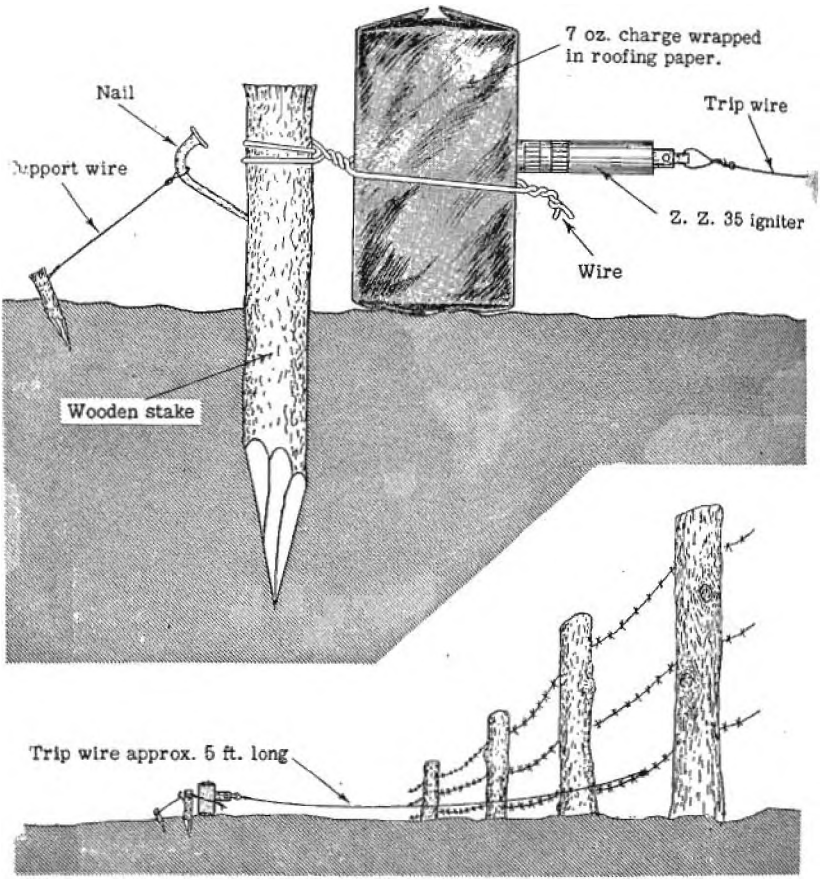


Figure 6.—German Improvised Warning Device for Use with Wire Obstacles.

wound around the sides of the can. The top of the can is left open. The improvised mine is then placed on one side of a foot path, with a trip wire leading from the igniter to a stake driven into the ground on the other side of the path.

4. RUBBISH-HEAP BOOBY TRAP

It has been reported that the Germans, in an effort to interfere with United Nations mine-detecting equipment, have covered Italian wooden box mines with rubbish including tin cans, paper, garbage, brushwood, and earth (see fig. 7). Also, booby traps have been attached to various articles in these rubbish heaps. Because of the presence of tin cans in the rubbish, it is necessary to exercise extreme caution in locating and removing the mines.

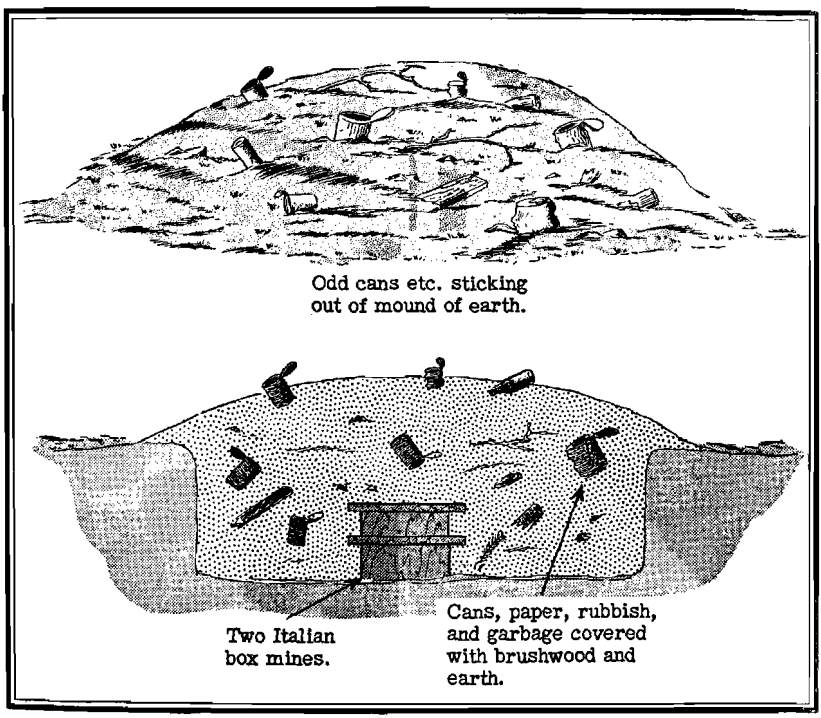


Figure 7.—Rubbish-heap Booby Trap.

Section V. BOOBY-TRAP IGNITERS

1. INTRODUCTION

Although the Germans do not issue booby traps as standard equipment, German booby traps normally involve the use of standard igniters, which can detonate either a mine or an explosive charge. It would be virtually impossible to give a complete list of the booby-trap devices that the enemy has employed to date, since they have depended to a large extent on deception and concealment—factors limited only by the enemy's extensive imagination.[1]

It is possible, however, to describe the igniters used in most German booby traps and to explain how they are fired.

Apart from booby traps which employ time-delay igniters and anti-disturbance bomb fuses, most German booby traps involve the use of antilifting devices on mines, trip wires connecting seemingly harmless objects with pull-igniters, and concealed pressure-operated igniters.

Antilifting traps may take the form of pull-igniters screwed into the base of the mine and secured to a wire

[1] Readers interested in a comprehensive discussion of booby traps are referred to *Intelligence Bulletin*, Vol. 1, No. 1, pp. 21-33. Further information on this subject has also appeared in Vol. I, No. 10, pp. 1-13 and Vol I, No. 12, pp. 1-6.

anchorage. However, the Germans in Africa buried British mines attached by wire to pull-igniters screwed in prepared charges beneath the mines. They also attached pull-igniters beneath the lids of mines. Trip wires attached to pull-igniters have been found laid in terrain of all types. Push-igniters are normally used with buried improvised mines. They have been found screwed into the base of Tellermines (thus making the mines antipersonnel) and also beneath the floor boards of houses. The S-mine igniter is also push-operated.

Souvenir traps, which rely for their effect on distracting attention from the igniter, have involved pull-igniters beneath helmets, inside water bottles, and near attractive objects of all kinds; trip wires and pull-igniters near such prominent objects as abandoned guns; and grenades with the normal 4½-second delay igniter (BZE) replaced by a 1-second delay igniter, which has a red cap.

The principal German antipersonnel igniters initiated by these traps are: the push-igniter (D.Z. 35): two models of pull-igniter (Z.Z. 35 and Z.Z. 42) and the push-igniter for the S-mine (S.Mi.Z. 35). [In the above abbreviations, "D" means *Druck* or push, "Z" means *Zünder* or igniter, the first of two "Z's" means *Zug* or pull, and S means *Schützen* or infantry.]

2. THE D.Z. 35 (see fig. 8)

This push-igniter, which is 1¾ inches long and 1¼ inches in diameter, is used in improvised antipersonnel

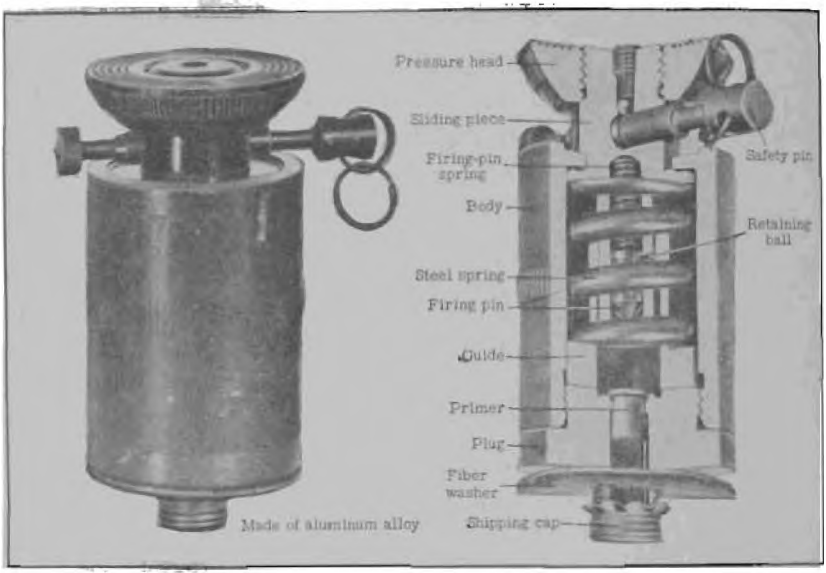


Figure 8.—German Push-igniter, D.Z. 35.

mines and with prepared charges. The igniter has a spring-loaded firing pin held up by two retaining balls. A steel spring supports the pressure head, and a weight of 126 pounds or more is required to depress it sufficiently (1/3 inch) for the retaining balls to reach the wider part of the guide, into which they escape. When they do this, they free the firing pin to fire the primer and detonator. There is a slightly shorter model of the D.Z. 35 igniter, which requires less pressure but which otherwise is similar to the one illustrated.

3. THE Z.Z. 35 (see figs. 9 and 10)

This pull-igniter is used not only in explosive charges

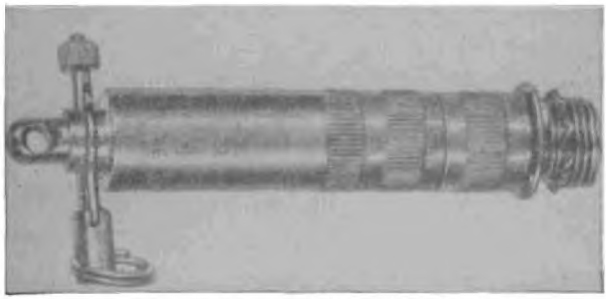


Figure 9.—German Pull-igniter, Z.Z. 35.

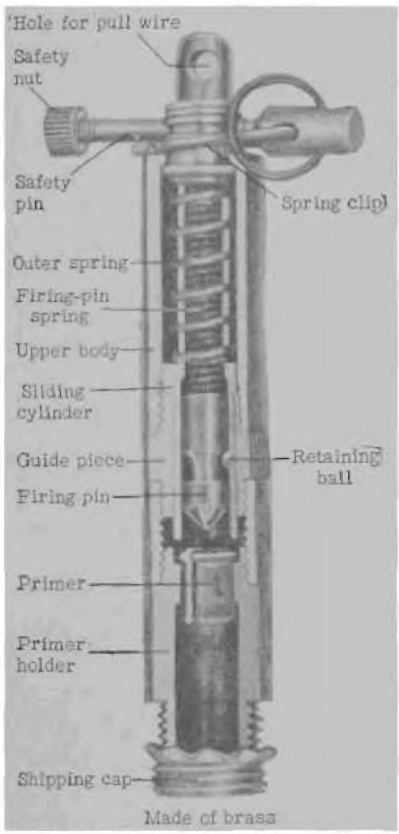


Figure 10.—German Pull-igniter, Z.Z. 35 (cross section).

but also as an auxiliary igniter in the S-mine. It contains a spring-loaded firing pin held up by two retaining balls. A steel spring resists the sliding cylinder being pulled upward (by a trip wire). It requires a tension of from 9 to 13 pounds to overcome the spring and raise the cylinder sufficiently for the retaining balls to reach the wider part of the guide, where there is room for them to escape. This frees the firing pin to fire the primer and detonator.

4. THE Z.Z. 42 (see fig. 11)

This pressure or pull-igniter is 3½ inches long and is used in small antipersonnel mines, in the antitank wooden box mines (types 42 and VBI), and with prepared charges. The igniter case is made of bakelite and contains a spring-loaded firing pin held by a release pin. There is nothing else holding the striker—that is,

Figure 11.—German Pull-igniter, Z.Z. 42.

there is no safety pin—and a pull of from 6 to 11 pounds on the release pin, either by a wire on the smaller loop or by pressure on the larger loop, removes the release pin so that the firing pin fires the cap and detonator.

5. THE S.Mi.Z. 35

This igniter is not suitable for improvised antipersonnel charges because it has a special thread and no recess for a detonator. It is used in the S-mine (see fig. 5) to initiate the 4½-second delay pellet leading to the propellant, which throws the inner container into the air. The operating principle is the same as that of the push-igniter (D.Z. 35). A pressure of from 8 to 15 pounds lowers the striker cylinder, freeing the two steel balls and allowing the spring-loaded firing pin to fire the primer.

Section VI. COMBAT SMOKE SCREENS RECENTLY USED IN ITALY

The Germans have been using smoke on an increased scale during recent operations in the Cassino and Anzio beachhead areas. In the beachhead fighting, especially, smoke was used on a large scale of a number of occasions.

In *Intelligence Bulletin* Vol II, No. 5, pp. 1-19, the German theory of smoke tactics was outlined in some detail. The following report from a U. S. observer in Italy gives actual examples of the use of smoke, both in the attack and in the defense:

On Monday afternoon, 28 February, the Germans set up a smoke screen about 4 miles long, and maintained it from 1630 until dark. The wind was favorable, and under cover of this screen, which was blowing parallel to our lines, the Germans re-aligned many of their units, and got their artillery in travel positions preparatory to making a push the following morning.

On Tuesday morning, the 29th, I witnessed the use of a smoke screen to cover a German attack on the Anzio beachhead. The smoke was laid with a 12-o'clock wind blowing in the face of the attackers. The screen was placed well back of our front lines, on our main support position. In the cool damp air of the early morning, this smoke cloud settled down to a solid bank, which moved across the level fields and passed over our front lines. However, it was fairly well dissipated by the time it reached the Germans.

From their high observation points in the mountains to the rear, the Germans were able to see over this cloud and to direct their artillery fire against specific targets, while, at the same time, the view of our observers was cut off over that entire front. The Germans made a considerable dent in our lines; however, this was more than straightened out that night, when our infantry counterattacked under cover of our own smoke screen and air bombardment.

German platoons and detachments attempt to infiltrate into our lines. When counterattacked, the Germans usually set up a smoke screen with hand grenades and small smoke pots in an attempt to cover a withdrawal.

German tanks invariably use their smoke-screen apparatus —that is, their smoke projectors—when they are fired upon. The tanks then move to safer places under cover of a smoke screen.

When small German units are preparing a night attack, they almost invariably set up a smoke screen about half an hour before darkness, and, behind this creen, move into their new attack positions. Also, smoke screens often are set up when no attack is intended. This is done with the idea of harassing our front-line units into making defensive preparations which involve a waste of time and energy.

Registration is done in the early morning and late afternoon —very frequently with smoke shells, and sometimes with only two or three rounds. On the Anzio beachhead, following the attack on the 29th, it was quite noticeable that the Germans were registering with about three rounds of smoke on all the crossroads and the various draws that our troops might conceivably use in a night movement.

About 90 percent of the German smoke shells now being used are believed to be filled with a brown-tinted liquid which gives off a dense white smoke. About 10 percent, which are used for harassing purposes rather than for screening, are

filled with white phosphorus. The use of white phosphorus by the Germans began about three months ago, and has gradually been increasing. Most of the smoke produced within the Germans' own lines apparently is created by smoke pots.

The foregoing methods of employing smoke appear to be practically standard, inasmuch as they have been used in exactly the same way on the Anzio beachhead and on the Cassino front.

Section VII. WARNING MARKERS FOR CONTAMINATED AREAS

The Germans are equipped with sets of warning markers for use in any area which may be contaminated by gas. Each set consists of 20 marking flags with rods, a roll of marking tape, and a carrying case. The total weight is approximately 3.3 pounds.

The carrying case is shaped like a long pistol holster, and is about 23 inches long. A side pocket is stitched on for holding the marking tape. The case is provided with an adjustable carrying strap. The marking tape is reported to be about ¾ inch wide, and to be dyed with a coloring matter which is resistant to light and water. Two bands of the tape, each about 27 yards long, are wound on a cardboard spool.

The steel rods for the marking flags are about 20 inches high, and are painted red. The lower tip is pointed, while the upper part is bent at a right angle. The horizontal portion of the rod is 4 inches long; attached to it is a triangular piece of yellow fabric printed with black skull and bones. A lengthening device, consisting of two metal clips attached one above another to the vertical part of the rod, permits one rod to be mounted on top of another.

According to the German Army document, "Gas Pro-

tection—All Arms," these warning markers for contaminated areas are used in the following manner:

When a gas scout (*Gasspürer*) discovers that terrain is contaminated, he goes back approximately 15 feet and sets a marking flag in the uncontaminated ground in such a manner that the warning signal points to the area of contamination. Gas scouts then reconnoiter further, as directed. If the farthest edge of the contaminated area can be reached, it is marked with contamination flags and marking tape. The distance between flags varies according to local visibility conditions. As a rule, it will be between 60 and 150 feet. The position of the flags must always give the approaching troops clear information as to the limits of the contaminated area. In terrain covered with tall vegetation (such as underbrush, crops, or tall grass) the lengthening device must be used.

When the foremost boundaries of contamination have been determined and have been marked with flags, the dangerous area can be indicated more clearly if marking tape is spread out and held in place by stones or fastened to trees or bushes. This is especially necessary in terrain where, because of brushwood and so forth, the flags may be overlooked.

The German contamination markers are light, compact, and simple. It is believed that they are satisfactory for use in the field, in spite of the fact that the smallness of the flags limits the range at which they are visible.

Section VIII. GERMAN MOBILE STEEL PILLBOX

1. INTRODUCTION

In Italy the Germans have been using a mobile steel pillbox, nicknamed the "Armored Crab," which made its first appearance on the Russian front in 1943. This pillbox (see fig. 12) is mounted in an inverted position on wheels, and usually is hauled by tractor to a designated site, where it is overturned into a prepared cavity. After this, the exposed upper half of the pillbox (which is non-rotating) is camouflaged with rocks, earth, or local vegetation.

The pillbox accommodates two men, and is armed with an M.G. 42.

2. TABLE OF CHARACTERISTICS

The following characteristics of the German mobile steel pillbox are worth noting:

a. Dimensions

Overall height	6 ft 3 in
Overall length	5 ft 10 in
Overall width	5 ft 7 in
Interior height	6 ft 1 in
Interior length	5 ft ½ in

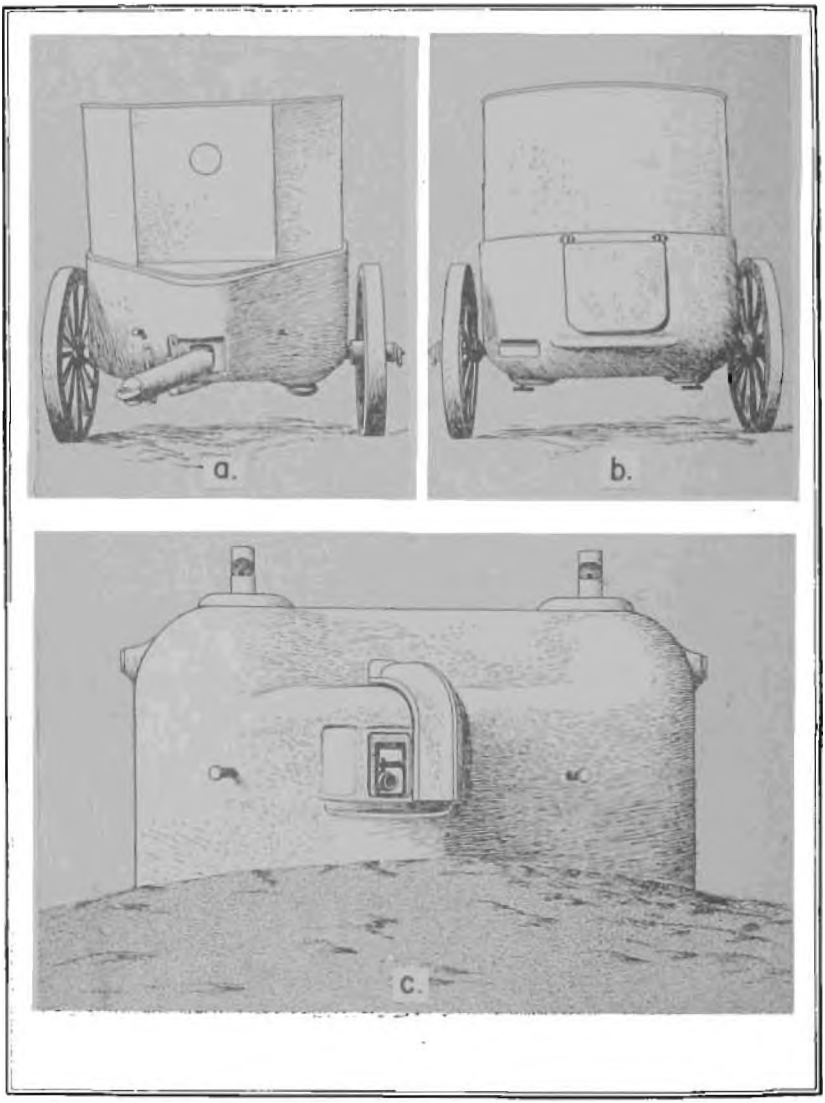


Figure 12.—German Mobile Steel Pillbox.

Interior width ..... 5 ft 3 in
Door .....1 ft 11 in by 1 ft 11 in
Gun slit .....3 in by 5 in
Vision slit (front) .....2 in by 5 in
Openings for periscopes.....4 in diameter
Ventilation slit .....8¼ in by 2½ in

b. Armor

Front ..... 7½ in
Rear and sides..... 1¾ in
Top ..... 1¾ in
Door ..... 1 in

3. DESCRIPTIVE NOTES

In the front of the pillbox, there is a small embrasure for the machine gun, with an observation peephole above. When necessary, these openings are covered outside by a heavy metal shield, which can be moved either to the right or left of the embrasure by means of a lever inside the pillbox. On top of the pillbox are two collapsible periscopes, also regulated from the interior. The entrance to the pillbox is a small door in the rear; this is locked from the inside by means of two brackets.

The machine gun is mounted on a single bracket mounting which allows a free horizontal traverse on a semicircular grooved slide. The field of fire is 60 degrees. Elevation and depression, which are limited, are accomplished by a small handle to the left of the machine gun.

Forward of the machine-gun trigger, there is a leather cover to channel off the gases from the gun and also to receive spent cartridges. Attached to the cover is a metal tube. In turn, this tube is connected to a metal box fastened to the floor. The gases are expelled by a small fan situated beside the metal box. The fan is operated by two small foot pedals, one on each side of the pillbox. Each pedal may be worked independently. Air is expelled through a slit above, and to the right of, the door. Fresh air enters through a vent in the ceiling.

Two folding seats are provided for the crew. There are two iron rungs which serve as steps to facilitate entering and leaving. Two leather straps are hung from the ceiling, near the periscope openings.

At the rear of the pillbox, and near the top, there are two holes into which steel bars may be inserted to lift the pillbox on and off its trailer. When these holes are not in use, they are closed by metal plugs.

Ammunition is stored on shelves below the machine gun, in the forward part of the pillbox. There are also two boxes for tools and spare parts for the gun. Space is provided for a field telephone.

4. HOW THE RUSSIANS COMBAT IT

The following is a paraphrase of a Red Army discussion of the best methods of combatting the German mobile steel pillbox:

Inasmuch as only a small portion of the pillbox may show above ground level, the installation may be somewhat difficult to detect. Thorough reconnaissance is necessary. The pillbox can best be detected by the outline of its embrasure, its periscopes, and its flue pipe, and by flash and powder smoke when the machine gun is fired.

Riflemen or mortar squads should demolish the periscopes, thus leaving the crew without means of observation, apart from the embrasure peephole. Rifle fire should be aimed at the embrasure. In a number of captured pillboxes, armor-piercing rifle bullets had made holes in the lower half (the walls of the base). Obviously, such fire is possible only if this portion has been uncovered by artillery or if it was not completely covered with earth when the pillbox was emplaced. Antitank guns should aim at the sides of the pillbox about 20 to 24 inches from the top, since the thickness of the armor there is only 1 inch. The most practical method of destroying these pillboxes is by point-blank fire from antitank or artillery guns.

Since the field of fire is only 60 degrees, separate pillboxes may be destroyed by assault troops moving in on the vulnerable and unprotected sides and rear. As a rule, these pillboxes are used in groups, but, by neutralizing the supporting pillboxes, it is possible to isolate any particular one.

When assault troops come up to these pillboxes, they should first clog the embrasure with earth and throw hand grenades at the trap door in the rear. If the crew refuses to surrender, the pillbox should be blown up. In attacks on these pillboxes, Molotov cocktails may be used against the periscope openings. If no explosives or gasoline bottles are available, stones or logs should be wedged against the door, to trap the occupants.

Section IX. RUSES FOR CONCEALING ARTILLERY POSITIONS

Some German artillery methods of countering Russian observation and sound ranging are analyzed in a recent article in the semiofficial Russian Army journal *Red Star*. Only those which are likely to be of interest to U. S. troops in the European theater are discussed here.

The Russians observe that since the results of sound ranging are dependent on atmospheric conditions, the Germans always try to exploit these. At times when sound carries the farthest—for example, at night, in fog, and when there is no wind—German artillerymen try to fire as little as possible. But when sound conditions are disturbed—that is, when there are head winds, vertical midday currents, sharp falls of temperature, and so on—their activity increases. The Germans also take sound into account when they are siting their guns. In Russia, this factor has led them to display a marked preference for reverse slopes, groves, lake shores, and marshes.

In Russia the Germans have used roving batteries extensively. These move around, firing a few rounds from each position — and occasionally undertaking more systematic fire. The Germans select positions which are a reasonable distance away from other

friendly units. German batteries often are held in ambush, and for long periods do not fire at all. Almost never does a gun fire singly, lest this make it easier for Russian sound ranging to locate its position. Instead, it is a common German procedure for a number of batteries to fire together at an even tempo, so that all the sounds of gunfire merge.

The Germans have been using special devices to imitate the sound of gunfire. These have been placed from 200 to 300 yards to one flank of a well-camouflaged German battery, or some distance to the rear of the actual gun sites. Sometimes these devices are supplemented by others, which simulate muzzle flashes.

In line with this same principle, a German gun will register from a site 200 to 300 yards to one flank of its battery. If a gun were moved farther away, it would make the registration for the rest of the battery less accurate and, by getting out of the general area of the battery, would make the success of the ruse less likely. When the Germans are taking part in systematic fire, they wait until they believe that the opposition has located this gun. The Germans then open up with their remaining guns.

To give their muzzle flash a background against which it will not stand out, the Germans sometimes send up rockets or set haystacks on fire. Smokeless powder and flash reducers are also used. Sometimes German engineers erect dummy structures to conceal artillery pieces, as a camouflage measure against air and ground observers.

Section X. REMOTE-CONTROLLED DEMOLITION VEHICLES

In Italy the Germans have used several types of small, remote-controlled, tank-like vehicles containing demolition charges. (The enemy also has used similar devices in Russia.) These vehicles appear to have been designed principally for use against tanks and pillboxes The control is effected by means of a three-wire cable which unwinds from the miniature tank as it moves forward.

The specifications of the several models of this contraption vary somewhat, although not appreciably. One type has an approximate over-all length of 5 feet 4 inches, an approximate over-all width of 34½ inches, and an approximate over-all height of 20 inches (see fig. 13). The body of the vehicle is made of thin steel, and is divided into three compartments. One contains the explosive charge (reported as about 80 pounds in a recent instance), another houses four relays for controlling the two electrically driven motors and for detonating the charge, and a third contains the drum of three-wide control cable. A cable guide made of steel is mounted on the rear of the vehicle.

The machine can travel at a rate of speed which is equivalent to a fast walk. The operator at the control panel can direct the vehicle forward, to the left, or to

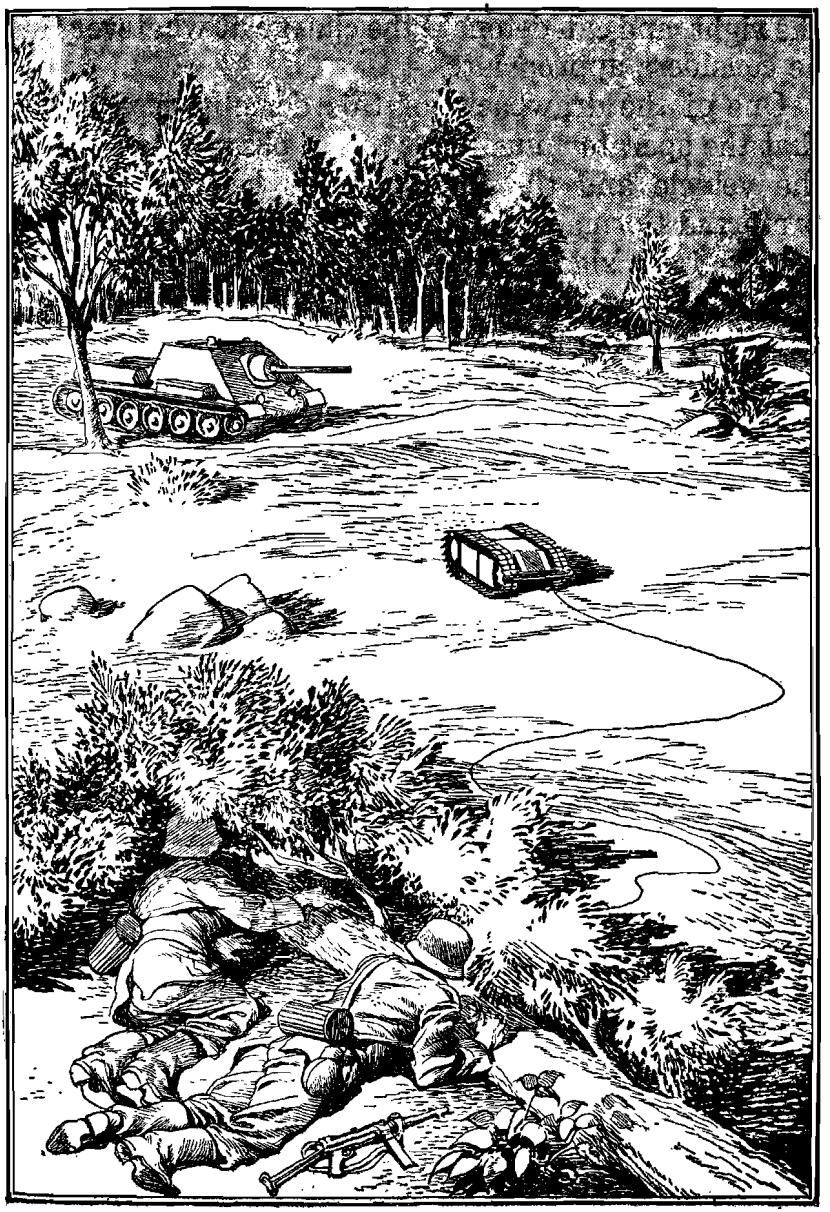


Figure 13.—A German Remote-controlled Demolition Vehicle.

the right, and can detonate the charge at whatever time he considers appropriate.

One of the drawbacks of this demolition vehicle is that the operator must have direct observation both on the vehicle and the target. It is believed that the preferred German method of operation is to direct the vehicle in a zigzag manner toward its target. The vehicle cannot travel over very rough terrain, and is definitely vulnerable to small-arms fire.

PART TWO: JAPAN

Section I. PLAN TO COUNTER HOSTILE LANDING OPERATIONS

1. GENERAL

To counter hostile landing operations, the Japanese have devised a special amphibious assault unit for the purpose of "landing suddenly and in force in the rear of opposing forces and destroying them during the initial phase of operations."

The Japanese have found it necessary to employ such forces, as outlined above, "because swift counterattacks from land positions are often impossible owing to difficult terrain, poor communication facilities, the disposition of our troops, and so on."

According to a Japanese source, the amphibious assault unit will be ordered to attack immediately after a hostile landing, often without a clear picture of the situation. If possible, this attack will be made on the same night the hostile forces land; it will, as a rule, be made no later than the following night. The Japanese stipulate that, if possible, the attack be supported by air and sea forces.

Japanese regulations state that the counter landing operations will be executed jointly by the Army and Navy, or by the Army alone. The landings will be made with naval craft or high-speed boats.

ing anchorage. If the situation permits, the landing may be made by barges directly from the base instead of using naval ships.

c. Landing Combat

When the troops are transferred from ships to barges, each barge will proceed to a designated point and will come under the control of barge unit commanders. Then, each barge will assemble at a prearranged assembly point (usually near the No. 1 ship's hull, facing the beach). When all barges are assembled, they will start out in a prescribed formation under the assault-unit commander. The starting order will be given by a concealed signal light.

As the unit approaches the shore, the formation will be deployed. Each company will advance in a single horizontal front. (Collapsible boats will be towed, or tied to small motor landing craft.) Before landing, the companies will deploy their platoons and then make the landing. For support, a naval barrage may be used, depending on conditions, but usually this will not be done.

When attacked by hostile torpedo boats, take the initiative and attack them with a portion of the armed barges while the main force continues its advance. If attacked by hostile aircraft, continue the advance. It is usually advisable not to fire antiaircraft weapons.

As soon as the barges reach the beach, annihilate the hostile forces and destroy or burn their equipment, ammunition, fuel, and so on. Continue to push on to the objective. Endeavor to achieve the utmost result before dawn.

Continue the attack with absolute reliance on cold steel, disregarding losses. However, once the fighting subsides, capture officers—particularly staff officers—for intelligence purposes, and utilize captured equipment.

At daybreak, while the attack is being carried out, move to a daytime disposition and continue on. At such times, in order

to minimize the loss from artillery shelling, our forces should not be concentrated. However, the pressure of attack must not be let up by giving too much consideration to the safety of personnel.

If an amphibious assault unit lands at a place other than one previously planned, one of the following measures must be taken:

(1) Counterland on the hostile line from the sea,

(2) Advance overland, or

(3) Make preparations near the hostile landing point for counterlanding the following night.

(This should be decided in accordance with the distance between the hostile line and the landing beach, time of landing, terrain, and so on.)

Section II. NOTES ON JAPANESE DEFENSIVE POSITIONS

1. INTRODUCTION

Described in this section are four types of Japanese defensive positions, which differ in some respects from others previously reported. One shows the organization of a defensive position for a platoon, another describes a company position, while the other two illustrate typical trench fortification systems found on Kwajalein Island.

2. POSITION FOR A PLATOON

Recently a defensive position for a platoon was outlined by a Japanese battalion commander in the Southwest Pacific theater. The commander's orders for the construction and organization of the position follow:

The distance between squads will depend on the density of the jungle; however, each squad will be located in sight of neighboring squads.

If a heavy machine gun is attached, it will be sited to permit enfilade fire in front of the forward troops.

The platoon commander will be in the center with the No. 4 (grenade-discharger) squad.

At night, squads will close in, and at dawn they will take up their original daylight disposition.

When time permits, communication trenches will be dug between squads.

Each squad will be subdivided into groups of three to five men, well equipped with hand grenades. The distance between these groups will depend on the density of the jungle, but they will be located in sight of neighboring groups.

The light machine gun of each squad will be sited so that it commands the most favorable field of fire. The squad leader will remain with the light machine gun.

When time permits, communication trenches will be dug between groups of each squad.

3. POSITION FOR A COMPANY

A Japanese company all-around defense position, captured recently in Burma, consisted of three platoon areas, which, together, occupied a frontage of almost 1,000 yards. The fortification system for each platoon was located on a small hill.

Behind the company position was a steep drop to a river, and on the enemy's left flank was a large gully, the maximum width of which was about 100 yards. In general, the area was covered by dense jungle, and the maximum field of fire was 50 yards until trees and bushes were blasted away by aerial bombing.

Since the fortification system for each platoon was similar, only one—the one on the left flank—is illustrated in figure 14.

The defense area for each platoon was surrounded by a four-strand barbed-wire fence, which was located about 20 yards out from the foxholes. The wire perimeter was about 250 yards in circumference.

Two interesting features of these all-around defense systems for platoons were the one-man dugouts constructed almost beside each foxhole and a three-bay

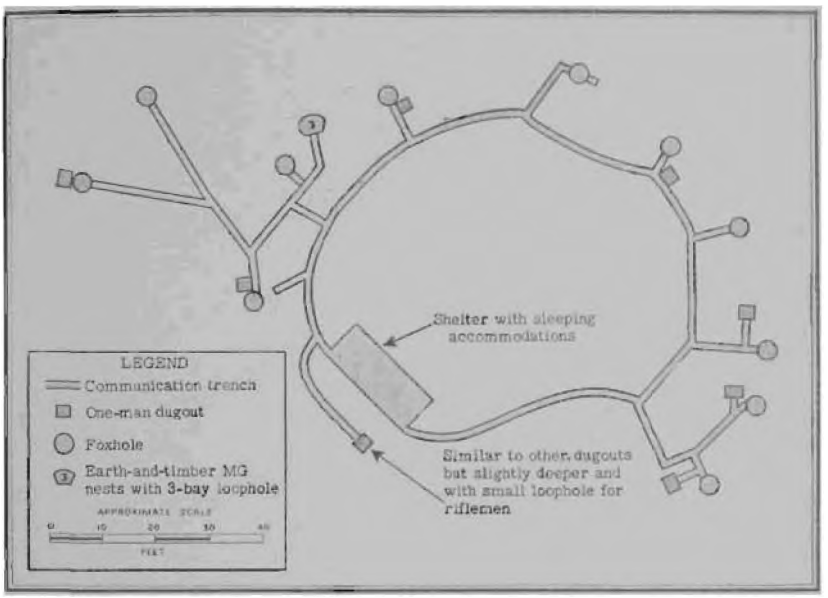


Figure 14.—Japanese Platoon Position (part of company defense area in Burma).

light machine-gun nest. The dugouts were constructed at the end of a trench, and had an earth-and-log top about 1 foot thick. The machine-gun nests also were constructed of earth and logs, along somewhat similar lines as found elsewhere.

4. POSITIONS ON KWAJALEIN

Figures 15 and 16 illustrate typical Japanese beach fortification systems as found on Kwajalein Island. The trenches were dug in an irregular pattern, which extended back of the high-tide mark to a depth of about 30 yards. If the trench system can be classified, it was of zigzag pattern. The outstanding features of the trench system were its lack of depth, the fact that indi-

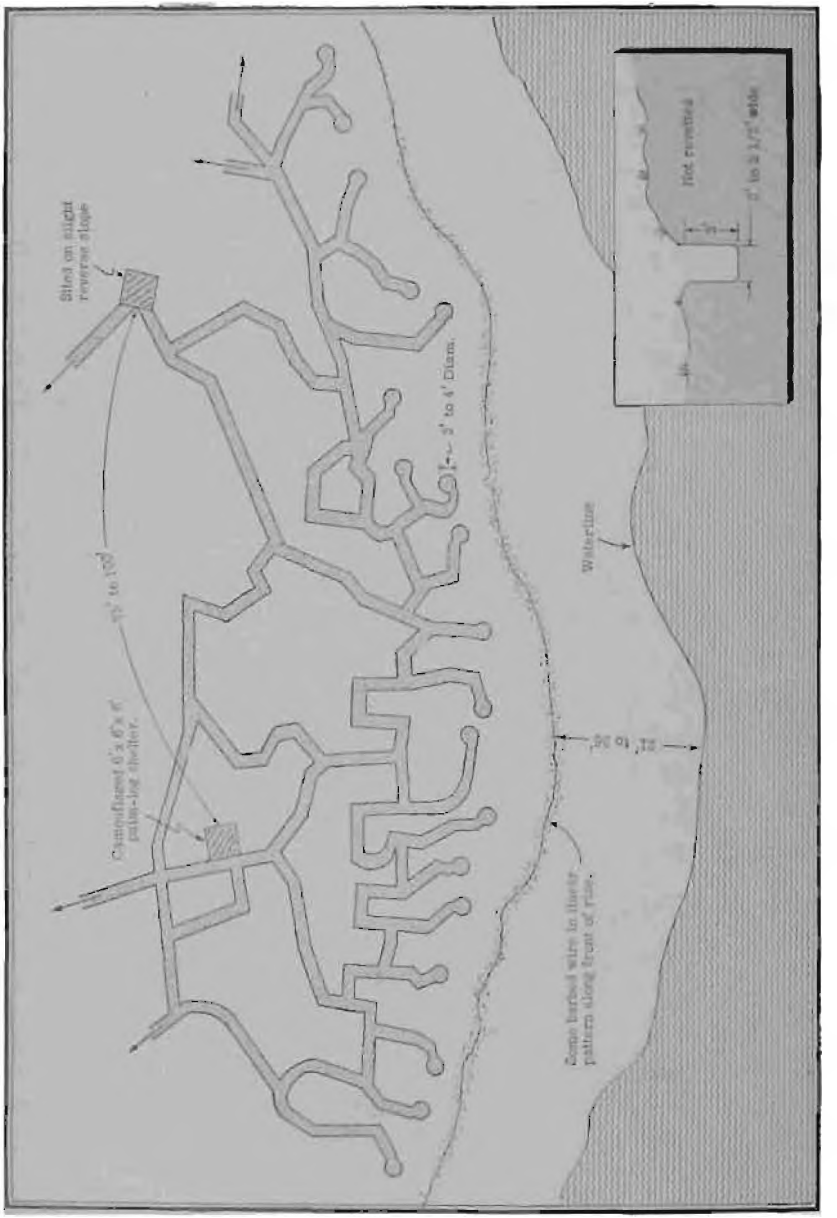


Figure 15.—Typical Japanese Trench System (Kwajalein).

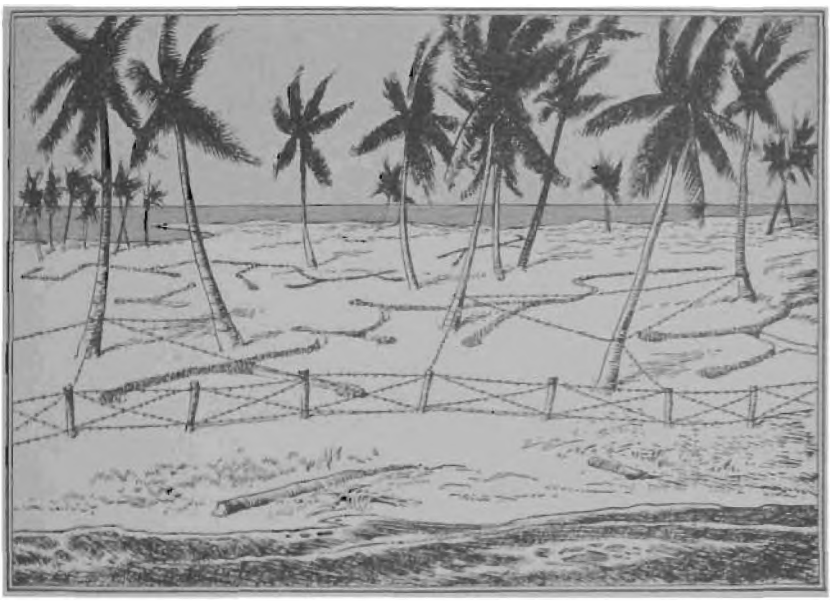


Figure 16.—Japanese Trench System (showing typical use of wire on Kwajalein).

vidual rifle pits were always offset as a countermeasure against gunfire enfilading a trench, and its high lateral density (15 feet from one trench to the next). The lateral cross-section of the trenches is shown in figure 15. The trenches were about 3 feet deep and 2 feet wide, and usually were not revetted. The trenches and shelters were placed indiscriminately and continuously on high and low ground.

Some individual rifle pits were made by setting empty oil drums in the ground, flush with the original surface.

On important beaches, and particularly on the lagoon side of Kwajalein, the trench system was augmented by concrete pillboxes and log-and-sand bunkers.

Section III. JAPANESE FIRING DEVICE FOR BOOBY TRAPS OR MINES

1. GENERAL

A Japanese pressure-type firing device, for booby traps and other similar uses, was recovered during the U. S. offensive in the Marshall Islands (see fig. 17). This was the first reported instance of the Japanese employing any arsenal-manufactured device for such purposes.

Although there is no visible means of securing this firing device either to a prepared or improvised explosive charge, the instrument can be used in a prepared charge with a seating recess, or it can be used in a framework attached to a charge of plastic explosive (of which the Japanese appear to have plenty).

2. DESCRIPTION

The firing device is constructed of machined steel, and is finished with a light black coating of paint. The device consists simply of a pressure plate and the body, which has two threaded openings to receive the firing-pin holder and the booster.

The booster incorporates both the primer and detonator, and consists of .1 gram of lead azide with a small black powder initiator and 3.5 grams of tetryl. This booster is powerful enough to detonate the Japanese plastic explosive found in the Marshall Islands.

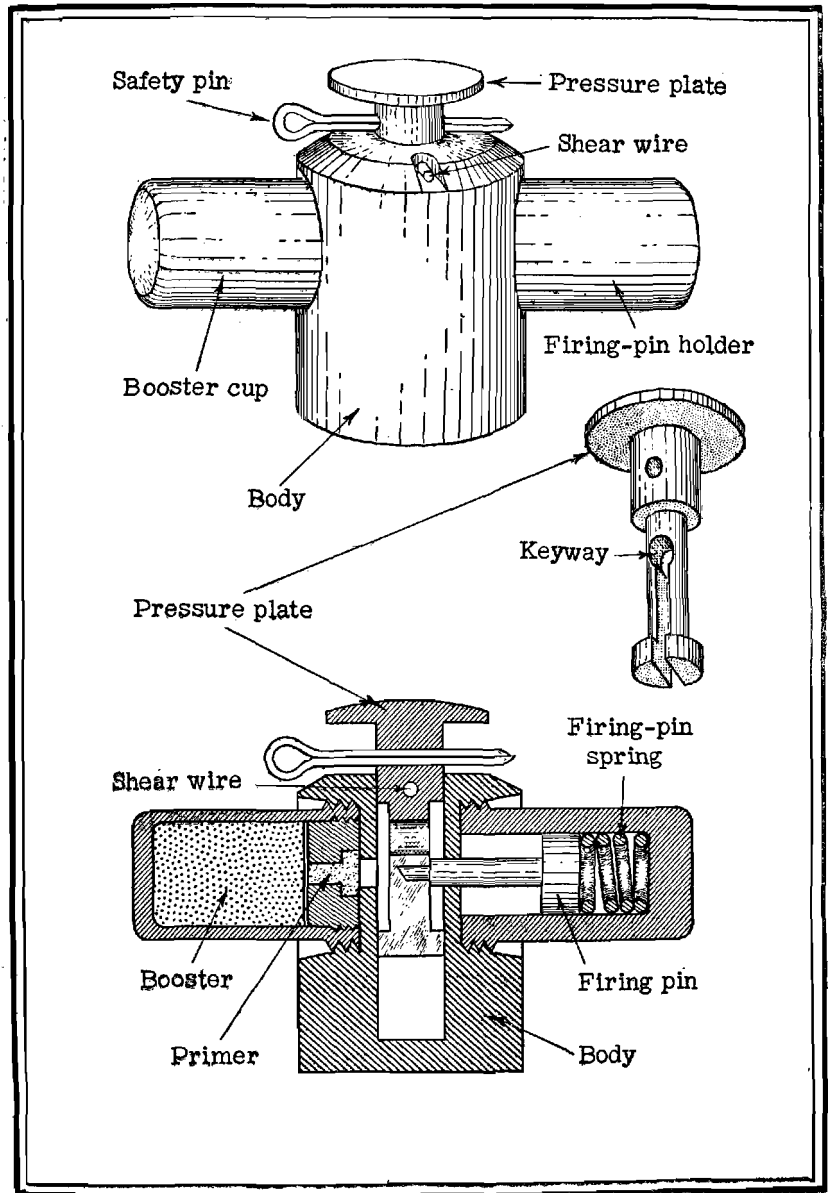


Figure 17.—Japanese Firing Device.

The firing-pin holder contains a firing pin and the firing-pin spring. When assembled, the firing-pin spring is compressed. However, the firing-pin holder in no way holds or secures the firing pin.

The pressure plate has a wide, mushroom head with a safety-pin hole, a shear-wire hole, and a slotted keyway, as shown in fig. 17. The firing-pin holder bears against a narrow portion of the keyway. The larger opening permits the firing pin to enter and pierce the primer.

3. FUNCTIONING

After the device has been secured to the charge, the safety pin is withdrawn. The shear wire in the device recovered in the Marshall Islands can be broken by a pressure of approximately 6 pounds. As the pressure plate moves down, the large hole in the keyway also moves down until the action of the spring forces the firing pin into the primer. Shear wires are not necessary, and the device may be found without them. Shear wires of various thicknesses were recovered during the operations in the Marshall Islands.

4. SAFETY PRECAUTIONS

To make this device safe, a small wire or nail should be inserted in the safety-pin hole. The firing-pin holder or booster may be removed if no safety pin is present.

Serious injury can result from a booster of this size; therefore, the apparatus should be carefully handled until the booster has been unscrewed.

Section IV. SOME DATA ON ENEMY MINES AND OBSTACLES

1. INTRODUCTION

This section describes a new Japanese antivehicle mine, and presents some pertinent data about the enemy's Model 93 land mine, his Model 99 armor-piercing mine (magnetized), and about obstacles. For additional details on Models 99 and 93, see *Intelligence Bulletin*, Vol. II, No. 1, pages 1-8, and *Special Series*, No. 19, pages 61-67.

2. NEW ANTIVEHICLE MINE

a. Description

The new Japanese antivehicle mine, of Navy design, was recovered recently in the Southwest Pacific area. The weapon has been dubbed the "Yardstick" mine because it is 3 feet long. Outwardly it resembles a Bangalore torpedo, but actually it consists of four fuzed units (see fig. 18) completely enclosed in a smooth, flattened steel tube or case, which is oval in cross section. The tube houses eight ¾-pound blocks of picric acid—two for each fuze or firing device (see fig. 18). One end of each block is so molded that the firing device fits between each two blocks; thus, in effect, the tube encloses four mines.

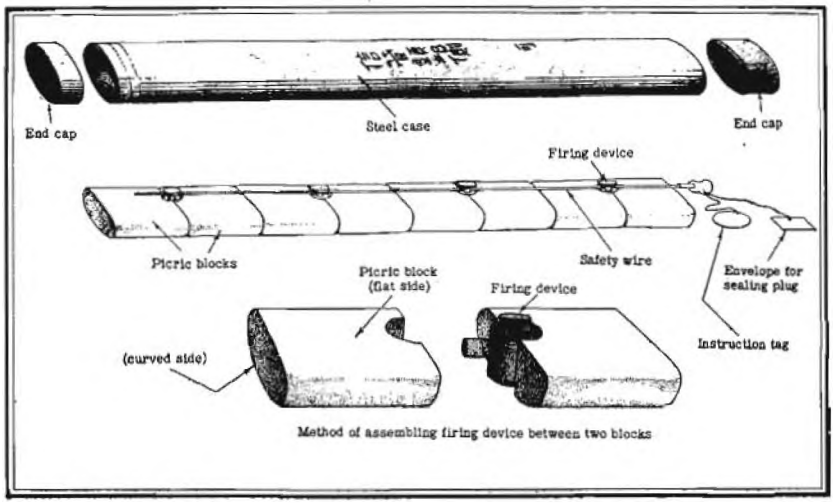


Figure 18.—Japanese "Yardstick" Mine.

The longest cross section of the oval tube is 3⅜ inches, and the shortest is 1 13/16 inches. The weight of the mine, complete, is 4.8 kilograms (approx. 10.6 lbs.) and the weight of the explosive charges totals 2.7 kilograms (approx. 6 lbs.). Each picric-acid block weighs 228.8 grams (approx. ½ lb.), and is 4⅜ inches long, 3 1/6 inches wide, and 1¼ inches thick.

The tube, painted olive drab over an undercoat of black, is formed by welding together two halves of sheet steel. Two steel caps close the ends of the tube. One cap provides a hole for insertion of the safety wire, which is held in place by a spring fitted in the cap. Both caps are removable, and are held in place by single screws.

The picric acid is cast in a paper container, and the filled block is coated with paraffin. The blocks are flattened on one side, and consequently do not completely fill the oval cross section of the mine tube. The space left between the flat side of the blocks and the wall of the tube accommodates the protruding heads of the firing devices, and also allows space for the side of the case to be depressed onto the firing devices by the passage of a vehicle over the mine.

The remains of a small envelope marked "Burying Plug" was tied, along with an instruction tag, to the safety wire of the mine. It is believed that this envelope contained a threaded plug, which screws into the safety-wire hole as a step in making the assembly moisture-proof. A thick tarlike compound had been applied to the seams around the caps which close the ends of the tube.

b. Functioning

This mine contains about three times the amount of explosive found in the Japanese Model 93 land mine. The effects of the "Yardstick" mine on a tank would depend on the amount of the mine under the track at the time of explosion. It is probable that in many instances it would have little more effect on a tank than the Model 93 mine, as only about one-third of the "Yardstick" would normally be under the tracks. The effects on unarmored vehicles would probably be much greater than the effects of the Model 93 mine.

The strength of the tube itself limits the use of the "Yardstick" mine as an antipersonnel weapon, but in its present design it could be detonated by almost any vehicle. The mines may be buried on landing strips in an attempt to deny the use of newly captured airfields.

When these mines are used in minefields, the enemy stipulates that they be waterproofed and buried within 2 inches of the ground surface.

The mine is designed to function as follows:

When enough force is applied to the pressure plate (on the head of the firing device) to break the copper shear wire, the firing-pin release plunger is depressed, the enlarged portion of the slot in the plunger is moved down, and the firing pin is driven through the opening until it strikes the priming cap.

Shear wires from two mines were tested on a tensiometer, and were broken at an indicated force of 336 pounds. The same force should be more than sufficient to crush the mine tube.

The firing device can also be used without a shear wire. In this case approximately 6 pounds pressure would cause the device to function.

The safety-pin hole under the pressure plate of the firing device is large enough to take a small cotter pin or a nail smaller than the eight-penny size. If an improvised safety pin is unavailable, the device can be neutralized by unscrewing and removing either the booster or the firing-pin holder.

The instruction tag attached to the safety wire reads:

(1) When burying [the mine], remove the safety wire and insert the burying plug. Use [the plug] after coating it with moisture-proof paint.

(2) When using this mine in close combat, the charge may be utilized after merely removing the safety wire.

c. Safety Precautions

According to a reliable Japanese source, it is very dangerous to attempt to replace the long safety wire without removing the explosive charges from the tube.

If the tube is bent and disassembly is difficult, Japanese instructions stipulate that no force be used, but that the mine be disposed of by placing it in water. Since the picric-acid charge will dissolve in water, this should be a fairly satisfactory method of disposal.

The Japanese also warn against dropping the armed mine from a height of more than 5 feet.

3. MODEL 93 LAND MINE

The information presented below on the Japanese Model 93 land mine was obtained from enemy sources. The explosive force of this mine, according to the Japanese, will immobilize a tank by damaging its tracks. The weapon is designed for offensive as well as defensive use.

a. Preparations Prior to Use

(1) Take the mine out of the storage box. With the fuze recess facing up, remove the fuze-retaining cap (brass cap, safety pin, and safety packing).

(2) Take the fuze out of the storage box. Unscrew the brass cup, which is screwed on the base, and also the safety cap, which is screwed on the upper end of the fuze.

(3) Screw the fuze into the fuze recess (right-hand thread).

(4) Screw in the safety washer and fuze-retaining cap.

b. Tactical Use

Offensively, these mines are employed to destroy tanks when they counterattack. Concentrate the mines on the roads or trails that the tanks will traverse in counterattacking. After placing the mines, move away and be prepared to aid in the annihilation of the tanks if necessary.

In employing the mines defensively:

(1) Place them where tanks are expected to pass, and conceal them by simple means.

(2) Whenever possible, place them on a hard foundation (when placing them on a soft surface, make the necessary arrangements so that the mines will be actuated by pressure).

(3) A board or a thin steel plate may be placed on top of two or more mines so that they will explode at the same time.

c. Precautions for Handling

(1) When the mine is not to be used, be sure to replace the safety cap.

(2) At the time of use, be sure to remove the safety cap.

(3) In attaching the fuze to the mine, be sure to remove the packing.

(4) When the mine is to be actuated by a pole, the latter must be more than 2 yards long.

(5) At the time of explosion, one is safe if he takes cover in a defiladed position 5 yards away.

4. MODEL 99 ARMOR-PIERCING MINE

As in the case of the Model 93 land mine, the information presented below on the Model 99 armor-piercing mine (magnetized) was obtained from Japanese sources.

a. Preparations Prior to Use

Each storage box contains two mines. When the mines are carried for immediate use, they are placed individually in carriers with the fuze attached.

To insert the fuze, pull out the wooden plug, then take the fuze out of its container and screw it tightly (right-hand thread) into the fuze recess.

b. Tactical Use

Take cover on the side of roads likely to be used by tanks. When a tank comes within close range, pull out the safety pin of the mine, hit the plunger with a hard object, and then, after making certain that the fuze is actuated, throw the mine from a distance of 2 to 3 yards. Also, one may dart up to the tank and fix the mine to the armor by means of magnetic adhesion.

c. Precautions for Handling

(1) Take precautions so that the magnets will not lose their magnetism while in storage.

(2) In actuating the fuze, take precautions to insure that the plunger setscrew slot does not fail to function. (When the plunger is depressed and the plunger setscrew slot emits a hissing sound and a small flame, one can be sure that the fuze is actuated.)

5. OBSTACLES

The following data on Japanese use of obstacles were extracted from an enemy field manual:

Discard the idea that obstacles cannot be constructed without wire entanglements and that obstacles should be constructed just as they are shown in manuals.

Use all suitable materials at hand to construct obstacles. Whenever barbed wire is available, stretch it between trees and bushes. Build things which resemble entanglements, or make obstacles simply by spreading vines between trees. When numerous trees are available, abatis can be used to advantage. Furthermore, make obstacles which are expedient [see fig. 19].

To make our fire power more effective and to check surprise attacks, it is necessary to construct at least one line of obstacles in the area around each defensive position, and also around important installations.

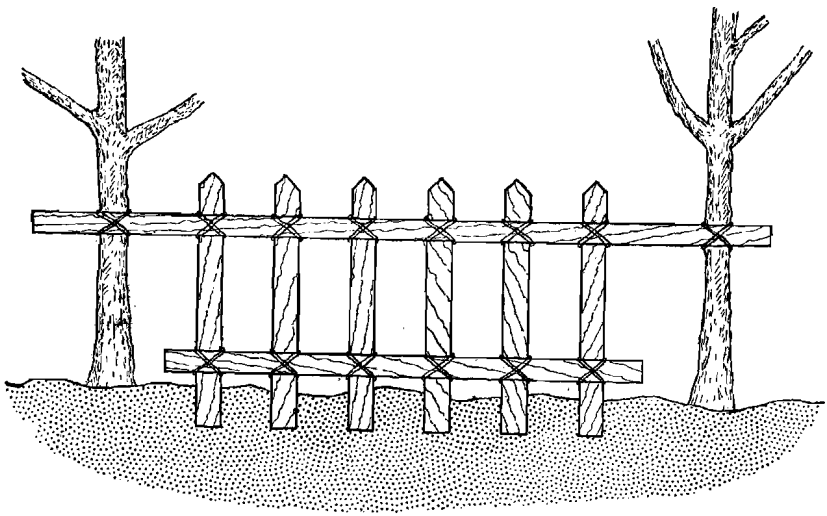


Figure 19.—Japanese Improvised Obstacle.

Place land mines (both the trip-wire and pressure types) on roads and trails which lead into our positions (see fig. 20). In this connection, make preparations so that, if necessary, a portion of our fire power can be directed toward the places where the mines are laid.

Land mines are sometimes set off prematurely by hostile artillery and bombing; therefore, they should be located some distance from our positions.

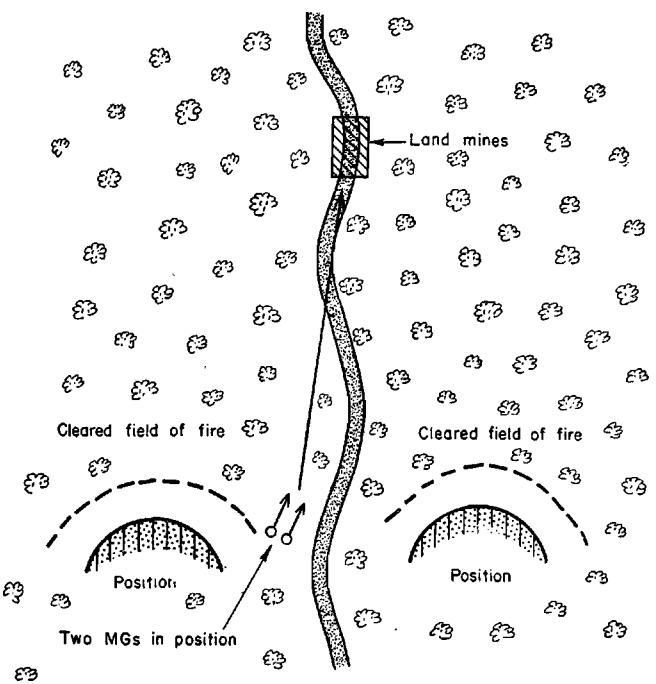


Figure 20.—Japanese Use of Land Mines.

Section V. SMALL-UNIT TACTICS USED BY JAPANESE

1. INTRODUCTION

Considerable information about Japanese small-unit tactics has been printed in previous issues of the *Intelligence Bulletin* (for example, see Vol. II, No. 5, pp. 64-72, "Small-unit Tactics Used by Japanese at Night"). Some aspects of this subject not previously covered in detail are included in this section. These new details are based on only one Japanese source; this source, however, is believed to be reliable.

2. PATROLLING

On Bougainville Island, the Japanese usually employed two types of patrols: the reconnaissance patrol, which reconnoiters terrain, hostile positions, roads, and so on; and the so-called microphone patrol, which usually destroys communication nets as well as microphone installations. In each case, the strength of the patrol is approximately one squad (10 men), but it may vary according to the situation, mission, and the time available.

If time permits, long-range officer patrols are sent out prior to an attack. Noncom patrols usually are sent out on short and less important missions.

During the last few hours preceding attacks, the microphone patrols, generally led by noncoms, are sent out repeatedly.

Patrols generally study aerial photographs before going out, and one of the main duties of patrols is to confirm information indicated on these photographs.

All patrols are equipped for combat, but are instructed to resist hostile forces only when necessary. The equipment includes a light machine gun.

Just prior to an attack, most patrols stay out one day, or less, but they carry more than one day's rations.

Patrols generally march in a staggered formation, which consists of two single files on either side of a trail or road. The interval between men in each file is about 5 yards. The patrol leader and the light machine-gun operator march at the head. In a withdrawal, these two men remain in the rear until the other personnel clear the danger area.

An overnight patrol generally does not bivouac, but halts for extended periods of rest. The men usually do not sleep, and all remain on watch.

When patrols are out for several nights, they maintain sentries on watch within the bivouac area. Reliefs are made about every 2 hours.

3. APPROACH MARCH

When a company is marching as a unit, normally a platoon is sent about 30 to 40 yards to the front as an advance guard. This is followed by a platoon, the

command section, and another platoon, at intervals of approximately 20 yards. About a squad is used for a rear guard. The flanks usually are secured by two men, each about 50 yards to both flanks, but when contact with hostile forces is imminent, a squad is provided on each flank. When a battalion is marching as a unit, about a company of advance and rear guards is provided, and the interval between companies is approximately 50 yards.

The formation used in a night march is exactly the same, but, depending upon the situation and the terrain, the interval between both individuals and units is kept at a minimum. In all cases contact is maintained by connecting files and runners, who are dispatched from each unit to the unit immediately to its rear. During night marches, luminous vines—which can be found in most jungle areas of the Southwest Pacific—are used for individual markings and also as direction guides. These are fastened to the back of each man's pack or may be wrapped around trees to designate the route of advance.

The machine-gun company marches in the main body with the battalion headquarters so that the company can be dispatched immediately to rifle units or sectors where it may be needed.

During a recent operation (Torokina, Bougainville Island), the Japanese normally marched 5 to 7 miles in the daytime, but this is considered to be slow. When pressed for time, they have covered 12 to 13 miles. During these marches there is no particular rate of

march and rest is taken as needed. The Japanese consider that it is practically impossible to march at night in the jungle, but if routes are known and planned, 5 to 6 miles can be covered under cover of darkness.

During a halt in a daytime advance, both the rear and the advance guards extend about 15 yards beyond their normal march intervals (45-50 yds.). Each unit observes to its immediate flanks. In special cases sentries may be dispatched to the flanks. The same measures are adopted for night security, but troops are told to close up so that no one is left behind. Troops are ordered to be very quiet.

4. ATTACK TACTICS

a. During the Day

Normally the Japanese move into an assembly area before launching an attack. From this halt, units advance to an area approximately 2½ to 3 miles from the opposing forces and make final preparations. At this point the Japanese leave behind all surplus equipment, and then advance to a line of departure, which is generally located about 500 yards from the hostile positions. At this point deployment is made, and the attack is launched. The tactics employed are much the same as those used in the night attack described in paragraph 4b, except that a normal platoon front is about 50 to 60 yards.

The Japanese heavy weapons are emplaced so that they can fire against hostile heavy weapons and at the

same time assist the advancing troops. When a platoon is attacking a position, the attached heavy machine gun normally is located near the center of the platoon. The heavy weapons are controlled by the company commander. He designates the objective and the squad leader in charge of the weapon decides as to its final emplacements.

All communications are maintained by runners. In case the heavy weapons are not under the control of the commanding officer of the attacking unit, the orders have to be issued by higher headquarters as to their emplacement and duties.

b. During the Night

No definite amount of time is allotted for a night attack. The time depends upon such factors as the nature of the terrain, the size of the unit, and so on. However, after arrival at the line of departure, there usually is a 2-hour interval before the attack is launched. The Japanese usually depart from the assembly area at dusk, and favor using dawn for an attack.

When a platoon is attacking a position at night, the normal formation used is as follows:

The rifle squads are deployed on one line and within contact of each other. If a heavy machine gun is attached, this squad will follow the center squad on line and keep within visual and voice contact. When faced with a wire entanglement, one squad breaches the wire, and immediately passes through and deploys to the left.

A second squad then passes through the same breach and deploys to the right. The remaining squad, with the heavy machine gun attached, moves up into a position between the first two squads. The normal front of a deployed platoon is 40 yards. In night operations the surprise element is considered essential.

Contact between a squad leader and the platoon leader is maintained by a runner and from a squad leader to his men by voice and signals. Direction is maintained by selecting intermediate objectives as the advance progresses, or, if time permits, by using vines or markers as guides. The platoon leader supervises the maintenance of direction and controls the advance.

c. General

(1) *Infiltration.*—No set system of infiltration is followed by the Japanese. Usually a squad at a time is given the mission of infiltrating through the hostile lines. The wire is breached and individuals move up by crawling, or by short rushes. They take advantage of moving during hostile firing and other noisy periods. The Japanese depend solely upon grenades or bayonets for protection, never returning fire. When a suitable route has been established, contact is maintained by a runner who infiltrates back and forth through the lines.

(2) *Mortar Company.*—For the Torokina operation, the former battalion-gun platoon was reorganized into a mortar company equipped only with 90-mm mortars. The mortars were under the control of the battalion commander—it is unusual for them to be

attached to infantry companies. The mortar company normally moves with battalion headquarters and is sent to vital points by order of the battalion commander, according to the situation.

In coordination with heavy machine guns, mortars are often deployed in support of advancing infantry units. Observers are dispatched to a high spot or place where concealment is readily available. In cases where observation is limited, forward observers are used. In these cases, reports from observers to machine guns are transmitted by voice down a connecting file of men stationed at various intervals between the observer and the gun position. Communications between the battalion command post and guns are maintained only by runners. This method is slow and inadequate.

(3) *Special Assault Teams.*—In breaching wire entanglements, specially trained assault teams are used by the Japanese. An ordinary wire team, consisting of six men and a leader, normally is employed for breaching wire entanglements. Two men are designated for cutting the wire, one man armed with a rifle is stationed to protect the cutters, and two men are held in reserve. However, in the Torokina operation, only two- or three-man teams were used.

Each platoon has three wire cutters, one per squad. Bangalore torpedo and demolition teams come from within each infantry company. The commanding officer controls this party, and, according to the mission assigned, dispatches the type and size of team required to accomplish the mission.

Special assault squads are an integral part of the "working party" found in each battalion. They are composed of approximately 20 men commanded by a sergeant major or a warrant officer. This party carries one flame thrower. For the Torokina operations, each company was organized with a "Special Assault Squad." This squad, composed of 10 to 12 men, carried three Bangalore torpedoes. One man carried and operated a flame thrower, while the number of men required to use a Bangalore torpedo varied with the length of torpedo used. The number of covering riflemen varied with the situation.

(4) *Snipers.*—The squad leader and platoon commander select snipers from the riflemen of each squad. The selections are made on the basis of intelligence as well as marksmanship. The training of snipers is conducted by each company or battalion, depending upon the situation. First of all, they are given further training in marksmanship, using both moving and stationary targets. Correction of windage is also stressed in this practice. They then receive training in estimating the range with the naked eye. The snipers use the regular Model 38 rifle, fitted with a telescopic sight and a folding bipod. The primary target for snipers is the apparent leaders of the units they may encounter. The maximum effective range for sniping is considered to be 300 yards.

(5) *Communications.*—All communication is by runners who are dispatched from the lower units. During combat, two messengers familiar with the terrain

and local dispositions are dispatched by the squad leader to the platoon commander. Each platoon, in turn, sends out its runners to the company command post. Runners are normally sent out in pairs, but, depending on the importance of the message, this number may be increased. The senior man is put in charge and actually carries the message; no particular formation is used, and the men always travel together. However, during the Torokina operation, a so-called liaison section was organized within each platoon; this section consisted of six men (including officers' orderlies) which were used by the platoon leader as runners and messengers. All runners are instructed to memorize, if possible, the order they are transmitting. However, long orders usually are written down.

Usually no telephones are used, even for communication between company and battalion. However, if one company is dispatched to a distant location for guard duty, telephones may be used for company and battalion communication.

Section VI. JAPANESE WARFARE IN BURMA

1. DEFENSIVE POSITIONS

In recent months the Japanese have increasingly been emphasizing the necessity for constructing more, and deeper, communication trenches to connect defensive positions. Emphasis also has been placed on constructing individual shelters strong enough to protect personnel from bombs and artillery shells. "The usual tactics of hostile forces," according to a Japanese source, "are facilitated if our individual shelters and slit trenches are constructed separately."

The same Japanese source states that "communication trenches (deep enough for a person to traverse in a crouched position) between shelters are absolutely essential. Communications during an attack are extremely important, and if communication trenches have not been prepared, intercommunication is impossible."

A U. S. observer recently commented as follows on Japanese defensive positions:

In this area the enemy uses many communication trenches. These vary from the crawl type to those deep enough for a man to walk upright. The depth apparently depends on the time available for digging. The Jap here, as everywhere, is a

continuous digger, and, given time, he constructs very elaborate defenses.

The most interesting thing about some of these trenches are the holes dug into the sides, big enough to permit a man to crouch. In such a hole, dug into the side at the bottom of a trench 5 feet deep, a man has complete protection from all types of fire. Not only is this type of shelter provided in trenches, but a large number of individual foxholes have offsets dug at the bottom in the same manner. A few of these had been enlarged enough to permit a soldier to lie down and sleep—in a sort of slit trench 4 feet underground.

In the case of one underground shelter observed, the entrance began at the bottom of a trench and extended straight down for 10 feet. It was necessary for the Japs to use a ladder to get in and out. At the bottom of this "well" [entrance], a short tunnel led to an underground room, which was roughly 6 feet wide, 8 feet long, and 3 feet high. The ceiling, walls, and floor were completely lined with split bamboo. As though the 15 feet of earth were not sufficient cover, the room was placed directly under a thick clump of big bamboo trees. This particular system of trenches contained a number of these deep shelters, all of which were lined with bamboo.

A Japanese training memorandum stipulated that positions be organized in depth, but that the interval between positions must be short enough to permit measures against hostile infiltration. The memorandum stated further:

In constructing positions, it must be remembered that the jungle does not afford permanent shelter; it may be cleared away by bombing and shelling. Deployment must be carried out laterally and in depth, and preparations must be made just as if the ground had been cleared previously.

On terrain which slopes down toward the hostile forces, it is best to place defensive positions between 20 and 30 yards

below the crest line—because shells generally will either go over the crest or fall short on the slope.

As a rule, the ground in front of positions should be cleared a distance of 50 yards to facilitate observation and firing . . . It is essential to keep all positions fully camouflaged. And maintenance of a dummy position close to the front of the main position is a profitable way of observing hostile firing.

2. DEFENSE AGAINST ARTILLERY

In Burma the Japanese have made little use of artillery firing for counterbattery purposes. In the isolated cases where it has been used, the firing has been inaccurate and not concentrated. It is believed that this firing was only for harassing purposes.

As their primary counterbattery measure, the Japanese have used infantry attacks on gun positions.[1] The following are examples of how these attacks were conducted:

a. Twenty to 30 Japanese infiltrated through British infantry posts, and, from a small hill, attacked four artillery sections at night, firing machine guns sighted on fixed lines and firing grenade dischargers. The attack ended with a bayonet charge, which was repulsed.

b. A battery of four guns was in a position where one gun was slightly separated and not visible from the other three sections. At night about 20 Japanese attacked the one separated gun section with grenade dischargers and a bayonet charge. The attackers were

[1] In this connection, reference may be made to *Intelligence Bulletin*, Vol. II, No. 4, pp. 13-16, "How Japanese Raiders Demolish Artillery."

armed with explosive charges with which to destroy the piece. After neutralizing this single section, the Japanese attacked the three remaining sections but were driven off.

c. A Japanese soldier crept up through the jungle at night and was in the process of attaching a sticky grenade to a gun tube before he was discovered and killed.

3. OFFENSIVE TACTICS

The following information about Japanese offensive tactics was extracted from an enemy training memorandum:

The interval between hostile [British] positions are relatively long—75 to 100 yards—and there are many places loosely guarded, especially in the rear. Therefore, it is easy to infiltrate into the hostile positions.

In making an infiltration attack, as many grenades as possible should be carried. About 10 men are needed to attack each position, but these should be deployed as much as possible. If more than 10 men are deployed, it becomes difficult to maintain silence, and the lack of freedom for movement leads to heavy losses.

At each of his centers of resistance, the enemy [British] will be confused by a squad, or less, which will hurl grenades from the flanks and rear; the position will then be penetrated by an immediate assault with cold steel . . .

Section I. FACTS ABOUT BLAST, AND SHOCK WAVES IN WATER

1. GENERAL

Numerous experiments on the nature and effects of blast have been made in the United States and Great Britain, and hundreds of thousands of soldiers and civilians have personally experienced the effects of blast by bombs, shells, and mines. The subject of blast is treated in this section mainly for the benefit of soldiers who have not experienced these effects. The facts and observations set forth below are based largely on experiments conducted in England, the results of which appeared in *The Bulldozer*, a British military publication.

Before the war, the No. 1 bogey of the civilian population was poison gas and the No. 2 bogey was blast. During the earlier stages of the Japanese war against the Chinese, and also during the Spanish Civil War, stories were circulated on the streets to the effect that persons in the war-torn areas were being found dead in streets and houses, without any visible wounds. We now know that these stories were largely untrue, and that blast—as far as human lives are concerned—is

by no means the terror that some persons have imagined. Nevertheless, we know that blast is destructive to buildings and equipment, according to the circumstances, and that its effects—rather than the actual blast—are injurious or fatal to persons under certain conditions.

2. WHAT IS BLAST?

Generally speaking, blast is a violent disturbance of the air, and is produced by any very sudden movement. One characteristic of a blast wave is its sudden start. The air pressure reaches its peak immediately and then falls below normal. The pressure is below normal longer than it is above normal. These periods are known as the pressure and suction phases of blast. The pressure wave travels outward at a speed a little faster than that of ordinary sound, which is approximately 1,000 feet per second.

When a bomb bursts, the case swells like a balloon to half again or more of its original size; then it cracks into fragments, and the compressed gases from the explosion come out fast—up to 10,000 feet per second or faster. The surrounding air does not have time to get out of the way, and something like a solid wall of high pressure is formed. The gases, some few feet outward from the bomb, cool off and lose speed, but the push they give to the air still carries on as the pressure wave. (Such waves can actually be photographed.) As the wave moves on, its pressure spreads

wider and wider and gradually decreases until it becomes an ordinary sound wave.

3. WHAT ARE THE EFFECTS OF BLAST?

As we hear it, a nearby explosion makes a cracking sound while a distant one makes a booming sound.

When a blast wave hits an object, there are two different effects: one caused by the pressure of the wave and the other caused by the immediate forward movement of the air behind the pressure wave. Therefore, an object in the path of a blast is compressed and pushed away from the explosion and then drawn toward it—by suction.

In the case of large objects near the explosion, the pressure phase is the most damaging. For example, the walls of ordinary houses are pushed in by the pressure. (It takes about 50 pounds per square inch to push in a wall and about 10 pounds to push in a window.)

Large objects some distance from the explosion suffer most from the suction phase. For example, pressure from the explosion of a large bomb would not be great enough to push in the walls of a house, but the suction immediately following the pressure wave would suddenly take away most of the normal atmospheric pressure in front of the structure. Because of this partial vacuum outside of the house, its walls would be pushed outward by the normal pressure from inside. Although the walls would be pushed out in all direc-

tions, the main force of inside pressure would be against the wall facing toward the explosion.

In the case of small objects, movement is more important than pressure. Leaves and branches are torn off trees. Clothes may be ripped off, and people flung about. Actually, far more casualties are caused by this flinging about by blast than by the direct blast effect. Therefore, it is always best to lie down when exposed to blast bombs, not to mention the protection afforded against fragments.

In an area affected by blast, the amount of protection available depends largely on the number and size of obstacles behind which personnel can seek refuge.

The blast wave can be thought of as having a high-frequency, short-wave pressure component and a low-frequency, long-wave suction component. The pressure component, like light but unlike sound, cannot get around a medium-size obstacle. The suction component, like ordinary sound, will get around most obstacles smaller than a medium-size hill.

The result is that behind an obstacle the blast wave is quite a different shape. The high-pressure part is practically obliterated; the suction part remains.

Fortunately, it is the pressure part that is dangerous to human beings, either because it knocks them about or because it damages their ears and lungs; therefore, a man behind a wall or rock is unlikely to be hurt, even though he is quite close to a bomb—that is, as long as the wall itself does not come down on top of him.

Several months ago two sailors were together when a bomb hit nearby. One just managed to get around the corner of a wall and was unhurt, while the other did not make it and was never seen again.

In the same way, blast does not easily get into closed spaces from the outside. Even comparatively fragile underground shelters can furnish complete protection against blast from air-burst bombs. Once a whole shelter full of people were uninjured by a bomb falling 10 feet away.

But the results are very different when an explosion occurs inside confined space, where reflections of blast waves come from the walls and where the internal pressure is much increased.

What is worse, blast waves from an inside explosion will run along tunnels for great distances without losing any of their strength, and they will even travel around curves.

No tunnel shelter is safe from bombs exploding just inside, unless it is provided with baffle walls, sharp turns, or blast traps. Fortunately, this lesson has been well learned by now in military establishments.

We now know, largely from experiments, what blast does to animals and men. It is really much less hazardous than people used to think.

To summarize previous statements, all the damage to buildings at close range is due to the pressure and not to the suction component.

There is no time for the suction to draw the air out of a lung, as some rumors have suggested.

The pressure phase affects chiefly those parts of the body that have air hollows behind them. The most important ones are the ears and the lungs. The effect on the ear is simply to burst the delicate membrane of the ear drum. This occurs at comparatively low pressure—although this pressure is a great deal higher than that accepted as safe for gunners. Fortunately, burst ear drums usually cause only temporary casualties. The ear drum re-forms and hearing is not permanently lost.

The lung is a more serious concern, but only when the victim is very near the explosion. A man can barely survive a pressure of between 400 and 500 pounds per square inch—the kind of thing that would completely destroy any ordinary building.

Two instances illustrate this:

a. Three men in a small brick shed, in the middle of which a 50-kilogram bomb burst, are alive and well today, although the building itself was scattered over many square yards.

b. A man, 25 feet from a bomb in the open but fortunately lying down, not only remained fully conscious but was able to get up immediately after the explosion and assist other victims.

The effect of blast on the lungs is to push in the ribs and press them against the lungs, bruising them or rupturing the small blood vessels and lung spaces and thereby leading to more or less extensive internal bleeding. The immediate effect may not be noticed, but it is similar to a severe case of pneumonia, since the

amount of lung space available for breathing is reduced.

The treatment is simply rest; obviously a man taking violent exercise immediately after exposure to blast is likely to injure himself fatally.

It is surprising how very few cases of true blast deaths have occurred in all the bombing of this war—so few, in fact, that the doctors have great difficulty in getting good case histories. The reason is, of course, that you have to be very close to a bomb to get blasted, and if you are very close, you are far more likely to be killed by splinters.

Most of the so-called mysterious deaths in dugouts and shelters were certainly not due to blast, but most often due to carbon monoxide poisoning resulting from poor ventilation, and sometimes from explosive gases.

4. WHAT ARE THE EFFECTS OF SHOCK WAVES?

In combined operations, men have to face not only blast in the air, but shock waves in water.

In principle, these shock waves are the same as blast, but there are two big differences in scale. The shock wave from an underwater explosion travels faster and farther—about 6,000 feet per second instead of 1,000—and it has a much higher pressure, measured in tons per square inch instead of pounds. But it is, accordingly, of much shorter duration.

Fortunately, the effect of the shock wave in water is greatest on deeply submerged objects and least on

those on the surface. This is because the free surface can yield to the wave, so on the actual surface itself the effect is practically nil unless the intensity is such that the surface is actually flung up into the air—as in the spray dome above a mine.

Experiments and trials have shown that for a man in the water, the safest position is floating on his back and that the next safest is swimming. Treading water or hanging vertically to some floating object exposes the lungs and abdomen to a more severe shock.

5. WHAT ABOUT CONCUSSION?

There is one other condition which is sometimes confused with blast—concussion. This usually refers to supposed effects on personnel in gunrooms and magazines due to large bombs or shells exploding in the ground nearby. Experiments have shown that this is not a serious danger.

Real concussion can be caused only by a hit on the head—and such a blow must be caused by a really hard object. Certainly no one in a room can be exposed to concussion except from some flying object. Nevertheless, the effect of shock is an alarming and distressing experience; but if the explosion is not so close that it actually breaks into the room and throws its contents about, no one inside will sustain a concussion.

The research on blast and concussion has done something to provide protection where protection is neces-

sary. And perhaps its real value lies even more in debunking the many misconceptions about mysterious dangers.

There are enough real dangers in war to make worrying about the others a waste of time.

Section II. NOTES ON CAMOUFLAGE AND CONCEALMENT

1. INTRODUCTION

This section consists of two paraphrased reports, one dealing with camouflage problems on the Italian front and the other concerning jungle concealment in the Burma theater. Both reports stress the importance of individual as well as group camouflage and the strong relation of troop discipline to the maintenance of concealment and secrecy during movement of small units.

2. ON THE ITALIAN FRONT

The following "Camouflage Notes" were prepared mainly from observations made during the Sicilian campaign and during training exercises back of the Italian front:

It is apparent that many [British] units in Tunisia and Italy, especially those with training and experience in desert warfare, have not appreciated the necessity for employing camouflage techniques and disciplinary measures radically different from those used in desert areas. For example, it was found that some units were still relying on dispersal alone for protection against air attacks. This practice in Tunisia and Sicily led to disclosure of headquarters locations and other strategic spots to the enemy.

The conduct of offensive operations over terrain covered by woods or undergrowth, or broken by hills, calls for new emphasis on certain aspects of camouflage. Complete concealment in the desert was impossible, but in such country as that described above excellent opportunities are offered. If these opportunities are not utilized, they will be turned into blatant advertisements of the arrival and presence of untrained and poorly disciplined units.

This change in terrain also means that greater attention must be paid to concealment from ground observation. Operations are now taking place where the enemy frequently has the advantage of high ground; and, with the use of field glasses, his powers of observation are great.

It should be the aim of each unit to reach such a standard of camouflage discipline that the whole business of elementary camouflage becomes a drill. To achieve this, it is essential that junior commanders possess a quick appreciation of natural features, background, and shadows, and that the men under them have an intelligent appreciation of the instruction they receive.

Therefore, it is essential that camouflage training be an integral part of day-to-day training and tactical exercises.

In training, particular attention must be paid to the use of cover provided by trees, hedges, and buildings. Every possible use must be made of the concealment afforded by the terrain. Most important of all, track discipline must be strongly enforced.

Figure 21 illustrates the need for stressing individual concealment down to the smallest detail. Note (1) the unbroken outline of the helmet and (2) the shining magazine. A few blades of grass and twigs placed in the helmet net will break the outline. Remember that it is necessary always to keep all shiny metal a dull color.

The use of camouflage nets must be encouraged, and care must be taken to insure that their full value is obtained in

relation to the ground. However, it must be emphasized that concealment can often be gained from natural means afforded by the terrain—without artificial material, which is often unavailable in mobile operations.

The quickest way by which a unit can advertise its arrival and presence on what was previously undisturbed and peaceful ground is to allow its vehicles to move "anywhere and anyhow." The simple remedy is a track plan.

It is desirable that headquarters and units should detail an officer to be responsible in any reconnaissance party (for halting places and staging areas, and so on) for laying down a track plan. This track plan must then be followed carefully by all vehicles.

Figure 21.—Individual Camouflage.

3. IN THE BURMA THEATER

Presented below is a paraphrase of a British camou-

flage officer's report dealing with concealment in the Burma theater. The report deals primarily with problems of concealment which face a patrol operating in jungle country.

The report emphasized at the beginning that it is impossible to take any camouflage equipment on such patrols, and that troops, therefore, must learn to conceal themselves without it.

The paraphrased report:

It has been established in maneuvers that discipline—ordinary soldierly discipline—rather than equipment is the basis of good concealment in the jungle. In one instance, the "enemy" was able to follow a column for two days because of the refuse and other terrain "scars" left behind by the column.

The following points regarding concealment discipline should be noteworthy:

a. No talking above a whisper by any one.

b. Don't use trails or paths. If their use is necessary, have the patrol move 20 yards inside the jungle on either side and permit only the leading man (navigator) to use the path. This prevents clouds of dust and footprints.

c. Conceal all refuse and footprints. This must be impressed on every officer and man. This applies particularly to ration wrappings, empty cigarette packs, cigarette butts, pieces of cellophane, human excreta, burned-out fires from old bivouac sites, and so on. It is an officer's job to see that such things do not happen where the enemy can pick up a trail.

d. Fires are nearly always a matter for tactical handling by the commander. He will generally know if enemy patrols are likely to be near him. If they are—no fires and no coffee or tea. During the early morning, fires from a patrol occupying 200 square yards of jungle create a fog of smoke, even among

thick trees, and are very obvious from a point of vantage overlooking the area. Surprisingly enough, fires in thick jungle or in hollows cannot be seen for more than 70 yards during darkness, but in all cases at night no fire should be lighted unless authorized by an officer.

One of the most encouraging lessons from a particular exercise was the fact that two or three large patrols often bivouacked or rested within 300 yards of each other but were never aware of the presence of one another because of good concealment discipline.

Section III. G. I. QUESTIONS AND ANSWERS ABOUT MALARIA

1. GENERAL

Malaria remains the greatest obstacle to the success of military operations in the tropics. In some highly malarious combat areas ten men have been rendered non-effective by malaria for each battle casualty. The importance of any disease which constitutes such a serious threat to the success of military operations cannot be overemphasized. This simplified question-and-answer article on malaria will be found useful for the instruction of units in training or en route to malarious areas or to those units already in such areas. The article was prepared by the Office of the Surgeon General.

2. THE ARTICLE

a. *What is malaria?*

Malaria is a disease caused by very small parasites. These parasites, or germs, feed on red blood cells and destroy them.

b. *When should a man suspect he has malaria?*

A man should suspect malaria when he has a chill followed by fever and sweating. The chills and fever

may come at regular intervals, sometimes every day, sometimes every second day, and sometimes every third day, depending on which kind of malaria parasite is in the blood.

c. *Does malaria always behave the same way?*

No. The symptoms of malaria vary greatly in different persons and at different times. The symptoms of malaria may be anything from a headache to a delirious fever, or even sudden unconsciousness. In places where malaria is common, any fever or severe headache should suggest the possibility of malaria.

d. *How can a man be sure whether or not he has malaria?*

The only way to be certain that one has malaria is to have a drop of blood examined by microscope for parasites. Sometimes an experienced medical officer can recognize malaria without examining the blood.

e. *Is malaria a serious disease?*

Yes. Malaria destroys a man's blood and makes him weak. It may keep him in a hospital for ten days or longer. It may make him a chronic invalid for a year or more. It may kill one or two out of every hundred persons who catch it, if they are not properly treated.

f. *Is malaria serious for armies?*

Yes, malaria may be more serious for an army than its opposition. In the last world war British and French armies faced German armies in Macedonia for three years with neither side able to advance because of malaria. In one of these armies, which had an average strength of 124,000 men, there were more than

160,000 hospital cases of malaria in three seasons. Over 25,000 soldiers had to be evacuated because of chronic malaria in the spring of 1918. Malaria was far more important than the enemy, who caused a total of only about 27,000 casualties in the three years.

g. *Has malaria appeared in this war?*

Yes. Malaria has been a serious difficulty in the Caribbean area, in Africa, in the Southwest Pacific, in India, and elsewhere.

h. *How does a man catch malaria?*

A man catches malaria from a mosquito. Mosquitos act like airplane transports for malaria parasites. They ferry these germs from one man to another. This is the only way in which malaria spreads.

i. *Do all mosquitoes carry malaria?*

No. Fortunately, only certain kinds of mosquitos, called *Anopheles*, can carry malaria.

j. *How do the Anopheles mosquitoes carry malaria?*

Anopheles mosquitoes not only give the malaria parasites a free ride but also a comfortable home where they can breed. *Anopheles* mosquitoes stand on their heads on a man's skin, with their tails pointing up. They suck up a drop of blood, which they need for food, and then they fly away. If there are malaria germs in that drop of blood, these germs are taken with the blood into the mosquito's stomach. Then the malaria germs raise a large family in the mosquito's body. It is interesting that all other mosquitoes except *Anopheles* destroy the malaria germs in their stomachs. The

Anopheles don't have the right kind of digestion to do this.

k. *How soon can an Anopheles mosquito infect another man after it has fed on someone who has malaria?*

Usually in about ten days. By this time the young family of malaria germs has grown up and is waiting in the mosquito's spit or saliva glands for a chance to infect a man.

l. *How does the Anopheles mosquito infect a man?*

Every time the mosquito drills a hole into a man's skin for blood it drools some saliva into the hole, and if malaria parasites are in the saliva they go into the hole and so into the man's blood.

m. *How soon after a mosquito infects a man does malaria show up in this man?*

Usually in from 8 to 14 days. It takes this long for the parasites to increase in numbers enough to throw their weight around and make a man ill.

n. *How is malaria cured?*

There are drugs called quinine and atabrine, either of which when given by a medical officer for a week will often cure malaria. A third drug, called plasmochin, is also used to treat malaria in some cases. But sometimes, even though a man feels well after treatment, the drugs have not destroyed all the germs. Some may hide away in the internal organs. Then, after ten days or a month, or sometimes longer, the disease appears again. There may be three or even

more such attacks (called relapses) which have to be treated each time like a new infection.

o. *Can malaria be prevented by keeping fit?*

No. Malaria is one of the diseases that will hit the strongest as quickly as the weakest, and hit him just as hard. Mosquitoes are defeated by brain work, not by muscles.

p. *Can malaria be prevented by keeping a camp clean?*

No. Ordinary camp cleanliness, which is necessary to prevent bowel diseases, has no effect in preventing malaria. It takes special measures to prevent malaria.

q. *What is malaria control?*

There are two kinds of malaria control in the Army. One kind includes measures which Medical and Sanitary Corps officers and the engineers carry out for the soldiers. The other kind includes measures which the soldier does for himself and which *no one else can do for him.*

r. *How does the Army control malaria?*

The Army controls malaria by attacking and outwitting the mosquito. It knows that the *Anopheles* mosquito must spend the first week or ten days of its life swimming in certain kinds of water collections, such as streams, ditches, ponds, and pits, so whenever possible this water is eliminated by draining or filling. It also knows that oil and Paris green will kill the young mosquito wrigglers in water, so, when filling or draining is not advisable, one or the other of these poisons is spread where it will do the most harm to

mosquitoes. It also knows that adult flying mosquitoes cannot pass through screens, so the right size screening is put on barracks and hutments. It also knows that certain sprays will kill adult mosquitoes, so there is a program for spraying places where the mosquitoes are roosting. Finally, it knows that most malaria mosquitoes can fly only a mile or two, so camp sites are chosen which, if possible, are not near mosquito breeding places.

s. *What can the soldier himself do to prevent malaria?*

The soldier himself can use sleeping nets, protective clothing, and repellents, and he can stay out of malarious villages and get behind screens at night. The soldier must be able to think faster than a mosquito to prevent infection.

t. *What are sleeping nets?*

Sleeping nets are cloth nets used to protect a soldier when he is sleeping. This is the time most malaria is caught. The malaria *Anopheles* mosquito usually bites at night and, of course, can bite more easily when a man is asleep. It is important to use sleeping nets properly. They must be put up so that mosquitoes cannot get inside, and so arranged that a man does not sleep up against the side and thus allow the mosquitoes to feed on him through the net. Holes must be repaired promptly with adhesive tape or by sewing.

u. *What is meant by protective clothing?*

Protective clothing is any clothing which gives protection against mosquito bites. For example, leggings

will prevent bites around the ankles, and rolling down the shirt sleeves at night will protect the forearms. There are also gloves for guard duty at night and head veils which, although sometimes hot and uncomfortable, will keep mosquitoes from drilling holes in the skin of the neck and face. Don't wear shorts at night or at any time in the jungle. Don't sit around with your shirt off at night outside screens. Don't go bathing at a malarious beach, swimming hole, or unscreened bathhouse at night.

v. *What are repellents?*

Repellents are chemicals which when spread over the skin will keep mosquitoes from biting. The standard Quartermaster repellents will keep mosquitoes from biting for from three to four hours after being spread over the skin. When needed, the repellent should be used liberally at night on all exposed skin. It should also be put on the clothing wherever it is thin enough or tight enough so that the mosquito can drill through it (for example, at the shoulders or seat). The repellent should be used as often and as freely as necessary.

w. *Are native villages dangerous?*

Yes. Stay out of malarious native villages after dark. They are deadly. Most natives in malarious places have malaria parasites in their blood, even if they look fairly healthy. The mosquitoes in such places are full of malaria.

x. *What about taking drugs to prevent malaria?*

Atabrine or quinine in small doses will postpone the chills and fever of malaria. But even large doses of

these drugs will not prevent the mosquito from infecting a man. Sometimes it is very necessary to keep fit when away from base camps and in places where it is not possible to get sufficient protection from bed nets, clothing, and repellents. Under these conditions atabrine (or quinine) is taken in small doses to postpone any attacks of chills and fever. When the mission is completed, the atabrine (or quinine) doses are stopped. Then in about ten days or so, if a man has caught malaria, the chills and fever will show up and he can be given a regular treatment in a hospital.

y. *Is all this talk about malaria important?*

Yes. Malaria in an army can spoil a campaign. This is fact, not fiction. The Japanese know it and so do the Germans. They try to prevent malaria. Wherever they do a better job of malaria control than we do, they stand a good chance of winning a battle. In malarious places it is just as necessary to beat the mosquito as to beat the enemy. The mosquito's brain is smaller than a pinhead. We should be able to outsmart a mosquito if we use the brains with which we were born.

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(For explanation of symbols see FM 21-6.)


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