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PART ONE: JAPAN

Section I. JAPANESE WARFARE AS SEEN BY U. S. OBSERVERS

1. INTRODUCTION

The comments carried in this section are made by observers who have been in the Southwest Pacific theater of operations, and by officers and enlisted men who have participated in the actual fighting. The comments have been edited to eliminate repetition and, as far as possible, to arrange the information according to subject matter.

2. THE JAPANESE SOLDIER

In my opinion, the Japanese soldier is a well-trained, well-equipped, and well-disciplined fighting man. He is in good physical condition, is infinitely patient, and shows a sacrificial devotion to duty. The Japanese is only a fair small-arms shot, but is proficient in the use of mortars and artillery. He uses large quantities of hand grenades.

Japanese soldiers have been trained to create fear in the hearts of their opponents, and they exploit to the utmost the

advantage gained thereby. Although they prefer to conduct the offensive on a dark night or just at dawn, they have fallen far short of mastering the technique of night fighting.

The individual soldier is an expert camoufleur, well-trained in the most effective use of natural camouflage materials. He does a large amount of close-in fighting, but is not exceptionally proficient in the use of the bayonet or in hand-to-hand combat. He is not endowed with superhuman qualities.

The greatest weakness of the Japanese fighting man is his inability to cope effectively with unexpected situations. Although he is a very efficient cog in a war machine and follows a definite plan even to minute details, he is sorely lacking in resourcefulness and ready adaptability to rapidly changing situations. No amount of training can remedy this defect of the Japanese soldier; it is an inherent weakness which is at least partly the result of having led a closely regimented life in which free thinking and individual initiative have been discouraged. This weakness is apparent both in offensive and defensive situations. When attacking, the Japanese soldier makes extensive use of weird, piercing shrieks and of threatening cries such as "Marine, you die!" The obvious intent of this practice is to demoralize his opponent and also to boost his own morale. The result expected is a disorderly, confused flight to the rear. When, however, the Japanese soldier's opponent holds his ground unwaveringly, even in the face of heavy casualties, the Jap himself becomes disorganized and confused, and is then quite vulnerable to a counterattack. If, after being repulsed in the initial attack, he decides to try again, he will probably employ identical tactics.

The Japanese's well established custom of preparing his evening meal just at dusk and his morning meal at dawn offers an opportunity for catching him in known bivouac areas with concentrated artillery fire.

Our troops should understand that the Japanese is no better able to go without food than we are, that his stamina is no better than our own (provided we have taken the necessary steps to insure top physical condition), that the Jap gets just as wet when it rains, and that he suffers just as much, if not more, from malaria, dysentery, dengue, ringworm, and other forms of tropical ills. This has been amply borne out by the condition of prisoners captured in this area, and by the finding of dead who had literally starved to death.

To the Japanese, machines of war—from the heavy machine guns to the tank—are only incidentals in warfare. We Americans realize that the infantry must perform the tasks of actually taking over the ground and holding it, but we use every available machine of war to prevent unnecessary losses. In contrast, the Japanese do not conceive of substituting the shock action of war machines for the shock action of infantry, and they merely strengthen the shock action of troops by the assistance of the machines. The Japanese Army is an army of men, supported by machines of war; ours is an army using machines of war. This is a fine distinction and perhaps not readily understood, but every statement of Japanese military policy bears this out.

A Japanese who has not tasted defeat will attack with a dash and a magnificent disregard for himself. When he has been set back on his heels, just once, he loses that zip and comes back without confidence and impelled by a morbid feeling toward death that might be worded as "Come on, let's get it over with."

He has found himself up against things he can't understand: For example, the way we use artillery (the Chinese never used it against him like that, and he doesn't know what to do about it); the fact that we prefer to sit back and stop him with well aimed rifle and machine-gun fire, and not fight it out with the bayonet; the fact that when we meet him with a bayonet we

don't break and run; and, above all, the fact that his basic idea—that skill, bravery, and cold steel alone will win the war—is wrong.

3. OFFENSE

a. During the Day

On gaining contact along a road or trail in jungle country, Japanese forces in New Guinea usually followed a certain pattern of tactics.

First, the commander rapidly advanced specially selected, trained, and equipped troops, who corresponded to our advance guard.

When these forward troops gained contact with the opposition, they took up a position astride the road or track and endeavored to pin down the opposing forces with the support of machine guns and mortar fire.

Next, these forward troops used various ruses and demonstrations in an attempt to scare the opposition into a withdrawal, or into revealing the strength, extent, and location of their position by premature movement and firing.

If our troops did not withdraw, Japanese elements in rear of their forward group tried to by-pass our positions by infiltrating or stalking around one or both flanks as speedily as possible.

A stalk is carried out by a chain of men moving by a series of sidesteps. The sidesteps are made quickly, and, between steps, bodies are motionless as statues and eyes are glued on the objective. Fire is opened only when a target is seen.

These forward Japanese groups can usually be easily disposed of if our troops withhold their fire until a suitable target presents itself. There are numerous instances when Japanese advance elements were permitted to pass by and the larger rear elements were accounted for by rifle or machine-gun fire.

Upon first contact (in New Guinea), the Japanese would site a machine gun behind cover and fire along the track or road. This gun usually was well protected by riflemen and difficult to dislodge. The primary mission of this group was to protect and aid the advances of their forward group, but they periodically tested the strength and location of their opposition by feints and by deliberate attack.

They made feints and rapid advances, affording just fleeting glimpses, in order to draw the fire of our troops and thus determine our location and strength. By firing at these fleeting targets, our troops would immediately draw a heavy return fire by a group which was placed for that purpose.

To test the possibility of further advance, the Japanese would send men forward along the track or road under cover of fire from rifles, machine guns, and mortars. They placed much confidence in the effect of sound and apparently did considerable firing for this reason.

If the Japanese fail in their first attempt on a position, they seem to bring their forward lines right up to within 50 yards of ours wherever possible. (Hence the importance of being able to dig in.)

In many instances, the Japanese have not hesitated to send troop elements into areas where it was next to impossible to secure their return or even to supply them. As a result, some of the deep infiltrations of their troops have failed because of food shortages.

Unless fields of fire have been cut, it is almost impossible to stop Japanese infiltration through jungle.

If you are assigned to do some sniping, you should first seek concealment and then a field of fire. The Japanese does exactly that. Whenever one of the sniper trees is at the end of a little lane or clear strip in the jungle, look out. The turn of a trail, or the turn of a dry stream bed are ideal spots for snipers.

The Japanese have two favorite maneuvers. The first is an envelopment over "impassable" terrain by which he hopes to force the opposition to withdraw because of threats on one or both flanks. Little actual fighting is anticipated. (Their actual attack is usually made on a very narrow front, and, as a consequence, in great depth; this makes them particularly vulnerable to artillery fire.)

Their second favorite maneuver is what has been called a "filleting" attack. It is like filleting a fish—removing the backbone so that the rest can be cut into convenient pieces. In this type of attack, they rush down an arterial supply route with tanks, followed by a dense mass of infantry, on the assumption that, by holding the road and denying us the use of it, we will be forced to withdraw. If they gain this end without fighting, they are highly successful, but if they have to fight they are at a decided disadvantage—not only are they highly vulnerable to artillery fire (the dense mass, in depth, with no maneuver space) but, if our troops are up to it, the Japs are vulnerable to a single or double envelopment.

All Japanese operations indicate the tendency to follow a set doctrine without the ability to readjust for changing circumstances. Despite a failure which involved terrific losses, they have repeated the same operation over and over again without attempting to figure out something new.

The Japanese bayonet assaults have been reported as a terrifying attack—but all our units on Guadalcanal loved them. The Jap practice of singing his *Banzai* song for about 5 minutes prior to his assault has simply been a signal for our troops to load a fresh belt of ammunition in the machine guns, put new clips in rifles and BAR's, and to call for the Tommy gunners to get in position.

In their attack on prepared positions the Japanese have used a more or less standard procedure. Prior to the attack they

make every effort, by reconnaissance and ruses, to determine our strength and location and a "soft spot."

After the Japanese have selected their point of attack, they persist in attacking this point in an effort to break through. Should these efforts fail, they sometimes shift to another point but usually return to their original point of attack. Thus, as experience along the Kokoda Trail (New Guinea) indicates, we should not appreciably weaken our defense in the sector originally attacked in order to aid in the defense of some point subsequently attacked.

In the Japanese attacks along the Kokoda Trail, the following points were noted:

During their attacks it was not uncommon for the Japanese to replace their forward troops with fresh forces, a few at a time. This was done efficiently and without confusion.

When the Japanese were held up, they immediately dug in for protection. There were slit trenches and foxholes all along their line of retreat on the Kokoda Trail.

b. At Night

The Japanese selected night-attack objectives by observing our dispositions at sunset. If they failed to find these objectives where they expected them to be, they became confused in the dark because they did not know where to look for us. It would take the Japs about an hour or two to reorganize—this interval was the best time to attack them.

In their night attacks, the Japanese sent advance parties through the dense cover of valleys; they reserved the more open terrain of the higher ground for the main body to approach and make the main effort. To cover up the noises made by the advance parties, the main body purposely made noises as it approached.

Frequently the advance parties cleared away jungle growth on terrain over which large units were to approach, spreading luminous paint along the "blazed" trail as a guide.

4. DEFENSE

a. Enemy Tenacity

It would be impossible to overstress the tenacity with which the Japanese clung to their prepared positions (in the Buna area). Ordinary grenades, gun, and mortar fire were completely ineffective. There were many instances where dugouts were grenaded inside, covered with gasoline and burned, and then sealed with dirt and sand, only to yield—two or three days later—Japanese, who came out fighting. One souvenir hunter, entering a dugout that had been sealed for 4 days, was chased out by a Japanese officer armed with a sword.

b. Enemy Positions

The enemy bunkers and dugouts were constructed of coconut palm logs, dirt, sand, and sand bags, covered with natural camouflage. In some instances, pieces of armor plate were set up. The log-and-dirt bunker construction was done carefully and strongly. The corner posts were firmly embedded in the ground, and the horizontal logs neatly and strongly attached and interwoven. Several alternate layers of logs and earth were generally used, to give full protection against mortars and light artillery. Roofs were thick; they were made of alternative layers which gave excellent protection. No concrete positions were found.

The bunkers were connected to systems of fire and communication trenches radiating on both sides. In some instances, underground trenches were constructed. These were used by snipers to

infiltrate into our midst, even after the enemy units had long been driven from the general ground. Leaves and grass were well used to camouflage all bunkers. The bunkers had been planned and built for just this purpose long before the campaign actually started, and the naturally quick jungle growth, sprouting up over the earthworks, gave first-class natural camouflage.

The enemy dugout positions were well sited and mutually supporting. It was extremely difficult, if not impossible, to bypass any of the positions, each of which had to be reduced in turn.

c. Enemy Tactics

The Japanese is good at organizing ground with automatic weapons, and usually covers approaches into his position by well placed, mutually supporting fires. They usually hold their fire when the first targets appear—they wait for bigger game. They have allowed platoons, or even companies to infiltrate past their positions—so they could cut them off from the rear. It must be recognized, however, that the Jap will seldom leave his position, even when completely outflanked, and that he must be reached and killed. However, in spite of his cleverness at concealment and covering avenues of approach, he seldom, if ever, traverses or searches with his machine gun, and therein lies the key to his destruction. He is also prone to organize ravines and reverse slopes, in direct contrast to our practice of occupying the military crest of ridge lines.

Imbued with the offensive idea, the Japanese naturally attempts frequent counterattacks, probably based upon some form of mobile reserve. "On one occasion," wrote an Australian officer, "when our attack drove the Jap out, he appeared to become panicky, running from side to side and firing wildly with every-

thing he had; however, a short time later our troops were forced to withdraw by the weight of a counterattack, made by a mobile force in reserve."

An Australian account of Japanese defensive operations in the Owen Stanley Mountains of New Guinea says:

The action fought between Myola and Templeton's Crossing was along a narrow ridge, on the crest of which runs the main track. The whole length of the ridge is covered by dense jungle, which in some parts consist mostly of bamboo.

When first contacted, the enemy withdrew up a ridge on which he had prepared defensive positions. All approaches to the positions were covered by fire and well camouflaged. Circular, one-man pits were used by each individual soldier. These pits were 2 to 3 feet across and afforded good protection, especially from grenades.

It appears that the Japanese keeps his head down and fires burst after burst from his machine gun, blindly spraying the area in front and below his position to create a lot of noise in an attempt to intimidate the attacker.

Machine-gun posts covering the main track were cunningly chosen for position and field of fire. Natural camouflage, such as the butt of a large rotting tree with flanged roots, or a small natural ridge beside the track, were used to advantage. The positions were well sited for all-around protection.

The Japanese used medium and light machine guns as their main defense; a few riflemen moved to points of vantage as our troops went forward. Hand and discharger grenades were used extensively.

The Japanese likes to move his light machine gun or medium machine gun from place to place during the day. One of our officers, after a reconnaissance, was quite certain that there was no automatic weapon in one position, but when we attacked,

shortly afterwards a machine gun opened up at the first indication of movement by our troops.

d. On Makin Island

In their raid on Makin Island, U. S. Marine troops encountered a force of about 90 Japanese soldiers plus about 100 Japanese civilians.

The Japanese set-up consisted of two main positions, a number of lookout points, and a mobile reserve, which moved on bicycles and in a truck.

One of the main positions was along the edge of the beach on the south side. It consisted of a shallow trench with barbed-wire obstacles to the front.

The other main defense position extended across the island, facing the east. It included a fire trench, 2½ feet wide and 2½ feet deep, with the spoil thrown up in front. Along the trench, at intervals across the island, were four machine-gun nests. About 75 yards east of the trench, a barbed-wire fence extended across the island. To block the lone road cutting the defense line, the Japanese used portable barbed-wire "hedgehog" obstacles.

The machine guns and snipers provided the major difficulties for the Marines. The Marines flattened themselves on the ground when the machine guns opened up, but they still were exposed to snipers, who had cleverly camouflaged themselves under the fronds of palm trees off to the flanks of the machine guns. The snipers were dressed in a jungle green uniform; some used individual camouflage nets while others hung coconuts all over their body. They were almost impossible to see until they moved, or the fronds were shot away. One sniper had the tops of two trees tied together, and when spotted he cut the trees loose, making it hard to decide which tree he was in.

These snipers tried to pick out troop leaders and radio men.

The Marines took care of the snipers first and then knocked out the machine-gun nests. The guns were well sited as to fields of fire and were well concealed.

5. DUMMY SNIPERS (New Guinea)

A patrol advancing up the coast was fired on by a tall tree-top sniper. They halted, located him, and apparently shot him down. They then advanced and were fired on again. This happened several times. Thorough investigation revealed that one sniper had been holding up the patrol and dummies had been placed in other trees. These are dropped by a pulley arrangement after the Americans had fired a number of shots. This made them imagine that they had cleared the opposition.

In another case, the sniper's dummy was rigged so that it could be pulled back up into place. The sniper made the mistake of pulling it back up too soon, giving away his ruse. The sniper, incidentally, showed very poor marksmanship.

6. RUSES

The Japanese have used the following ruses in the New Guinea fighting:

a. They dragged a dead United Nations soldier close to our lines and propped him up, expecting that a group of our troops would be sent out to "rescue" him.

b. With the same purpose, they placed captured weapons in front of our forces.

c. They fired captured weapons to give the impression that our troops were at the places where the weapons were sited.

d. Over their hats, they wore cut-out circular boards to imitate Australian hats.

e. They scattered cast-off garments and equipment on a trail to give the impression they had fled in disorder—actually it was an attempt to ambush our forces.

f. They shook bushes and talked loudly in an attempt to draw our fire.

7. SUPPLY ON GUADALCANAL

The serious supply difficulties which confronted the Japanese on Guadalcanal were brought about, to a large degree, by poor distribution and planning. On the same days, we continually encountered Japanese soldiers who were "round-faced and well fed" and those who were emaciated and starving.

This situation was believed to have been due to Japanese overoptimism regarding the outcome of planned attacks. This optimism was transmitted to supply echelons; the Japs had to win a victory on schedule so that their supply operations would continue functioning adequately. One unit that attacked Henderson Field, Sept. 12, 1942, carried only three day's ration, with no reserve in the rear. Consequently, the few who survived the attack were immediately faced with a food shortage.

The Japanese adopted the system of having each company send carriers back for rations, which were then carried forward. Because of the rough terrain and our air operations, this round trip took as long as 2 or 3 days. These efforts did not provide a full ration for the units, so the men were put on reduced rations. This, plus the strain of jungle operations, made the soldiers easy marks for malaria, beri beri, and diarrhea. Eventually the condition became so bad in some units that half-sick men were sent to carry rations and the journey took a correspondingly longer time.

Air transportation of food to these troops was attempted with limited success. Late in January, 25 parachutes of food and supplies were dropped to units in the jungle. The parachutes were strafed by our planes, starting some fires, so it is believed only part of the supplies were received by the troops.

The Japanese used all available types of native foods. Ant nests were reported as very good eating by one Japanese soldier. Their forces in New Guinea turned to horse meat when food supplies became low. The meat was processed and issued under the direction of a high echelon.

Although all varieties of food were used by the enemy on Guadalcanal, the normal issue was field rations and dehydrated foods, including powdered eggs. It is doubtful if perishable food was issued to front-line troops, but some was obtained. In some cases food was buried in the field cemeteries for safekeeping.

Stealing of food became quite common. Ration dumps required extra guards and special precautions. Towards the end, the situation became so bad that an emergency courtmartial was appointed to deal with the special cases of stealing rations, and this court had instructions from the appointing officer to inflict drastic punishment. Rations were reported as being frequently stolen from carriers en route to the front.

Section II. GRENADE DISCHARGERS

1. GENERAL

To date, two types of grenade dischargers, both 50–mm, have been used by the Japanese. One is known as Model 89, heavy grenade thrower, and the other as the "10-year" type. These have been erroneously referred to as "knee mortars." They have a small attached base plate, designed to rest on the ground or any solid object while firing—never on a soldier's knee or thigh. A Marine on Guadalcanal fired one of the dischargers from his thigh, and his upper leg bone was broken by the force of the recoil.

The Japanese are using both types of dischargers in the South Pacific fighting, and a number of them have been captured by our forces. Studies and experiments with both types have been made by the U. S. Ordnance Department, and the information in this section is based on the Ordnance findings. The dischargers were found to be very effective, easily carried, simple in design, and easy to manufacture. Designed for use by the individual soldier, they bridge the "gap" between hand grenades and regular mortar fire.

2. MODEL 89

a. Description

The Model 89 was perfected in 1929, and is considered to be an improvement over the earlier (1921) model.

All component parts of the Model 89 (see fig. 1) are made of steel. It is constructed in the form of a pipe-like, rifled barrel, which is attached to a small base plate. The plate is so shaped on the bottom that it could fit over a medium-sized tree trunk or log. The trigger housing is a tubular piece of metal with a lengthwise slot. Protruding through this slot, the trigger cocks and fires in one operation. A spring sleeve covers the trigger housing at the base plate. A range-adjusting assembly is attached to the base cup of the barrel.

b. Table of Characteristics

Caliber	50 mm (1.97 in)
Length (over-all)	24 in
Length of barrel	10 in
Weight	10¼ lbs
Range	65 to 700 yds
Weight of projectile	1 lb 12 oz
Barrel	Rifled

c. How It Operates

The discharger has range scales on both sides of the lengthwise trigger slot, and the weapon can be set at the desired range by turning the range-adjusting knob. When the knob is turned, it lengthens or shortens the

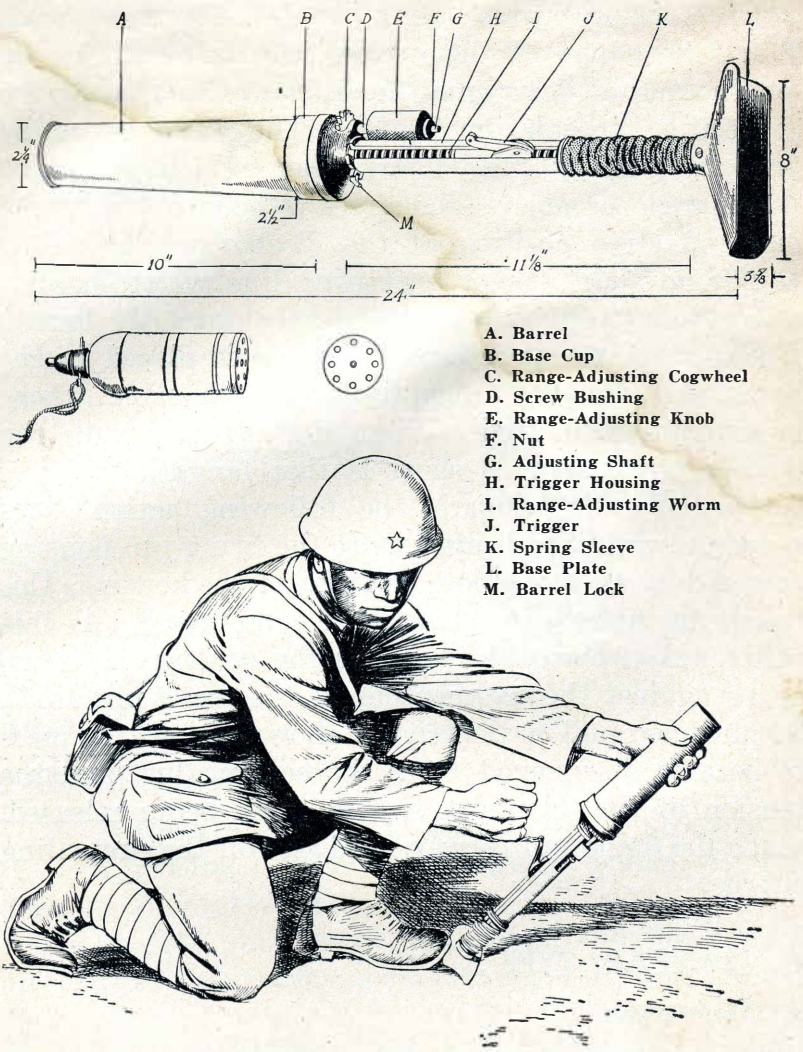

Figure 1.—Japanese Model 89 Grenade Discharger and Ammunition. (The correct position for firing is shown in the bottom view.)

worm housing inside the barrel of the discharger. Thus, the range of the weapon can be regulated by lengthening or decreasing the distance traveled by the projectile through the barrel. The weapon can be fired from the ground or any other solid base.

An angle of about 45 degrees is believed to be the most effective position of the discharger for firing. It has no sight except a grooved line which extends from the muzzle for a short distance down the barrel. Preparatory to operation, a grenade is placed in the barrel and allowed to drop to the firing housing, where it remains until fired. When the operator pulls the trigger (by pulling a short leather lanyard which is fastened to the trigger), the following action takes place: Cogs in the trigger move the firing-pin housing forward by engaging cogs in front of the housing; this causes the firing-pin spring to be compressed. As this action takes place, the tang on the cocking piece engages against the cocking lug of the firing-pin shaft. A continued pull on the trigger allows the cocking piece to become disengaged from the cocking lug, and the tension of the firing-pin spring, upon being released, sends the firing pin forward and sets off the propelling charge.

3. '10-YEAR' TYPE

a. Description

This discharger, also constructed entirely of steel, was perfected in 1921. It is still being used by the

Japanese, mainly for firing signal pyrotechnics into the air. It also fires a fragmentation-type grenade.

The weapon is muzzle-loaded, and is fired by a striker which is operated by a lever on the outside of the discharger body. Like the newer type, the 1921 model is fired while attached to a small base plate. No bipod attachments are used.

The discharger fires grenades that weigh nearly 1 pound. A special attachment containing the propelling charge and percussion cap is screwed into the grenade base.

b. Table of Characteristics

Caliber	50 mm (1.97 in)
Length (over-all)	20 in (about)
Length of barrel	9½ in
Weight	5¼ lbs
Range	65 to 250 yds
Barrel	Smooth bore
Transport	Carried on the man
Weight of grenade	1 lb

c. How It Operates

The weapon is fired by a trigger that is attached to the bolt housing. When the trigger is pulled, the following action takes place:

The trigger pin rotates in a notch, and the trigger lips compress the firing spring by engaging and forcing the cocking-piece sleeve forward on the firing-spring guide.

When the sear has rotated approximately one-half the way back, it slips off the notch and releases the firing-spring guide, which jumps forward because the firing spring is compressed. Thus the firing pin contacts the primer. When the trigger is released, the firing spring—which still has a slight tension—forces the trigger back into position to be fired again.

Upon being released, the sear moves back over the notch, which has a small leaf spring that depresses and also allows the notch to move downward. This latter movement allows the sear to go back to its original position so that the piece can be fired again.

This complete operation takes place each time the trigger is pulled, since the firing mechanism is of the continuous-pull type.

The range-control gauge governs the range of the projectile by the opening or closing of a gas port in the base of the barrel. This gauge can decrease or increase the force of gas expansion in the barrel, thereby regulating the range. By opening the gas port to its fullest extent, the range is decreased to its minimum; by closing the port, the range is increased to its maximum. (The elevation also must be taken into consideration.)

4. AMMUNITION

a. For Model 89

Only the 50-mm high explosive type of grenade projectile was available to the Ordnance Department

for examination. However, the Model 89 is believed to be designed to fire gas or smoke projectiles as well as high explosives.

The effective bursting radius of the high-explosive shell was found to be 30 feet. The explosion caused 211 impressions on a low-panel bursting range used by the Ordnance Department in conducting the tests.

The grenades received to date were painted with black enamel, with a ¼-inch red stripe at the head and a 5/16-inch yellow band around the center of the grenade body. Each round was wrapped, unfuzed, in water-resistant paper with a plastic-closing plug. The fuze accompanying each round was wrapped in paper and excelsior and separately contained in a small tin can.

The projectile consists of three major parts, the fuze, the body, and the propelling charge. The fuze is of a simple point-detonating type with a pin safety. After the pin is pulled out, the fuze is armed by a setback and centrifugal force on firing from the discharger.

The body of the projectile is made of mild steel. It serves as a receptacle for .31 pound of TNT-type explosive filler.

The propelling charge consists of the percussion cap, propellant, and an expanding copper rotating band. This unit is assembled to the body by a screw thread, and is fired when a striker hits the percussion cap. When the firing action occurs, the expanding gases exert their force on the copper band and drive it against the rifling. This causes the projectile to rotate.

b. For "10-Year" Type

Only the high-explosive, fragmentation-type grenade projectile was available to the Ordnance Department for study in connection with the "10-year"-type discharger. This projectile is the standard Japanese hand grenade with a modification enabling a propelling charge to be added to it.

The range of this smooth-bore ammunition is reported to be 65 to 200 yards, depending on the adjustment of the gas port of the discharger. No determination of ballistic data could be made because of the lack of sufficient ammunition to conduct a firing program.

No distinctive markings were found on the grenade examined.

Like the projectile for the Model 89 discharger, the grenade for the 10-year type consists of three main parts, the fuze, the body, and the propelling charge. The fuze is of a simple firing-pin-initiated, powder-delay type with a pin safety. The delay is approximately 7.5 seconds. However, it is reported that when this fuze is used in the discharger, it will also detonate upon impact. To arm and use as a hand grenade, simply pull out the safety pin and hit the firing pin a smart blow. When fired from the discharger, the pin is pulled out, and it is reported that the fuze will arm on setback. Sufficient ammunition was not available to check this statement.

The body consists of a mild steel filler-cap plug and a cast-iron body proper. The body serves as a receptacle for approximately 3 ounces of what appears to be TNT explosive filler. To it is affixed the filler cap and propelling charge.

The propelling charge consists of a percussion cap and propellant. When the firing pin strikes the percussion cap, the propellant is ignited and fires the grenade.

Section III. JAPANESE EQUIPMENT

1. INTRODUCTION

The comprehensive list of Japanese equipment given below was carried by a part of the Yokosuka 5th Special Landing Party, which took part in the Southwest Pacific fighting. This list of equipment represents about what a company of 250 to 275 men would carry.

2. THE LIST

Description	*Quantity*
Model 93 13-mm MG	2
Model 92 7.7-mm Hv MG	4 (with accessories and extra parts)
Model 96 6.5-mm LMG	11
Model 38 rifle (with accessories and spare parts)	172 (include 2 in reserve)
Model 89 heavy grenade thrower.	10
Model 14 pistol	66 (with accessories and spare parts)
Model 100 flame thrower	5
Model 93 13-mm ordinary Am	7,454
Model 93 tracer Am	3,476

Model 94 HMG ordinary Am	24,000
Model 94 tracer ordinary Am	6,000
Model 94 armor-piercing Am	6,000
Model 96 LMG Am	110,000
Model 38 rifle Am	102,000
Model 14 pistol Am	2,640
Model 89 heavy grenade-thrower shells	700
Model 89 heavy grenade-thrower smoke shells.	100
Model 91 hand grenade	980
10 Kg smoke candles	15
1 Kg smoke candles	200
Rifle grenade shell (ordinary)	60
Rifle smoke shell	60
Model 95 collapsible boat	5 (with accessories)
Barge for transporting bombs	1
Wire entanglements	8,202 ft
MG carriage, type 2, revised No. 1	1
Portable phone	8 (with accessories)
Detector equipment	1
Detector equipment for scout use	5
Rifle barrels	25
No. 2 bullet-proof jacket	100
Wire cutter	35
Small shovels	125
Small picks	20
Triangle tents A	3
Double tent	2
Smoke screen float	236
Sandbags	3,500
Model 93, No. 3 gas mask	270
Life jacket (merchant-ship type)	57
Life jacket (warship type)	209
Portable pump	1

Small B fire extinguisher	4	
Large B fire extinguisher	8	
Fire axe	3	
Model 92 Very pistol	4	
Model 41 signaling lamp (new type)	1	
Signaling rocket (new type)	5	
Portable signaling lamp	12	
Blasting powder (use on land)	40	
Model 99 demolition bombs	4	
Portable gasoline, direct-current charging generator 1 KW–105V, with the electric distributing equipment.	1	
TM type, portable wireless telegraph (new type 2).	2	(with accessories and spare parts)
D1 code book	1	(with number of dispatch tags and reception tags)
Rations—for about 1½ months.		
Canteen goods—for about 1½ months.		
Model 93 13-mm MG (auxiliary parts) light armament.	3	
Model 93 13-mm MG, arm rack Type 6	3	
Model 93 13-mm double combined armament MG.	2	
1 set Model 93 13-mm double combined armament MG arm rack.	1	
Ordinary ammunition	22,454 rounds	
Tracer ammunition	8,976 rounds	

Section IV. INFORMATION OBTAINED FROM JAPANESE PRISONERS

1. INTRODUCTION

All the information given in this section was obtained from Japanese prisoners; therefore, it is not necessarily correct in all particulars, and should be treated with reserve. The comments are presented according to subject matter.

2. THE COMMENTS

a. Regarding Morale

Several prisoners have stated that they were opposed to going to war against the United States and Great Britain. One prisoner remarked that Japanese soldiers and sailors were talking among themselves about the prospects of losing the war. He said there was considerable fear of Russia "turning on Japan and using Vladivostok as a base for bombing operations."

At least two prisoners deserted because of difficulties with their commanding officers. One of them, suffering from malaria and confined at a rest camp in New

Guinea, declared that his superior officer accused him of "gold-bricking" and "kicked, pushed, and beat me." He intimated that this treatment made him so miserable he went into the jungle and wandered three days until he reached the Australian lines.

Another prisoner wandered off into the jungle toward the U. S. lines on Guadalcanal after his commanding officer had reprimanded him because he asked for more rice than the individual rationed allotment. He was captured by natives while stealing food, and was turned over to U. S. troops.

When asked what he thought about fighting the war, the prisoner replied that he didn't think—he just followed orders. He refused to write home, and said he would like to settle in the United States after the war is over.

There is a difference of opinion among prisoners as to their reception in Japan after the war. Most of the prisoners have insisted that it is a life-time disgrace to be captured. One prisoner questioned recently declared that all those captured would be killed when they were returned to their country. He said that even his own father and mother would not receive him. However, he intimated that there might be a possibility of some kind of adjustment.

Another prisoner thought he would be able to return and live a normal life provided he did not resettle in his native district.

In regard to "saving face," another prisoner stated that the correct procedure for the commander of a badly defeated regiment would be to return to the district where his unit was formed and commit suicide.

According to one prisoner's story, Japanese enlisted men are forbidden to make allotments from their pay for dependents. In explaining this statement, the prisoner said the army felt that the enlisted men needed all of their pay to buy necessities.

Japanese soldiers may keep diaries in Japan and in other areas not close to the theater of operations, according to another prisoner. On his departure from Rabaul, the prisoner said his commanding officer read an order forbidding diaries to be taken to New Guinea or to be written there. The order did not apply to officers, he said, and noncoms in some instances could obtain permission to keep diaries.

b. Regarding Equipment

(1) *Collapsible Boats.*—One prisoner described a collapsible boat made of wood and reinforced with rubber. The boat, according to the prisoner, was constructed in four independent and water-tight sections, which hook together. The hooked joints were reinforced with rubber. The maximum capacity for the boat is 10 men.

Another prisoner described a collapsible rubber boat, which was inflated by a foot pump. The floor of the boat was made of folding wooden slats, which were

fitted into a side frame to provide rigidity. The overall length of the boat was about 8 feet and the width about 6 feet. The inside measurements were about 5 feet by 3 feet. The boat, which weighed approximately 100 pounds, accommodated two or three men. The occupants propelled it by paddling with their hands.

(2) *For Infantry Squad.*—A prisoner said each infantry squad, of 12 men, carried the following: 4 shovels, 1 axe, 1 hammer, 1 large tree saw, 3 picks, 1 hatchet, 1 pair of wire cutters, and nails and staples. He said the squad did not carry barbed wire.

(3) *Footwear.*—Before leaving Japan, each soldier is issued hobnailed shoes and rubber-soled canvas shoes, according to a prisoner. The latter are worn, he said, when leaving a ship because ordinary shoes are too slippery.

(4) *Camouflage.*—A prisoner stated that in addition to a camouflage headnet, each Japanese soldier in jungle areas is issued a pair of greenish cotton gloves.

(5) *Identification Badges.*—A prisoner explained that infantry troops are identified by a circular khaki cloth badge, 1¼ inches in diameter, which is worn above the left breast pocket. The prisoner said that the Japanese character denoting infantry was marked on the badge.

PART TWO: GERMANY

Section I. RECONNAISSANCE BY LIGHT TANK PLATOONS

1. INTRODUCTION

In German tank organizations, a light tank platoon consisting of seven Pz. Kw. 2's is an organic part both of the regimental headquarters company and the battalion headquarters company. The regimental light tank platoon is normally used for reconnaissance purposes. German doctrine covering the reconnaissance duties of patrols drawn from these platoons is summarized below. (It assumes that superior German forces are conducting an advance.)

2. THE DOCTRINE

a. Teamwork

Teamwork, the Germans point out, is the secret of successful reconnaissance. They believe that haphazardly formed reconnaissance patrols, made up of men who have never worked together before, are of little value.

b. Reconnaissance Before H-Hour

(1) *Orders.*—Orders given to light tank patrols which are to perform reconnaissance before H-hour include:

(a) Information about hostile forces and the terrain.

(b) German intentions (especially those of a patrol's own and flanking units).

(c) Composition of the patrol.

(d) Time of departure.

(e) Line of advance and objectives.

(f) Method and procedure of reporting (radio or motorcycle).

(g) Position of the patrol commander, and of the commander to whom he will report.

(h) Action to be taken on completion of task, or on meeting superior opposing forces.

It is prohibited to take written orders and situation maps on reconnaissance. Special precautions are insisted upon when markings of any kind are made on maps used on reconnaissance; these markings are required to be of a kind which will not reveal German dispositions if the maps are captured.

(2) *Information Needed Beforehand.*—For its disposition and method of work, the German patrol depends on knowing:

(a) Up to what point contact with the opposition is unlikely. (Until reaching this point, the patrol saves time by advancing rapidly and avoiding elaborate protective measures.)

(b) At what point contact is probable. (After this, increased alertness is maintained.)

(c) At what point contact is certain. (Here the patrol is ready for action.)

The patrol commander is also given necessary particulars regarding air support and information as to the attitude of the civil population.

(3) *Method of Advance.*—The light tank patrol advances rapidly from one observation point to the next, making use at first of roads and paths, but later, as it approaches hostile forces, using all available cover. When approaching villages, woods, or defiles, the patrol leaves the road in sufficient time to upset the opposition's aimed antitank-fire calculations.

(4) *Command.*—The German patrol commander makes a rapid estimate of our position, and tries to attack and overrun us if he thinks that we are weak. If such a move does not seem advisable, he attempts to discover the type and strength of the opposition encountered, without becoming involved in combat.

"Keen, capable, and well-trained officers or noncoms must be selected to command the light tank patrol," the Germans state. "These must be constituted of quick-thinking, resourceful troops who have functioned as a unit long enough to know and have confidence in their leader."

c. Reconnaissance after H-Hour

(1) *Mission.*—The mission of reconnaissance after H-hour is to explore the hostile position in detail, to

protect German deployment, and to discover hostile gun positions, as well as natural and artificial obstacles in the line of advance.

(2) *How Performed.*—The mission is carried out by light tank patrols (which may be reinforced) operating ahead or on the flanks, as in reconnaissance before H-hour. The reconnaissance tanks employed immediately ahead or to a forward flank are detailed automatically by the first wave of the attacking force. (Normally, one light tank per platoon of heavier tanks in the first wave, and always the same light tank. The remaining light tanks work behind the first wave, performing other duties.) The reconnaissance tanks advance rapidly, making for suitable high ground. They keep 300 to 500 yards ahead of the first wave, and maintain visual contact with it. The reconnaissance tanks observe from open turrets or, if fired on, through their telescopes, with turrets closed. They advance by bounds, from cover to cover, keeping the terrain ahead under continuous observation.

The tanks in the first wave, especially the Pz. Kw. 4's, cover the reconnaissance tanks as they advance.

When the reconnaissance tanks contact our infantry, they attempt to overrun us and, if they are successful, they report and continue their mission. A reconnaissance tank discovering hostile antitank weapons and artillery reports them, takes up a position, and waits for the rest of its company. While waiting, it fires on hostile antitank weapons.

Tanks are avoided, but are observed from concealed positions. The reconnaissance tanks report suitable terrain for meeting an attack by hostile tanks. As under the circumstances described in the previous paragraph, each reconnaissance tank waits for the rest of its company.

Opposition which begins to retreat is promptly attacked, the reconnaissance tanks reporting the development and continuing the pursuit.

In the event of an attack by the opposition, the reconnaissance tanks take up a position, meet the attack, report, and wait for the rest of their companies to come up.

In all these instances, the reconnaissance tanks avoid obstructing the field of fire of the heavier tanks following them. Throughout, the light tanks report by radio if it is available, by prearranged flag or smoke signals, or by significant firing or maneuvering.

Section II. COMPANY ORDERS (DEFENSE)

1. INTRODUCTION

A detailed set of German combat orders issued to a company in North Africa affords an excellent illustration of enemy defense technique, as well as insight into the way the tasks of smaller units are outlined and coordinated. Every platoon and squad, and almost every support weapon, is discussed separately and fully. For the sake of brevity, the contents of the orders are summarized and are grouped under appropriate headings.

2. INTENTIONS

The first words of the order were "The company will hold its position to the last man." Each sub-unit received its own assignment. The left platoon was to "neutralize and destroy the attacking enemy" [British]. The right platoon was already in its assigned position, where it had received its orders; the heavy mortar section had already been given two prearranged fire plans for the two halves of its front; the

antitank rifle 41 was not to engage British armored vehicles at more than 200 yards; the antitank guns were to bring the British tanks to a standstill in front of the main line of the company defensive area; and company headquarters was to use all available personnel to form a strongpoint (*Stutzpunkt*) in the event of an enemy penetration (*Einbruch*).

As is customary in German orders, the information given under "Intentions" contained a few tactical hints, as well. Thus the left platoon was encouraged to site its reserve machine guns in an enfiladed position, and its reserve squad was to fire between the forward squads. The right platoon was to have a listening post near the fence which surrounded the position; the post would withdraw as soon as the British attacked. The machine guns were to open up without orders as soon as they observed an attack developing. Designated snipers were to aim at commanders. The reserve machine guns were instructed to fire between the forward squads, and the remainder of the reserve was to give supporting fire in depth. The center platoon's fourth squad was to become a "counterattack group" and was not to open fire except to deal with British troops who had actually penetrated. The center platoon's antitank rifle was forward, between the center and right squads. The heavy mortar squad was reminded of the customary role of the mortar, and was advised to fire with the sun at its back. The antitank gun was given the

ranges beyond which it was not to fire—namely, 200 to 300 yards in the case of medium and heavy tanks, and 600 yards in the case of light tanks. For reasons of concealment, firing at British ground positions was forbidden. The antitank gun commander was ordered to observe the fall of his fire from a flank position, and the ammunition handlers, except when they were needed for their normal duties, were to join in the infantry fire fight. During action, all-around observation was to be maintained. The gun commander was instructed to prepare a range card, and to require his crew to learn it by heart.

3. DEFENSES

The company's position was apparently surrounded by a single-apron or double-apron fence. The British positions (given separately in each sub-unit's orders) were from 150 to 450 yards away. On the German side of the wire, the arrangement of the minefield appears to have varied. The left platoon's minefield consisted of a row of booby traps 3 to 4 yards from the wire, a minefield proper 40 yards behind this (3 to 4 yards between rows, 2 to 5 feet between mines), and three independent mines between the two fields. The right platoon's minefield consisted of four rows spaced alternately (4 yards between rows and 5 rows between mines). The center platoon's minefield was known only vaguely to the company commander, but in front

of its right squad the minefield was 30 yards from the fence.

The left platoon had a trip-wire in front of its fence, but no explosives in the fence itself; the right platoon had explosive charges hung in the fence, and these were detonated by a cord from the position; the center platoon had four to six grenades in its portion of the fence, to be fired in the same way.

From the orders, it seems evident that the details of siting minefields and booby traps were left to the discretion of individual platoon commanders.

4. POSITIONS

The left platoon's position was not described in the orders, but its total frontage was given as 300 yards. Attached to the center squad was the antitank rifle, model 41, covering a sector which ran through the whole position.

The right platoon's position consisted of three trench systems, arranged like a wide arrowhead. The squad occupying the trench system at the left had an antitank rifle. A reserve section was held at platoon headquarters with runners, and with the reserve (fifth) machine gun and antitank rifle.

The center platoon had three squads forward, while the fourth was 130 yards southwest of platoon headquarters. The heavy mortar squad had an observation post between two of the forward squads and a fire

position 500 yards in rear of the observation post (and 80 yards to the right of company headquarters).

There was no indication of the position of the antitank gun.

5. SENTRY SYSTEM

The left platoon had two men on guard by day. At night (from 1900 to 0600 hours), there were two men per machine gun and two men in each of the listening posts put out by the three forward squads.

The right platoon had one post per position (including platoon headquarters) by day, and at night two men per machine gun plus two sentries, who were allowed to rest in the position but who were required to know the light signals and the password.

The center platoon had one observation post per squad manned by day, with the "counterattack group" manning an observation post between the center and right squads. At night the center platoon had two men per machine gun. One of these was to be the squad leader or his second-in-command. The antitank riflemen maintained one man in a position between the center and right squads. On the left (open) flank, all squads in turn maintained two men with grenades in an abandoned antitank gun-pit northwest of platoon headquarters. The heavy mortar squad was to keep one man at the mortar by day and two at night. A man remained at the antitank rifle day and

night; he was relieved every two hours. One man by day, and two at night, maintained continuous observation by the antitank gun. At dawn the gun commander was to stand to.

6. AMMUNITION

Reserves of ammunition were dumped behind or in each position. The right platoon had one "echelon" of ammunition at platoon headquarters and two "echelons" with its squads. The heavy mortar squad's ammunition was dug in near the mortar pit. The antitank rifle's ammunition was hidden in holes within a radius of 30 yards from the position. The antitank gun's ammunition was similarly hidden, but in such a way that the gun crew could lay its hands on the right kind, even at night. (There were 11 cases of armor-piercing and 4 cases of high-explosive projectiles.)

7. RATIONS

There was a warning against bunching at the issuing point. As a precaution against harassing fire by British artillery, containers were to be distributed at some distance from the vehicles which brought them forward. It was noted that 8 days' reserve rations were buried near platoon headquarters in each position.

8. INTERCOMMUNICATION

Intercommunication was normally to be by light signal or by runner. The right platoon was reminded that, in line with normal German procedure, its squad leaders were to maintain contact with their neighbors.

The antitank gun commander was told to report the day's observations and any other events to his platoon commander, at the evening ration-drawing.

9. SAFETY PRECAUTIONS

For firing on fixed lines, wooden stakes were to be driven in near each machine gun, to mark the permissible arcs of fire. (All machine guns were given definitely prescribed arcs.) The antitank rifle was permitted to fire all around at ranges of 400 yards or more; along the sector it was covering, it was allowed to engage armored vehicles at ranges as low as 200 yards.

10. GENERAL INFORMATION

Each position was told in detail the degree and types of hostile fire likely to fall on its sector, and the distance between itself and the British position.

Section III. DEFENSE AGAINST GROUND-ATTACK PLANES

1. GENERAL

The effective use of Allied ground-attack aircraft against German troops and armored vehicles, especially tanks, has led the Germans to place great emphasis on defensive measures.

In the Polish and French campaigns, German machine-gun and cannon fire from low-flying attack planes caused great damage to military equipment and many casualties to personnel. Similar tactics were effectively employed at the outset of the Russian invasion. However, the Soviets concluded that a heavy concentration of small-arms fire would not only damage or destroy the planes, but would also bolster the morale of the troops by keeping them in action. Accordingly, the Russians proceeded to stress this form of defense. The results were encouraging, inasmuch as many German planes were damaged or shot down by rifle fire concentrated on their vulnerable under parts. The Germans countered by increasing the armor on

their attack planes, which reduced personnel losses but did not entirely prevent structural damage.

In one instance in Africa, an eye-witness reported the destruction of three Italian planes in 5 minutes by small-arms fire. In another case, the Germans claim to have brought down a Soviet plane with an automatic pistol.

2. GERMAN INSTRUCTIONS

On their own account, the Germans have endeavored to impress their troops with the absolute necessity of employing all available fire power against ground-attack planes. The following instructions appear to have had wide distribution among the German troops in Africa:

"Low-level air attacks have once again led to serious losses. In spite of this, troops still fail to seize the opportunity of destroying the enemy machines. Frequently no sort of defense is put up, and the enemy's task is thereby rendered easier.

"It has been proved, however, that heavy losses both of personnel and planes can be inflicted by the use of infantry weapons. Airplanes are sensitive and are partly crippled by hits on the engine, gasoline tank, ammunition, and so forth. Considerable success is attained when a pilot is put off his aim or when a plane has become a semi-casualty.

"Enemy fighters have a habit of flying very low and climbing only just before attacking. For this reason they cannot be picked up by the Air Warning Service sufficiently early to allow our fighters to arrive in time. The fire of all available weapons, including rifles, is therefore the best means of defense in such cases."

The Germans devised the following methods to beat off low-level attacks:

"a. Concentrate the fire of all weapons not immediately engaged in ground defense.

"b. Open fire on the planes before they attack you; open with a burst and follow it up with rapid rifle fire.

"c. Meet the attacking plane with a hail of bullets.

"d. Don't fire on diving planes at a range greater than 2,000 feet, because it is useless and serves only to give away your position to the enemy.

"Every soldier—no matter to which arm of the service he belongs—must be determined to destroy the attacker from the skies.

"Not only is small-arms fire a strong deterrent to enemy pilots, but a few bullet holes in an airplane may keep it in the repair shop for many days."

(NOTE. The British, in their defense of Tobruk, proved that small-arms fire can be effective against low-flying aircraft. In one period, rifles and Lewis-type machine guns accounted for nearly half the bombers brought down. One captain rigged a twin Lewis gun outside his office and was officially credited with six planes shot down.

Another of Tobruk's small-arms defenders was "Tiny," a very husky naval gunner who came into the harbor aboard a small British warship. Fifteen Nazi dive bombers attacked the ship, and she settled down in the harbor with all guns blazing. Her shattered superstructure still remained above water and Tiny and his mates got permission to remain aboard to get their revenge. Whenever the bombers came over they scrambled to the poop and let the enemy have it with their machine gun.)

Section IV. PARACHUTE TROOPS

The German parachute troop organization is continually expanding. For nearly two years, however, there have been no major air-borne operations. Since the campaign in Crete, German parachute troops have chiefly been employed as infantry, and today they are encountered more and more often in this role. This should not be interpreted as meaning that the German paratrooper is now merely an infantryman who has received training in parachute operations. Actually, he is recruited and trained as a specialist. While infantry tactics are a basic part of the instruction, special emphasis is placed on training for surprise attacks directed toward securing and holding small vital areas until the arrival of reinforcements. Instruction in demolition work and guerrilla warfare is also included.

Originally, the Ju 52 transport was used both in training and in actual operations, but recent reports indicate that the He 111 bomber is being used for training purposes. Jumps from altitudes as low as 275 feet were made from the Ju 52; however, the higher speed of the bomber makes it hazardous to

jump from altitudes under 600 feet. This has necessitated a revision of landing tactics. When the members of a machine-gun unit jumped in quick succession from a Ju 52, they were able to land fairly close together, whereas the same men jumping from a bomber are likely to land about 250 feet apart—altogether too great a distance for a tactical unit.

The new jumping procedure is interesting. The aircraft fly in close vees of three, with the center plane slightly higher than the other two. A tactical group is distributed among the three planes: No. 1 man in the left-hand plane, No. 2 man in the center plane, and No. 3 man in the plane on the right. When these three men jump, they are separated only by the distances between the belly turrets of the bombers, and therefore are likely to land approximately 35 feet apart. This enables them to assemble and go into action much more quickly.

It should be noted that He 111's carrying paratroops may be accompanied by active bombers of the same type, and that carrier identification by ground defenses may therefore be difficult. The possibility of surprise is also increased.

A further innovation involves smoke. The escorting bombers may be expected, at times, to fly ahead and drop high explosive and smoke bombs, creating a wall of smoke into which the carriers fly and drop their troops.

In the early stages of paratroop operations, it was considered very difficult for a man to land safely if

he carried any weapons other than an automatic pistol and a large jackknife, although the men in the first platoon to land were equipped with one to four hand grenades, and every fourth man carried a light automatic carbine. Accordingly, rifles, ammunition, light field guns, and mortars were dropped in separate containers, and in loads up to 260 pounds. It is now reported that, in addition to their usual equipment, parachutists jump with light machine guns, machine carbines, or rifles, and that they have drum magazines strapped to their waists. The light machine gun is wrapped either in a blanket or in a special zippered case, and may be put into action immediately. (In some instances a belt of ammunition is adjusted in the machine-gun feeder before the jump.) The separate containers are still used, of course, for additional ammunition and the heavier types of equipment.

Ground-air communications have been improved. Upon landing, the signal section, which consists of two noncoms and five especially picked men, establishes radio communication with the German Air Force planes and guides them in, using a powerful transmitter. If there is a hitch in establishing radio contact, smoke signals are used more often than identification panels.

The Germans are now well aware that if parachute troops or other air-borne troops are to be employed successfully, well-coordinated air support is a necessity.

Section V. PANZER GRENADIERS

The Panzer Grenadier regiments, which are the assault ground troops of the German armored divisions, are notable for their speed, mobility, and great fire power, as well as for their methods of cooperating closely with the tank regiments.

Besides the varied light and heavy armament possessed by the Panzer Grenadier rifle companies, in the Panzer Grenadier regiments and battalions we find headquarters companies, heavy gun companies, tank-destroyer platoons, motorcycle dispatch rider platoons, signal platoons, and engineer platoons. In addition, supply echelons for munitions, fuel, and rations are responsible for the maintenance of the troops. Repair echelons insure that motor vehicles, guns, and equipment are ready for use at all times.

The extensive allotment of weapons to Panzer Grenadier units include rifles, pistols, machine pistols, light and heavy guns, and antitank guns of every caliber. This permits fire power of considerable scope—so much so that a Panzer Grenadier company can develop three times the fire power of the

normal German heavy infantry company. So-called "Panzer Grenadier personnel carriers," fully armored and designed for cross-country duty, carry the assault troops into battle (see fig. 2). In combat from these vehicles, and in combat on foot, the Panzer Grenadiers have become an arm which does not fight according to linear and frontal principles, like the infantry, but one which tries to force a decision within and to the rear of hostile positions.

The chief task of the Panzer Grenadiers is to put their mobility and strength to effective use in combined operations with tanks. Often the Panzer Grenadiers must precede the tanks in assault and attempt to create a favorable situation for a tank thrust. This is done, for example, in attacks across rivers, attacks against forces which are established on or behind terrain unsuitable for general tank action, attacks against prepared defensive positions, combat in and around villages and forests, and combat at night and in fog.

Although in independent combat assignments the Panzer Grenadiers are often allotted artillery, assault artillery, and antiaircraft, tank destroyer, and tank engineer units, the Grenadiers assume primary responsibility whenever fighting reaches the hand-to-hand stage. If the Grenadiers have been successful in establishing a bridgehead, breaking through a position, or clearing a village or a forest, they may be expected to get back into their carriers and pursue a disorganized opposition.

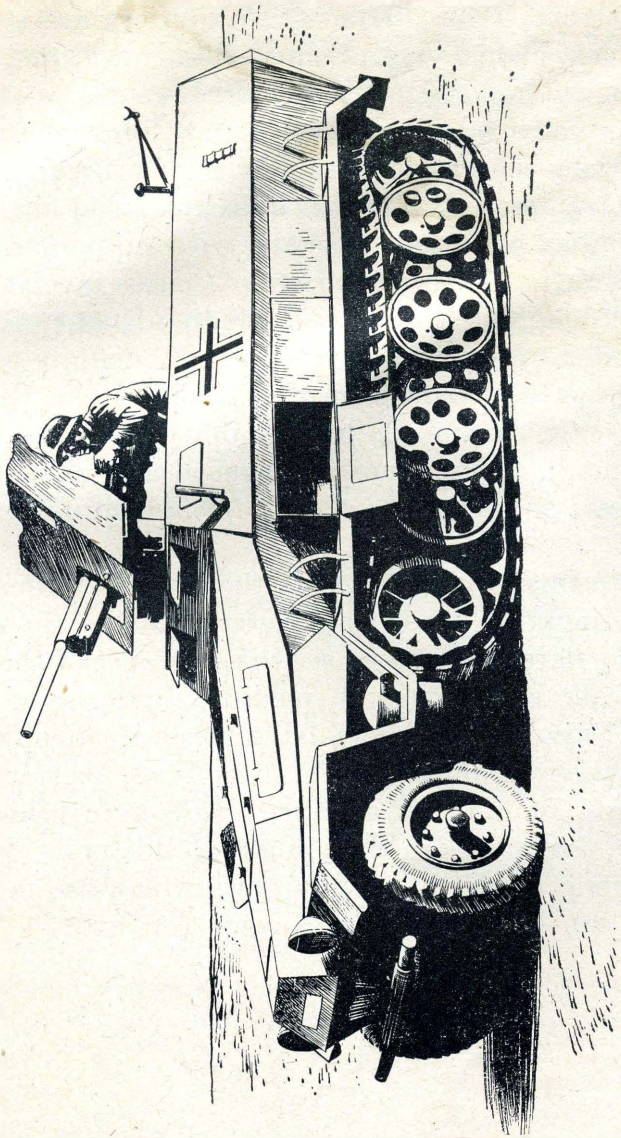

Figure 2.—Panzer Grenadier Personnel Carrier.

The Panzer Grenadiers, whose carriers are capable of a much higher speed than tanks can attain, have been known to dash far ahead of other troops—sometimes as much as 200 miles—to seize important communications centers, bridges, towns, or critical terrain. When they go deep into a hostile area, they maintain radio contact with their base and with supporting German aircraft. Such enterprises of course involve open flanks, "doubtful situations," and the danger of being surrounded by superior forces for an indefinite period, with no certain knowledge that supplies can be provided by air. From the leaders down, such undertakings demand a maximum of physical and mental preparedness, as well as a talent for assuming responsibility.

The German Army regards the Panzer Grenadiers as well qualified for certain defense tasks, too—especially the defense of broad sectors—because of their extensive allotment of light, medium, and heavy guns. If the Panzer Grenadiers have reached an objective well behind the opposition's front lines, they may be instructed to halt an advance made at considerable sacrifice (even though they might at this point be able to continue it) so that troop units which are not motorized can be given time to come forward.

Section VI. GERMAN ANTITANK AND TANK GUNS

1. ANTITANK GUNS

Since 1939 the German Army has been making a tremendous effort to bring into service a satisfactory antitank gun for every type of combat unit. Even the air-borne and parachute troops have been provided with light, tapered-bore weapons. A most important development is that the German Army is no longer dependent on the German Air Force for its heavy anti-aircraft-antitank gun, the 88-mm. Formerly, the Army had to borrow from the Air Force flak units armed with the 88-mm gun, because this was the only weapon which could give the requisite performance. The gun crews were German Air Force personnel, the equipment was not designed to Army specifications, and whether or not the guns were made available was likely to depend on the personalities of the commanders involved. Thus Rommel was able to get large numbers for use in a purely antitank role, chiefly because of his personal influence.

When the German Air Force releases flak units to the Army for use in an antitank role, the antiaircraft defense, which is primarily an Air Force responsibility, is bound to suffer. Hence it is only natural to expect that the Army's chief antitank weapons will increasingly be manufactured to its own specifications, and will be organized as an integral part of the Army.

In the 75-mm antitank gun, model 40, the German Army now has a piece which weighs 1½ tons as against the 7 tons of the 88-mm. For all practical purposes the two guns give the same performance against armor at distances up to 2,500 yards. Moreover, the 75-mm antitank gun, model 40, is to be manned by Army crews which have been Army-trained. In the 75-mm antitank gun, model 41, which also weighs about 1½ tons, the Germans have a weapon capable of defeating, under European fighting conditions (that is, up to about 1,500 yards), armor 100 millimeters thick—and greater thicknesses at shorter ranges.

When it was first brought out, the 75-mm antitank gun, model 40, had a muzzle velocity of only 2,400 to 2,500 feet per second, and it looked as though a still more powerful weapon would have to be produced. Now, with improvements, the gun has a muzzle velocity of about 2,800 feet per second, and the performance matches that of the 88-mm.

It should be evident, therefore, that Models 40 and 41 of the 75-mm antitank gun provide a powerful combination for all ranges up to 2,500 yards.[1]

2. TANK GUNS

Developments in the manufacture of German tank guns have, of course, been influenced greatly by the progress of the war itself. The 1939 German tank guns were not ideal for fighting the French tanks. At first, the 75-mm gun in the Pz. Kw. 4 was intended as a close-support gun, and as such it was very successful; even now it is being used for that purpose, and has recently been mounted in some Pz. Kw. 3's and in 8-wheeled armored cars. In 1941 the Pz. Kw. 3 was armed with a 50-mm weapon to fight British cruiser tanks, and the Germans decided to convert both the Pz. Kw. 3 and the Pz. Kw. 4 into fighting tanks in every sense of the term. (German tanks have always carried a generous allotment of high-explosive shells, just as German antitank guns have always been provided with high explosive shells.) As a result, in 1942 the Pz. Kw. 3 and Pz. Kw. 4 were rearmed with high-performance guns—the 50-mm Kw. K.[2], model 39, and the 75-mm Kw. K. model 40, respectively—and were given greatly improved armor.

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[1] A very recent report indicates that the Germans have introduced a new towed 75-mm gun, which has a muzzle velocity of 3,250 feet per second and which uses the same ammunition as the 75-mm antitank gun model 40.

[2] Kampfwagen Kanone—tank gun.

Moreover, two new tank guns capable of giving an even superior performance were brought into service. These guns were the 75-mm Kw. K., model 41 (tapered bore), and the 88-mm Kw. K. 36.

The appearance of the 88-mm Kw. K. 36 was probably inspired by the demand of the Afrika Korps for a gun which could throw a heavy projectile and which could give a good penetration performance at ranges of from 2,000 to 2,500 yards. The 88-mm Kw. K. 36 is a very heavy gun and one which is awkward to mount in a tank. Its ammunition (33-lb round) is hard to stow and handle in a limited space. Although the 75-mm Kw. K. 41 is a lighter gun, and uses a shorter and lighter (16½ lb) round, it gives a much better armor-piercing performance than the 88-mm at any range below 1,500 yards. The 75-mm would seem to be better suited to Russian or European conditions than to desert terrain, and is likely to be seen more often in the future.

The performance of the 75-mm Kw. K. does not match that of the 88-mm at any range; however, since it is fundamentally a good weapon, the Germans may attempt to improve its performance, instead of trying to develop a new and heavier gun.

3. AMMUNITION

The Germans seem to be losing interest in a combination armor-piercing, high-explosive shell, now that

substantial thicknesses of armor have to be dealt with. During the past year they have been improving the anti-armor performance of armor-piercing projectiles: first, by reducing the high-explosive capacity of the heavier armor-piercing shells and, second, by continuing to develop high-velocity, armor-piercing shot with a tungsten carbide core. What this amounts to is that

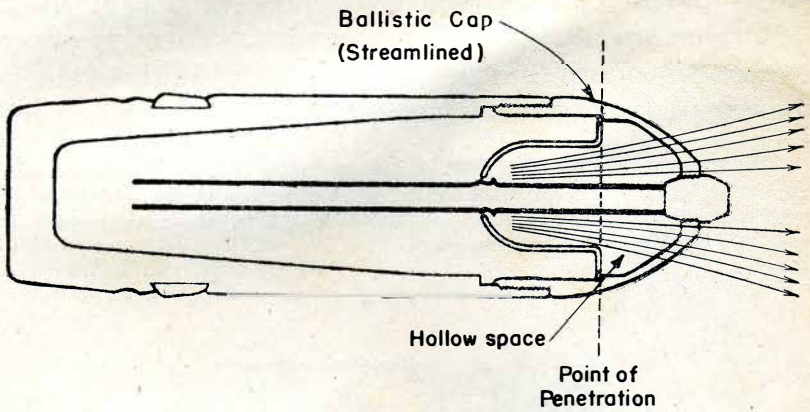

Figure 3.—Hollow-charge Principle.

the Germans are employing shot for attacks against thick armor, while retaining, for every weapon, high-explosive shells to be used in attacks against "thin-skinned" targets.

The Germans now use piercing caps on armor-piercing shells for everything over 20-mm caliber.

Both the 75-mm antitank gun model 40 and the Kw. K. 40 are provided with a hollow-charge round,[3] in addition to the high-explosive shell and the armor-piercing projectile with a ballistic (streamlined) cap. The Germans believe that the hollow-charge shell should not be used at ranges of more than 1,300 yards. It is interesting to note that there has been a rapid development of hollow-charge shells for all infantry, air-borne, and field artillery weapons. There is every reason to believe that the Germans will use these shells increasingly, and wherever possible.

[3] Hollow-charge projectiles have a hollow space (see fig. 3) in the nose section, to concentrate the blast against a small area and thus obtain better piercing effect. This principle is also followed in the manufacture of demolition charges and hand grenades.

Section VII. MISCELLANEOUS

1. 88-MM AA/AT GUN (DUG-IN)

The drawings in figure 4 are views of a dug-in but uncamouflaged German 88-mm dual-purpose gun in North Africa.

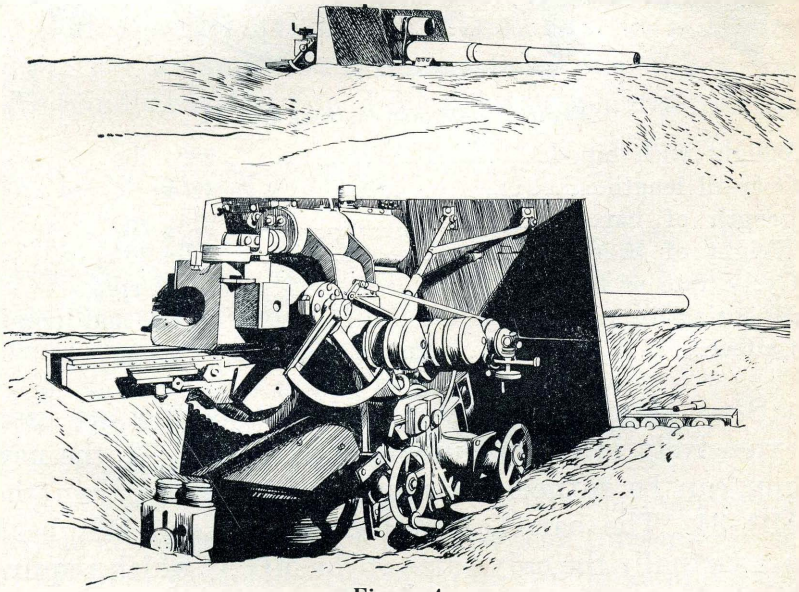

Figure 4.

2. NEW MACHINE GUN

The Germans are using a new type of machine gun, the MG 42 (see fig. 5). It has an unusually high rate of fire and is very likely to replace the MG 34 as the standard dual-purpose machine gun of the German Army.

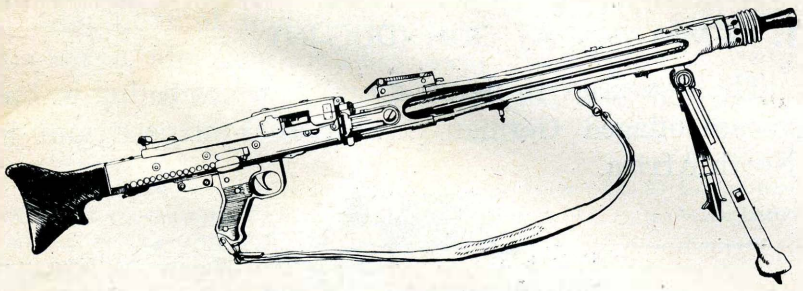

Figure 5.—German Machine Gun 42.

Weight with bipod	28¾ lbs
Over-all length	48 in
Length of barrel	21¾ in
Weight of barrel	3 lbs 14½ oz
Cyclic rate of fire	1,050 rpm
Mounting	bipod and tripod
Caliber	7.92 mm

Since stamping, riveting, and spot welding are used extensively in the manufacture of the MG 42, the new gun can be turned out much more rapidly than the MG 34. The barrel, barrel extension, and bolt head are virtually the only parts of the MG 42 which require intricate machine-tool work; as a result, the gun does not have the finished look which characterizes most German weapons.

The frequent barrel-changing made necessary by the high rate of fire is accomplished by a new and very good arrangement. A simple movement allows a hot barrel to be removed from the gun, and a fresh, cool barrel inserted with a reverse movement.

There is no provision for semi-automatic fire, as is the case with the MG 34.

The MG 42 is used as a light machine gun on a bipod, and as a heavy machine gun on a tripod. An antiaircraft rear sight is hinged on the leaf sight base, and a detachable antiaircraft forward ring sight can be fitted to a base on the barrel casing.

Both the MG 34 and the MG 42 use the same ammunition, ammunition belt, and drum or belt box, and are handled and stripped in the same general manner.

3. TANK RECOGNITION

In preparing revised recognition charts of our armored vehicles, the German Army relies heavily on the full cooperation of troops in the field. Through the usual channels, troops report:

a. New types of tanks, or altered models.

b. Organization and strength of our tank units.

c. Unusual tank tactics.

d. Types of tanks, shown in earlier German recognition charts, which have not been seen for some time.

Efficient German recognition of our tanks and other armored vehicles, and a thorough knowledge of the organization of our armored units, is the basis of all

German antitank methods. A German Army document points out that this information is used in evolving:

a. The principles for attacking heavy armored vehicles. In other words, the time to open fire, the time to stop the hostile tank, and the choice of ammunition vary according to the particular type.

b. An estimate of the enemy's intentions and, with this in mind, an appropriate use of our own antitank methods.

German troops learn to distinguish readily between the models and markings of German armored vehicles and those of the United Nations. Special attention is paid to different types of the same tank, and to captured tanks used by the German Army.

It may be said that measures which thwart successful German recognition are also likely to hinder German tactical decisions, especially those pertaining to antitank gunnery.

4. FLAME-THROWING TANK

The Germans have been known to adapt Pz. Kw. 2's for use as flame-throwing tanks. Details of the flame-throwing equipment mounted on these 12-ton tanks suggest that it is designed to fill an antipersonnel role at very close range.

Two independent flame throwers are mounted, one on each track guard. Each weapon traverses 180 degrees (presumably from front to rear), and is supplied with 35 gallons of fuel—enough for 80 flame

projections, each lasting from 2 to 3 seconds. Two high-pressure cylinders of nitrogen propel the oil to each flame thrower. Refueling the flame throwers takes from half an hour to an hour. For additional armament, each tank has a belt-fed machine gun fitted on a fixed mounting in the revolving turret, and carries 1,800 rounds of ammunition. There is an optical sight, adjusted to a range of 219 yards.

The tank has a 165-mile radius of action, and is capable of a speed of 34 miles per hour.

It is interesting to note that the flame-throwers' rate of fuel consumption (not more than 0.2 gal. per second) seriously limits the range of flame projection, which may be estimated at 30 yards (maximum).

A German manual on tank tactics observes that flame-throwing tanks should usually advance by bounds, halt, fire, and then repeat the procedure. The chief function of the weapon is to reach personnel among rocks, in cellars, in foxholes and dugouts, in wooded areas, and generally in places not accessible to tanks, or where gun fire is of little use.

PART THREE: UNITED NATIONS

Section I. SOME HEALTH RULES FOR N. AFRICA–MIDDLE EAST[1]

1. GENERAL

Military and civilian personnel in Northeastern Africa and the Western Asiatic countries may be exposed to serious health hazards, both because of the presence of diseases not commonly encountered in the United States and because of the relatively high incidence of certain other diseases that do occur on our continent. Some of the countries included in the area mentioned above have acceptable health departments, and a few of the larger cities have good health organizations. In normal times these health organizations may compare with certain cities in the United States. However, viewed as a whole, and considering the influence of the war, health conditions are much less satisfactory than in our country. Therefore, the soldier

[1] This section is based on information prepared by the Division of Medical Intelligence, Office of The Surgeon General, U. S. Army. It deals with only part of the health problems found in the Middle East area.

who values his health must be alert at all times to the possibility of illness and must guard against it by observing certain hygienic and sanitary precautions. A soldier's carelessness in this respect may result in his catching diseases, some of which may be serious; but attention to known health precautions should prevent all or most ailments for persons required to live in this part of the world.

These notes are designed to cover some of the potential hazards in a large general area, so that all the conditions enumerated may not apply to a particular locality. Common sense and good judgment, together with information acquired from local health authorities and Army medical officers, should serve to indicate which of the precautions outlined below can be modified or dispensed with to meet varying local conditions.

2. WATER

Drinking water contaminated with waste from the human body is one of the most common sources of infections of the intestinal tract, including the common diarrheas, typhoid fever, paratyphoid fevers, amoebic dysentery, bacillary dysentery, and, in some areas, cholera and schistosomiasis (infection with bloodworm or fluke). Guinea worm infection may also be acquired from water. Improper methods of disposing of human wastes, as well as inadequate treatment of water contaminated by these wastes, are direct causes of impure water.

Facilities for the purification of water are usually found only in the cities, and in the oil company settlements located at fields and at stations along the pipe lines. However, even in cities, the water frequently is not free from disease germs, either because of poor equipment, or because of a lack of supervision of available purification facilities, or both. In certain instances, safe water produced at the water plant is contaminated while passing through faulty water mains or when carried in unsanitary containers (tins, jars, animal skins, and so forth). In many cities, water distribution reaches only a limited area and thus supplies only a small percentage of the inhabitants, usually those in the European settlements.

The probability of outbreaks of various communicable diseases, especially water- and food-borne diseases, is greatly increased as a result of religious pilgrimages, from all parts of the Mohammedan world, to Mecca and other shrines.

While safe water may be found in some localities in Moslem countries of Northern Africa and Western Asia, it is generally advisable for army personnel stationed or traveling in this part of the world to consider all water unsafe for human consumption unless approved by a medical officer. The use of ice from such water presents the same problems as the water itself.

Carbonated drinks made from local water supplies should not be regarded as altogether safe. Soft drinks

(noncarbonated—for example, orangeade) are dangerous unless known to have been prepared under hygienic conditions and pasteurized.

Liquids recommended as safe for human consumption are:

a. Boiled water (boiled from 3 to 5 minutes).

b. Water properly treated with chlorine (see below; see also War Department Basic Field Manual 21–10, *Military Sanitation & First Aid,* par. 20c).

c. Tea
d. Coffee } when water is boiled in its preparation.

e. Beer and wines, when properly prepared and bottled.

f. Fruit juices, undiluted and freshly prepared—preferably by oneself.

Water treated under the supervision of British or U. S. Army Medical Department personnel is safe and should be used, where available, in preference to any other.

As a general rule of water chlorination, if the odor of chlorine is detectable after a contact period of 30 minutes, the water is safe, provided the odor does not come from concentrated chlorine that has been spilled on the hands or on the water container. It is therefore advisable for a person other than the one who treated the water (his hand may carry the odor) to perform the "odor test." If the water is muddy or contains large quantities of dirt and suspended matter, some form of filtration should be employed whenever

possible. The resistant form of the organism which causes amoebic dysentery may not be destroyed by chlorination alone, so that filtration before chlorination or boiling will be desirable.

Under field conditions where troops cannot obtain safe water, they can purify water in their canteens by the use of halazone tablets. Two tablets (4.0 MF or $\frac{1}{16}$ grains) are required for each canteen (one quart) of water. If the water is especially muddy, one or two additional tablets may be necessary. Where high-test calcium hypochlorite is used, the procedure is as follows:

The standard U. S. Army tube is broken, and the contents are dissolved in a canteen of water. One canteen-top full (approximately 1½ teaspoons) may then be added to each full canteen of water which is to be treated. Regardless of the method used, the water should be allowed to stand for ½ hour, and the "odor" or "taste" test should be applied. If one can detect the free odor of chlorine, or can taste chlorine when the water is applied to the tongue, a chlorine contest of at least 0.4 parts per million is indicated, and the water may be considered safe. One should be certain that the odor of chlorine does not come from concentrated chlorine spilled on the hands or the water container by careless handling. Where practicable, some form of filtration should be employed if the water is muddy or contains large amounts of organic material. This will aid also in eliminating the resistant form of the organism which causes amoebic dysentery.

3. WATER ECONOMY IN DESERT AREAS

Day temperatures may go as high as 130° F. in desert climates. This subjects the human body to severe stress, especially with regard to loss of water and salt. Exertion under these conditions is accompanied by much sweating. As a result, not only are large quantities of water lost, but also much body salt, which is in solution in the sweat. Under extreme conditions, as much as 10 quarts of water daily may be lost by sweating, although in hot, dry climates so much evaporation occurs that one is not conscious of this excess of perspiration. In fact, evaporation of sweat in high temperatures is the principal method by which the body is able to cool itself and thus maintain a normal temperature.

In temperate climates, except under conditions of strenuous physical exertion during warm weather, salt and water lost by sweating are replaced by a normal diet and moderate drinking of water; however, in the heat of the desert, more than ordinary quantities of salt and water must be consumed in order to maintain normal body requirements for these chemicals. Experience of desert armies indicates that an average of 5 to 6 quarts of water per man per day may be all that can be supplied for all personal purposes. Under extremes of temperature and physical exertion, up to 10 to 12 quarts are likely to be necessary. In emergencies, 2 to 3 quarts per day may suffice, but on such a restricted water ration, physical efficiency is reduced

after a short interval, probably 2 or 3 days. Therefore, under desert conditions where water supplies are inadequate, it is imperative to conserve water: before consumption, by care of water supplies, and after consumption, by avoiding unnecessary physical exertion and exposure to the sun, thus reducing sweating. Salt lost in perspiration should be replaced. (See subparagraph c below.)

Take the following precautions:

a. Stay in the shade as much as possible. Heavy work should be done at night, very early in the morning, or late in the afternoon. When work during the hot hours of the day is necessary, frequent periods of rest are advisable.

b. Drink water slowly and in small amounts (not more than an ordinary glassful at a time), but more frequently than in temperate climates.

c. Take two tablets of salt (equivalent to 20 grains, 1.3 grams, or ¼ teaspoonful) with every full canteen (1 quart) of water consumed. (See W. D. Circular 129, dated July 5, 1941, and Circular 169, dated Aug. 14, 1941.)

d. Avoid unnecessary physical exertion, and thereby prevent excessive sweating.

e. Wear headgear, preferably a sun helmet, when exposure to the sun is necessary for an appreciable length of time. Outer garments should be loose-fitting so that sweat will evaporate easily. Shorts are satisfactory during the day, especially indoors, but from

dusk until morning long trousers and long sleeves are imperative. The often-repeated suggestions to wear stomach bands, spinal pads, and similar devices to prevent diarrhea have no scientific basis and are harmful since they interfere with normal heat loss from the body.

f. The use of a superior grade of dark glasses is advisable under some conditions. The Calabar lenses, now widely used by Air Force personnel, are satisfactory.

g. Cool water evaporates slowly, and is more palatable and thirst-satisfying than warm water. Protect water supplies by keeping them in closed containers in the shade. Use insulated containers wherever possible.

h. Where conditions permit, such foods as canned tomatoes may be advantageous not only as rations, but also because they supply additional fluids.

i. Fluids are lost not only through sweating, but also through vomiting and diarrhea. Individuals suffering from these conditions, or from illnesses accompanied by fever, are susceptible to the effects of heat and should not be sent out from bases or camps until they have recovered completely.

4. FOODS

a. General

Foods are the second great source of intestinal diseases. They involve even greater hazards for the

uninitiated or unwary, since foods are not only subject to contamination, just as water is, but are also a fertile place for germs to grow. Refrigeration facilities for preventing or reducing bacterial growth (spoilage) in foods, especially meats and milk, are inadequate or lacking in many localities in this part of the world. In most instances, meat is not inspected, either before or after slaughter; as a result, meat from animals infected with tuberculosis, undulant fever, anthrax, trichinosis, and so forth, may be distributed for human consumption. Heat (cooking) is the only practical and effective agent for destroying bacteria in foods, but even well-cooked foods are subject to recontamination (by food handlers—cooks and waiters—or by flies, other insects, or small animals) and thus may become unsafe for consumption. Only well-cooked foods, freshly prepared, preferably consumed while hot, and not reheated, are safe for human consumption. Exceptions are bread and crackers, which may be considered safe unless mechanically contaminated.

Foods for lunches, as commonly prepared before short missions (flights, patrols, and so forth) in the United States, are likely to spoil in a short time under tropical or desert conditions. Therefore, it is recommended that sandwiches should not be made before departure, but that such foods as canned meats and other tinned goods, bread, crackers, thick-skinned fruits, and so forth, be carried. The Army canned field ration is a practical, safe food for the above uses.

If canned foods are used, they must be eaten soon after the can is opened.

b. Milk

Improperly handled dairy products (milk, cream, butter, cheese, etc.) constitute one of the most dangerous groups of foods. Disease-free dairy herds, pasteurization, and adequate refrigeration are not commonly encountered in Asia or Northern Africa. Raw milk not subjected to these safeguards may carry the following: dysentery, typhoid and paratyphoid fevers, common diarrheas, diphtheria, tuberculosis, undulant fever, septic sore throat, and other infectious diseases.

Only properly bottled pasteurized milk (meeting Medical Department standards), canned evaporated milk, condensed milk, powdered milk prepared with boiled water, or milk boiled immediately before use can be recommended. All other milk should be considered unsafe, as should ice cream prepared with local milk, and also cream for coffee and cereals.

c. Fruits and Vegetables

Soil pollution by human waste is common in this part of the world. When fertilized with this waste, the outer surface of vegetables grown by the native farmers are almost certain to be contaminated. Any of the intestinal diseases may be acquired by the consumption of uncooked vegetables. Therefore, only freshly cooked vegetables should be eaten. Such stand-

ard items of the American diet as salads made of lettuce, other uncooked leafy vegetables, or raw carrots and other root vegetables, cannot be eaten with safety. The dipping of vegetables in chemical solutions such as potassium permanganate does not protect against intestinal infections. Thick-skinned fruits requiring peeling—citrus fruits, papayas, mangoes, and melons, for example—are safe for human consumption provided they are not mixed with raw vegetables in salads. It is considered advisable to scald the skins of these fruits before peeling and eating.

5. CLOTHING

The prevalence of certain skin diseases, particularly "dhobie itch," necessitates frequent change of underclothing and socks. Light-weight clothing suitable for summer wear in the southern United States is satisfactory except in certain mountainous areas, and in Iraq and Iran where winter temperatures as low as 0° F. may be anticipated (January). Marked variations of temperature between day and night in the desert necessitate both warm and tropical types of clothing. Cases of pneumonia have been reported in increased numbers among aviators flying under desert conditions, and are thought to be caused, in part, by the drastic change from the high temperature of ground levels to the cold of high altitude (and vice versa), when

the aviator has no opportunity to change to clothing suitable for either one extreme or the other.

Care should be taken to put on a sweat shirt, jacket, or similar garment immediately after violent exertion. The wearing of headgear, preferably a sun helmet, is required when exposure to the sun is necessary. Shoes should be worn at all times as a precaution against hookworm disease. Because of the prevalence of certain eye diseases—for example, trachoma, gonorrheal ophthalmitis, and pink eye—it is necessary to avoid contact with personal articles, such as towels and pillowcases, used by other persons.

6. BATHING

Daily bathing is advisable when the water supply will permit. It is important to clean and dry thoroughly all skin folds of the body (crotch, groin, navel, armpits, around the scrotum, and between the toes) in order to prevent fungus infections such as "dhobie itch." The daily use of Army-issue foot powder on the parts of the body noted above is also a good preventive measure.

Fresh waters, such as lakes, rivers, streams, swamps, irrigation ditches, flooded rice fields, and so forth, in the area covered by this survey often harbor the young forms (larvae or cercariae) of various bloodworms or flukes. These flukes enter the body through the skin of swimmers, bathers, or persons wading in such

waters. The flukes may also be present in contaminated drinking water that has not been boiled or sufficiently treated with chlorine. They may cause serious diseases of the bladder and intestines. (These diseases are known as urinary bilharziasis or schistosomiasis and intestinal bilharziasis or schistosomiasis, respectively.) An early symptom of these diseases may be a skin rash. The urinary type is more common in this part of the world and in some areas affects from 20 to 40 percent of the native population. The cercariae are harbored by certain types of snails, and when discharged into the water cannot survive longer than 48 to 72 hours without a suitable host. Thus if water for bathing is impounded for such a time, and is free of snails, it becomes safe for bathing purposes, but not for drinking. Salt water bathing and swimming, except at beaches near the mouths of fresh-water streams or near city sewage outlets, present no disease hazard.

7. HOUSING

Clean and adequately screened quarters should be obtained if possible, and each individual should carry his own mosquito net. Shoes, clothes, luggage, and bureau drawers should be inspected carefully, since scorpions, spiders, and other insects prefer dark, warm places for rest, and may crawl into such places at night. Dwellings in the poor sections of the cities and in rural regions are dirty, and may harbor insects

and pests of many descriptions. Of these vermin, mosquitos, flies, fleas, lice, bedbugs, and ticks are most dangerous and obnoxious to man. Because of the presence of these insects, it is wise to refrain from sleeping in quarters of this kind.

Section II. PHYSICAL TRAINING NOTES FOR BRITISH AA UNITS

1. INTRODUCTION

The British Antiaircraft Command reports that a number of antiaircraft regiments have arrived at battle training centers without having had the proper physical conditioning. The regiments which have been trained and hardened physically go through the rigorous battle training with practically no injuries or sickness, while those lacking in physical conditioning have a high rate of injuries and sickness.

In emphasizing better physical conditioning of regiments before they reach battle training centers, the British Antiaircraft Command pointed out that this could not be accomplished with mere "daily dozen" exercises of the "bend-and-stretch-arms" type.

2. PHYSICAL EFFICIENCY

The following tests, laid down by the British War Office, are used by their Antiaircraft Command as a basis of judging the physical efficiency of antiaircraft

units (all tests should be carried out with full combat equipment):

a. Run 2 miles cross-country in 17 minutes.

b. Run 200 yards, and at the finish carry out a firing test in which three hits out of five rounds must be obtained on the figure 3 target (British) within 1 minute 15 seconds.

c. Complete a forced march of 10 miles in 2 hours, followed by a firing test.

d. Carry a man of approximately the same weight for a distance of 200 yards in 2 minutes, on level ground.

e. Jump a ditch 8 feet 6 inches across, landing on both feet.

f. Scale a 6-foot-high wall without assistance.

3. GENERAL PROCEDURE

To attain top physical efficiency, the British War Office has laid down the following general procedure:

a. Seek a general toning up of the body.

b. Strive to harden and strengthen the feet and ankles; practice them to withstand the strain of moving over rough or hilly terrain.

c. Train the lungs to coordinate efficiently when climbing or running.

d. Increase stamina by training the body to surmount natural obstacles skilfully, and to run, climb, pull, lift, carry, and crawl with the minimum use of energy.

e. Practice swimming with full equipment, and practice methods of crossing water obstacles at full speed.

f. Train the body to relax.

g. Train the body to react quickly and correctly to the unexpected.

4. SUGGESTIONS BY AA COMMAND

The British Antiaircraft Command makes the following recommendations with the object of assisting commanders of antiaircraft regiments in making such preparations as will enable them to get the maximum benefits from the battle training course:

a. Feet

The great majority of interruptions to training are caused from minor foot troubles, primarily blisters. The following precautions are therefore of first importance:

(1) A preliminary and thorough inspection by officers of the fit of shoes and of the condition of socks.

(2) Regular foot inspections by officers after marches, coupled with instruction in the care of feet.

(3) Training that hardens the feet (for example, route marches), to be carried on right up to the time of going to battle school, as even a short lapse of time will permit feet to soften again.

b. Route Marches

On arrival at the school, all men must be capable of making at least an 8-mile route march with full combat equipment.

c. Wearing of Equipment

As all training at the schools is carried out in full combat equipment, all ranks should get used to wearing equipment beforehand. This will involve wearing equipment as often as possible and for as long as possible during the weeks immediately prior to the course.

d. Jumping from Heights

Many cases of minor injuries to ankles and knees have been incurred by men when jumping over ditches, or down banks and over obstacles. On arrival at the school, all ranks should be capable of carrying out a running downward jump of 4 feet 6 inches in full equipment without sustaining injury.

Progressive instruction should be given in how to land when jumping from heights. It will be found that in the majority of cases elementary instruction will be necessary in plimsols (sneakers) from a low height.

The main point to be stressed is the necessity for landing on the ball of the foot and not with the weight back on the heels. Troops will gradually accustom themselves to shoes and battle equipment, and the height of the jump can be increased.

e. Forearms

Much of the training is carried out with the rifle at the port, and men have been inclined to suffer a good deal from lack of the necessary strength in the forearm. Every effort should be made to prepare for this with suitable exercises. Bayonet drill should figure prominently in the training programs.

f. At the Double

The majority of training is carried out at the double—much of it over rough ground. As much practice as possible should be given at this, and stress laid on economy of effort in order that all ranks will appreciate the necessity not only for reaching their objective, but for reaching it in a condition fit to fight.

g. Obstacles

The correct technique of clearing obstacles such as wire, walls, ditches, and streams should be taught as preliminary training

in negotiating the pursuit course. In this connection due regard must be given to the care of arms.

h. Endurance

All preliminary training should be progressive, but it must be hard. A man's powers of endurance and his will to see a job through will be fully tested only when he is on his last legs.

(Motor transport drivers and office personnel will need special attention in this preliminary training.)

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