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TACTICAL AND TECHNICAL TRENDS

NUMBER 37

4 NOVEMBER 1943

PREPARED FOR
ARMY GROUND, AIR
AND SERVICE FORCES

MILITARY INTELLIGENCE DIVISION
WAR DEPARTMENT . . . WASHINGTON, D. C.

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SECTION I

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AIR

1. RUSSIAN COMBAT EXPERIENCES WITH THE FW-190

In all probability the Germans have used their FW-190s on the Russian front to a much lesser extent than elsewhere, and the standards of air combat on that front very likely differ from those over Western Europe and in the Mediterranean.

The following translation of an article which appeared in the "Red Fleet" compares some of the tactics used by the German and Russian fighter planes (FW-190 and La-5). It should be pointed out that these observations apply particularly to the Russian front and are not necessarily in line with experiences in other European theaters. This translation is published without evaluation or comment, purely for its informational value in presenting Russian opinion concerning the FW-190, as printed in the "Red Fleet."

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The FW-190 first appeared on the Soviet-German front at the end of 1942. This is the first high-speed German fighter with an air-cooled engine. In comparison with the Me-109 and its modernized versions, the Me-109F and the Me-109G, the FW-190 is of a higher quality.

The speed of the FW-190 is slightly higher than that of the Messerschmitt; it also has more powerful armament and is more maneuverable in horizontal flight. The FW-190 has a large supply of ammunition, with 15 seconds of cannon fire, and 50 seconds of constant machine-gun fire. For this reason the gunners are not economical with their ammunition, and often open up the so-called "frightening fire". The pilots have good visibility laterally, forward, upward and rearward. A fairly good horizontal maneuver permits the FW-190 to turn at low speed without falling into a tail spin. An armored ring on the front part of the engine provides the pilot with reliable protection; for this reason, the FW-190's quite often make frontal attacks. In this way they differ from the Me-109s.

One shortcoming of the FW-190 is its weight. The lightest model of this plane weighs 3,500 kgs. (7,700 lbs), while the average weight is from 3,800 (8,360 lbs) to 3,900 kgs. (8,580 lbs). Since the FW-190 is so heavy and does not have a high-altitude engine, pilots do not like to fight in vertical maneuvers. Another weak point in the FW-190 is the poor visibility downward, both forward and rearward. The FW-190 is seriously handicapped in still another way; there is no armor around the gas tanks, which are situated under the pilot's seat and behind it. From below, the pilot is not protected in any way; from behind, the only protection is the ordinary seat-back with 15-mm of armor. Even bullets from our large caliber machine guns penetrate this armor, to say nothing of cannon.

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The main problem confronting our fliers is that of forcing the Germans to fight from positions advantageous to us.

The FW-190's eagerly make frontal attacks. Their methods of conducting fire in such cases is quite stereotyped. To begin with the Germans open fire with long-range ammunition from the horizontal cannons at a distance of 1,000 meters (3,200 feet). At 500 or 400 meters (1,000 or 1,300 feet) the FW-190 opens fire from all guns. Since the planes approach each other at an extremely great speed during frontal attacks one should never, under any circumstances, turn from the given course. Fire should be opened at a distance of 700 or 800 meters, (2,300 or 2,600 feet). Practice has shown that in frontal attacks both planes are so damaged that, in the majority of cases, they are compelled to drop out of the battle. Therefore, frontal attacks with FW-190's may be made only when the battle happens to be over our territory. Frontal engagements over enemy territory, or even more so in the enemy rear, should be avoided.

If a frontal attack of an FW-190 should fail the pilot usually attempts to change the attacks into a turning engagement. Being very stable and having a large range of speeds, the FW-190 will inevitably offer turning battle at a minimum speed. Our Lavochkin-5 may freely take up the challenge, if the pilot uses the elevator tabs correctly. By using your foot to hold the plane from falling into a tail spin you can turn the La-5 at an exceedingly low speed, thus keeping the FW from getting on your tail.

When fighting the La-5, the FW risks a vertical maneuver only at high speed. For example, let us assume that the first frontal attack of an FW failed. The plane then goes on ahead and prepares for a second frontal attack. If it fails a second time, the pilot turns sharply to the side and goes into a steep dive. On coming out of the dive, he picks up speed in horizontal flight and engages the opposing plane in a vertical maneuver.

Vertical-maneuver fighting with the FW-190 is usually of short duration since our planes have a better rate of climb than the German planes, and because the Germans are unable to withstand tense battles of any length.

The winner in present air battles must have an advantage in altitude. This is especially true with regard to the FW-190. "Once a comrade of mine and I engaged two FW-190's at a height of 3,500 meters (10,850 ft). After three energetic attacks we succeeded in chasing the two FW-190's down to 1,500 meters (4,650 ft). All the while we kept our advantage in height. As usual the German tried, out of an inverted turn, to get away and below, but I got one in my sight and shot it down. After that we immediately went up to 3,700 meters (11,470 ft) and met another group of FW-190's as they were attacking one of our Pe-2 bombers. We made use of our advantage in height and by vertical attacks succeeded in chasing the Germans away and also shot one down."

When following a diving FW you should never dive below the other enemy planes. When two planes dive the one following the leader should come out of the dive in such a way as to be at an advantage over the leading plane in height and

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speed. In this way the tail of the leading plane will be protected; at the same time, the second plane will also be able to open up direct fire against the enemy.

In fighting the FW-190 our La-5 should force the Germans to fight by using the vertical maneuver. This may be achieved by constantly making vertical attacks. The first climb of the FW is usually good, the second worse, and the third altogether poor. This may be explained by the fact that the FW's great weight does not permit it to gather speed quickly in the vertical maneuver. After two or three persistent attacks by our fighters the FWs completely lose their advantage in height and in speed, and inevitably find themselves below. And because of this, they are sure to drop out of the battle into a straight dive (sometimes up to 90 degrees) with the idea of gaining height on the side, and then of coming in again from the side of the sun with an advantage in speed and height. At times it happens that the FW, after diving, does not gain altitude, but attempts to drop out of the battle altogether in low flight. However, the FW-190 is never able to come out of a dive below 300 or 250 meters (930 ft or 795 ft). Coming out of a dive, made from 1,500 meters (4,650 ft) and at an angle of 40 to 45 degrees, the FW-190 falls an extra 200 meters (620 ft).

A shortcoming of the FW-190 is its poor climbing ability. When climbing in order to get an altitude advantage over the enemy, there is a moment when the FW-190 "hangs" in the air. It is then convenient to fire. Therefore, when following a FW-190 in a dive, you should bring your plane out of the dive slightly before the FW comes out of it, in order to catch up with him on the vertical plane. In other words, when the FW comes out of the dive you should bring your plane out in such a way as to have an advantage over the enemy in height. If this can be achieved, the FW-190 becomes a fine target when it "hangs". Direct fire should be opened up at a short distance, 50 to 100 meters (150 to 300 ft). It should also be remembered that the weakest spots of the FW-190 are below and behind--the gasoline tanks and the pilot's legs, which are not protected.

Throughout the whole engagement with a FW-190, it is necessary to maintain the highest speed possible. The Lavochkin-5 will then have, when necessary, a good vertical maneuver, and consequently, the possibility of getting away from an enemy attack or on the contrary, of attacking. It should further be kept in mind that the La-5 and the FW-190 in outward appearance resemble each other very much; therefore, careful observation is of great importance. We may emphasize once more: never let an enemy plane gain an altitude advantage over you and you will win the fight.

ANTITANK

2. LOCATING MINE FIELDS

The commander of a reconnaissance unit recently returned from Africa states that the quickest and most practical way of locating mine fields when in pursuit of retreating German columns is to load a jeep with sand bags and drive

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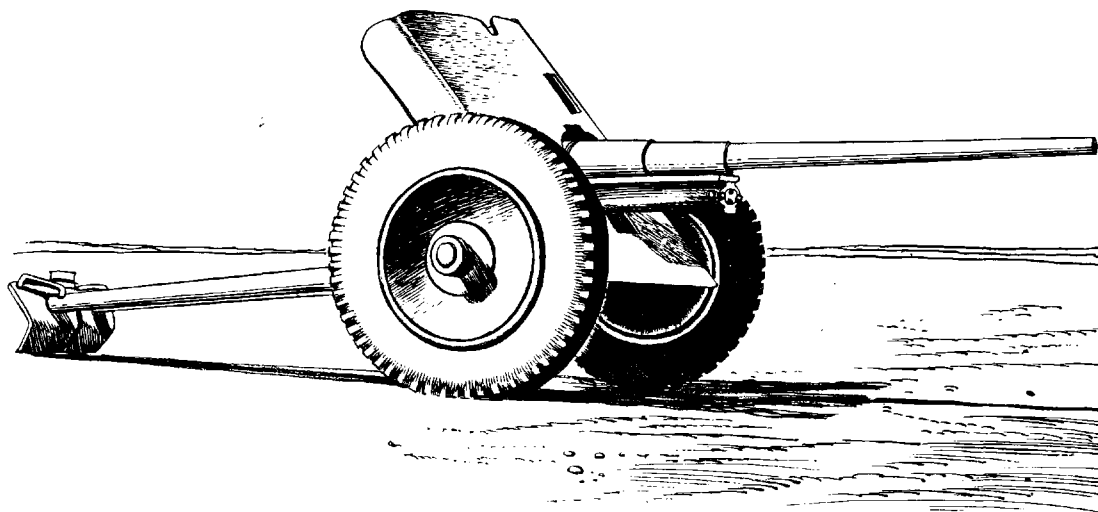
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straight ahead. Mines are located when the jeep is blown up. This process is dangerous and expensive, but saves invaluable time, and frequently, the jeep crew is not injured because of the protection of the sand bags. A light tank may be similarly employed. If time is taken for a cautious advance, the Germans have attained their objective of delaying pursuit. The risk and loss must be assumed.

When the first fields are met and a road cleared, active pursuit is resumed. As the Germans are pressed, their mine laying becomes progressively more careless until mines can be spotted hastily dug in or hardly covered at all. This is the last phase of their orderly retreat.

3. NEW GERMAN 42/28-MM AT GUN

A brief preliminary report has recently come in from an Allied source concerning the new German small-caliber, taper-bored 42/28-mm (1.65 in-1.10 in) AT gun. This model has apparently made its appearance only this year, and in small numbers. Its muzzle velocity is stated as 4,100 feet per second, which is high for even so extreme a type of artillery. As will be noted from the accom-



NEW GERMAN 42/28-MM AT GUN

panying sketch, no muzzle brake is fitted, which seems rather odd in a weapon of this type, but its absence would permit the use of spigot grenades. Further details will be reported as soon as they are released, but the following are now

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available:

Characteristics:

Caliber	-	42/28-mm (1.65 in-1.10 in)
Muzzle velocity	-	4,100 f/s
Rate of fire	-	10 to 12 rounds per minute
Horizontal angle of fire	-	44°
Vertical angle of fire from	-	-8° to +32°
Weight in firing position	-	990 lbs
Penetration	-	2.52 in of armor plate at a range of 547 yds

This gun is mounted on the old-type 37-mm antitank gun mount, but is a greatly improved antitank gun on account of its better penetration, due to its stepped-up muzzle velocity. The walls of the breech have been reinforced. This gun was manufactured at the Rhinemetall factory.

ARMORED

4. THE PZ-KW 5 (PANTHER) TANK

The German tank series 1 to 6 has now been filled in with the long-missing PzKw 5 (Panther) a fast, heavy, well-armored vehicle mounting a long 75-mm gun. It appears to be an intermediate type between the 22-ton PzKw 4 and the PzKw 6 (Tiger) tank. The Panther has a speed of about thirty-one miles per hour. It approximates (corresponds roughly to) our General Sherman, a tank which evoked complimentary comment in the Nazi press.

The following is a description of the tank: (It should be noted that practically all data contained in this report come from Russian sources).

Weight	45 tons
Crew	5
Armament	75-mm (2.95 in) gun, long barrel, (1943) 1 machine gun, MG-42, 7.92-mm
Ammunition	75 rounds (AP & HE)
Motor	Maybach, gasoline, 640 hp in rear of tank; the gas tanks are located on either side of motor
Cooling system	water
Ignition	magneto
Armor	front of turret and cannon shield 100 mm (3.94 in); upper front plate 85 mm (3.45 in) 57° inclination; lower front plate 75 mm (2.95 in) 53° inclination

		side and rear plate 45 mm (1.78 in); top of turret & tank and bottom of tank 17 mm (.67 in)
Dimensions:		
width	-	11 ft 8 in (same as the PzKw 6)
length	-	22 ft 8 in (1 1/2 ft longer than the PzKw 6)
clearance	-	1 ft 8 in (10 cm)(3.9 in) more than the PzKw 6)
Caterpillar section	-	drive sprockets at front rear idlers 8 double rubber-tired bogie wheels 850 mm (33.46 in) in diameter on either side; torsion suspension system; hydraulic shock absorbers located inside tank; metal caterpillar tread 660 mm (25.62 in) wide
Maximum speed	-	50 km hr. (approx. 31 mph)
Range	-	170 km (approx. 105 miles)

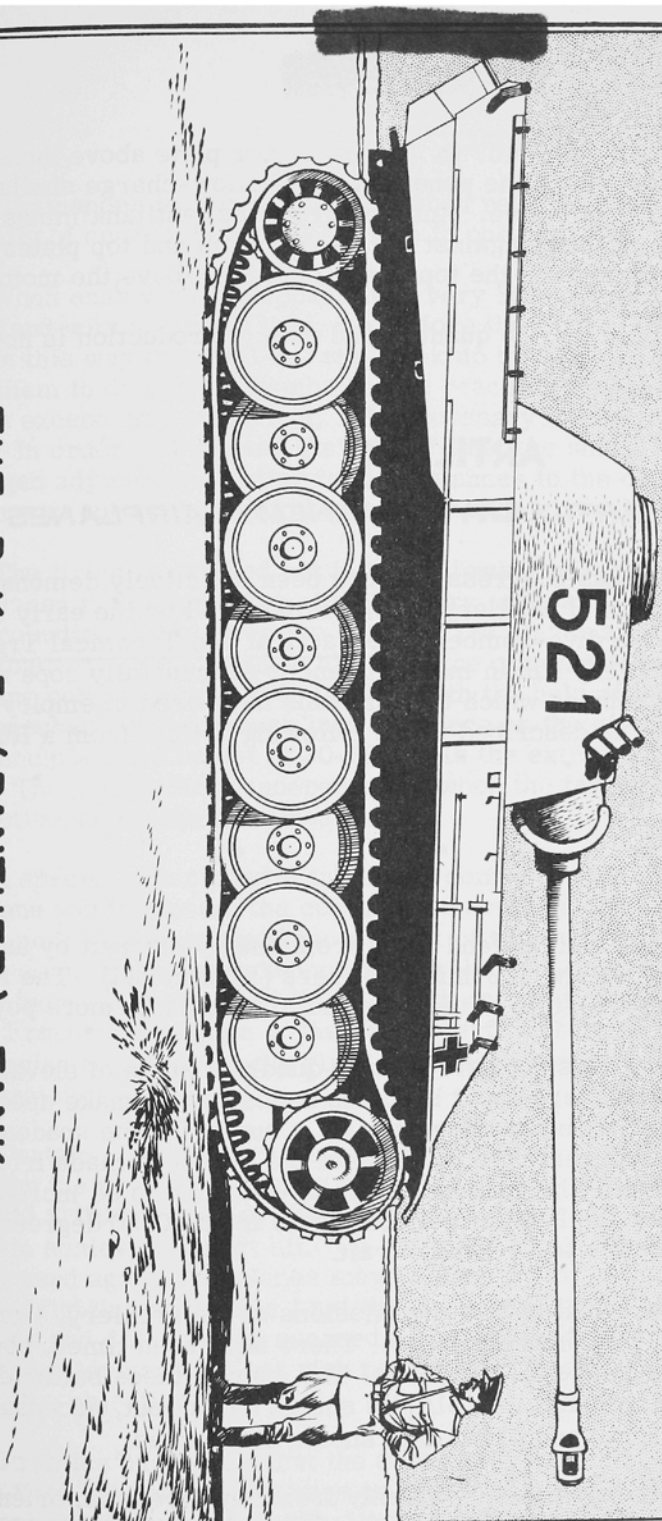
The 75-mm gun is probably the new Pak. 41 AT gun with a muzzle velocity of 4,000 foot-seconds. The estimated armor penetration at 547 yards is 4.72 inches, and the life of the barrel from 500 to 600 rounds. The gun has direct sights to 1,500 meters or 1,640 yards. The 75-mm has an overall length of 18 feet 2 inches.

The Panther can also be easily converted for fording deep streams by attaching a flexible tube with float to the air intake. There is a special fitting in the top rear of the tank for attaching this tube.

Although provided with smaller armor and armament than the 6, the Panther has the same motor, thus giving it higher speed and maneuverability. This tank is also provided with light armor plate (not shown in the sketch) 4 to 6 millimeters thick along the side just above the suspension wheels and the inclined side armor plate.

Panther tanks are organized into separate tank battalions similar to the Tiger tanks. Many of these tanks have been used by the Germans during the July and August battles. The Russians state that this tank, although more maneuverable, is much easier to knock out than the PzKw 6. Fire from all types of rifles and machine guns directed against the peep holes, periscopes and the base of the turret and gun shield will blind or jam the parts. High-explosives and armor-piercing shells of 54-mm (2.12 in) caliber or higher, at 800 meters (875 yds) or less, are effective against the turret. Large caliber artillery and self-propelled cannon can put the Panther out of action at ordinary distances for effective fire. The inclined and vertical plates can be pierced by armor-piercing shells of 45 mm (1.78 in) caliber or higher. Incendiary armor-piercing shells are especially effective against the gasoline tanks and the ammunition located just in the rear of the driver.

THE PzKw 5 (PANTHER) TANK



[REDACTED]

The additional 4 to 6 mm (.157 to .236 in) armor plate above the suspension wheels is provided to reduce the penetration of hollow-charge shells but the Russians state that it is not effective. Antitank grenades, antitank mines and "Molotov cocktails" are effective against the weak bottom and top plates and the cooling and ventilating openings on the top of the tank just above the motor.

This tank is standard but the quantity and rate of production is not known.

ARTILLERY

5. RUSSIAN ARTILLERY VS ENEMY AIRPLANES

As the present war has progressed it has been effectively demonstrated that not only has the function of artillery not been displaced by the early spectacular performances of the dive-bomber (see Tactical and Technical Trends No. 36, p. 9) but that field artillery can in many instances successfully cope with the attacking airplane. The methods which the Russians have used in employing field artillery against airplanes is described in the following article from a Russian publication.

* * *

Field artillery may easily defend itself from enemy aircraft by using 76-mm field guns of all types and 122-mm howitzers (1938 model). The rate of fire of the latter is less than that of the guns, but their fire is more powerful.

Since field artillery does not have a large quadrant angle of elevation necessary for firing at aerial targets, it becomes necessary to make special fire positions for the artillery. In the ordinary gun pit a tunnel for the spades is made with a gradual slant from the center to the edge of the pit. It is made from 16 to 20 inches deep, which permits the quadrant angle of elevation to be increased 10 or 15 degrees, thus raising the limit of vertical angle from 40-50 degrees to 55-60. This makes it possible to fire at aircraft.

Depending upon the situation and the missions of the artillery, 1 or 2 guns of each battery can be used against airplanes. There have been times, however, when it became necessary to use all batteries. The guns of these batteries should of course be prepared beforehand, i.e., all pits should be dug out, necessary ammunition should be at hand, and firing data should be checked.

Since enemy planes may appear suddenly from any direction, orienting points in various directions (at a distance of from 3/4 to 1 1/4 miles) should be selected beforehand; likewise the distances should be ascertained and the range elevation determined. On the basis of these data, a card is made of the antiaircraft defense for each gun. Orienting points common to all the guns makes it much easier



for the commander to control the fire when repulsing raids. It gives him the opportunity of concentrating all his fire in one direction.

When enemy planes appear it is very important to open fire as soon as possible and with a certain lead, i.e., before the planes arrive at the orientation mark. In this way the shell-bursts break up the enemy combat formations and compel them to drop their bombs before reaching the target. Since the moment of fire is exceedingly important, it is necessary to keep a constant observation of the sky. In order to increase the rate of fire, the shells are prepared with the fuse ranges adjusted according to the distances to the orienting points. It is also useful to sort out the shells to be used for each given direction.

The firing is carried out in the following order. On the appearance of enemy planes the commander of the battery orders: "West (or south, east, or north, according to the direction in which the planes appear), target height 600, platoon (battery) fire." And in his turn, the commander of each gun commands: "Orienting point 5, height 600, fire!" With the help of the panoramic sight and a lever mechanism the gunner lays the piece on the given elevation. The azimuth circle should always be set at 30-00, while the extractor should be on a 0-00 setting. The gunner fires independently when the target appears at the point on the objective where the two lines meet.

A special experimental table was compiled with which, if given the height of the plane and its speed, the commander could easily adjust the sight tube, and also determine the average time of flight of the shell to the target. This table excludes complicated calculations during the battle, thus relieving the gunner who can then increase the rate of fire. A high rate of fire requires well-trained gun crews. Frequent trainings of the crews perfect them in quickly traversing the gun, in laying the piece on the given elevation, and in making corrections quickly and accurately.

Certain commanders gauge the effectiveness of field artillery against aircraft by the number of planes shot down. This point of view is entirely wrong. Since field artillery does not have special antiaircraft devices, it is extremely difficult to achieve a direct hit. On the other hand, the effectiveness of field artillery used against airplanes may be seen from the fact that in the course of 15 days of fighting at Velikie Luki the Germans attempted to bomb Russian combat formations and did not once succeed. The field guns threw up such a barrage of fire that the Germans did not risk penetrating it and dropped their bombs before reaching the objective.

Practice has shown that the command should not depend wholly upon anti-aircraft fire, but should take care to use field artillery in protecting its combat formations. In this way the effectiveness of enemy air raids is greatly reduced.



CHEMICAL WARFARE

6. COMPARISON CHART OF WAR GASES

a. Axis Symbols Names and Markings

The accompanying chart is compiled primarily for quick comparison of German, Italian, and Japanese names and markings with those of the United States Army.

By following a chemical or common name from left to right one can easily obtain the Axis equivalent. Should an Axis shell marking or name be known, the American or British equivalent may be found easily.

Identifying odors, physiological effects and tactical classification are also shown.

b. All Known Gases are Not Shown

Some of the British and American "Secret" or experimental gases are not shown. Likewise, Axis "Secret" or "Rumor" gases are not included. Twenty-nine gases are now symbolized by the British and American authorities, although this chart identifies only twenty-three due to its restricted classification.

c. German Markings

The Germans may use the word cross or band interchangeably. Recent reports state that they have concluded that a band around a gas shell is easier to apply than a stencilled cross such as they used in the first World War. On this chart a "Gelbkreuz" (yellow cross) gas would appear as a "yellow band" marking.

d. Japanese Markings

Little is known about Japanese gas shells. Although Chinese reports claim that many have been captured, none have been examined in this office.

It has been confirmed however, that Japanese gas shells have been found, and that all have had a blue and red band on their nose.

e. French Markings

The French gases are listed solely because it is generally believed that the Germans have acquired the complete stock of French chemical munitions. The numbers accompanying the names have been known to supplant the French name as a shell marking. These are code numbers for the gas.

*Prepared by the Office of the Chief of Chemical Warfare Service. The accompanying chart does not include the chemical name and formula for each gas.

WAR GASES COMPARISON CHART

COMMON NAME	PHYSIOLOGICAL CLASSIFICATION	ODOR	TACTICAL CLASS	SYMBOLS, NAMES, AND SHELL MARKINGS OF--				
				GERMAN	FRENCH	ITALIAN	JAPANESE	UNITED STATES
Adamstite	Sternutator	Faint aromatic.	Harassing.	Adamst.	1 white band.	Yellow body, red nose	Adamusato. 1 red band	DM. 1 red band.
Arsine	Systemic poison	Faint phosphorus	Casualty.	1 green band.	Yellow body, red nose	Yellow body, red nose	Arushim. 1 blue band	SA.
Bromacetone	Lacrimator	Old leaves - bitter	Harassing.	B-Stoff.	Maronte or No. 9	Harassing.	Buromushian-ben-jiru. 1 green band	BA.
Brombenzylcyanide	Lacrimator	Sour or bitter sweet	Harassing.	T-Stoff. 1 white band	Cemite or No. 21	Harassing.	Buromushian-ben-jiru. 1 green band	BBC.
BenzyI bromide	Lacrimator	Aromatic - watercross	Harassing.	T-Stoff.	Cycelte or No. 14	Harassing.	Buromushian-ben-jiru. 1 green band	BBC.
Cyanogen bromide	Lacrimator	Piquant - bitter	Casualty.	Ge-Stoff.	Harassing.	Harassing.	Buromushian-ben-jiru. 1 green band	CN.
Chloroacetonaphenone	Lacrimator	Apple blossoms	Harassing.	T-Stoff. 1 white band	Harassing.	Harassing.	Buromushian-ben-jiru. 1 green band	CN.
Chlorine	Lung irritant	Bleaching powder	Casualty.	Chlor. 1 green band	Bertholite	Chloroacetone. Yellow body, 1 white band	Buromushian-ben-jiru. 1 green band	CN.
Chlorpicrin	Lung irritant	Flypaper.	Casualty.	Klop. 1 green band	Aquinite.	Chloropicrina	Buromushian-ben-jiru. 1 green band	CI. 1 green band.
Dibenzylchlorarsine	Sternutator	Shoe polish	Harassing.	Clark I. 1 blue band	Ratignite or No. 18. 1 white band	Difenilchlorarsina. Yellow body, red nose	Buromushian-ben-jiru. 1 green band	PS. 2 green bands
Diphenylcyanarsine	Sternutator	Bitter almonds	Harassing.	Clark II or Cyan Clark. 2 blue bands	1 white band.	Red nose.	Buromushian-ben-jiru. 1 green band	DA. 1 red band.
Diphosgene	Lung irritant	Musty hay	Casualty.	Persoff or K-Stoff. 2 green bands	Surpallite	Difosgene	Buromushian-ben-jiru. 1 green band	DC. 1 red band.
Ethyliodoacetate	Lacrimator	Pear juice	Harassing.	Iodoalipester	Harassing.	Difosgene	Buromushian-ben-jiru. 1 green band	DP. 2 green bands.
Ethylchloroarsine	Vesicant and lung irritant.	Biting - fruity	Casualty.	Dick. 3 green bands	Harassing.	Difosgene	Buromushian-ben-jiru. 1 green band	ED. 2 green bands.
Hydrocyanic acid	Systemic poison (paralyzant)	Bitter almonds	Casualty.	Blasature. 1 green band	Vincenite or Mangenite	1 red band	Buromushian-ben-jiru. 1 green band	AC.
Lewisite	Vesicant	Geraniums	Casualty.	Winerlost	Harassing.	Lewisite	Buromushian-ben-jiru. 1 green band	L. 2 green bands.
Lewisite and mustard	Vesicant	Harassing.	Casualty.	Methyl Dick. 1 yellow band	Harassing.	Lewisite	Buromushian-ben-jiru. 1 green band	HC. 2 green bands.
Methylchlorarsine	Vesicant and lung irritant.	Harassing.	Casualty.	Lost or Senf. 2 yellow bands	Yerite or No. 20	Yellow body, 1 green band	Buromushian-ben-jiru. 1 green band	MD.
Mustard	Vesicant	Garlic - onion	Casualty.	Stuckstoff. 1 yellow band	Harassing.	Yellow body, 1 green band	Buromushian-ben-jiru. 1 green band	H. 2 green bands.
Nitrogen mustards	Vesicant	Faint fish - soft soap	Casualty.	Pfiffikus. 1 white band	Sternite or No. 22	Yellow body, 1 green band	Buromushian-ben-jiru. 1 green band	HN.
Phenylchlorarsine	Vesicant and lung irritant.	Bitter almonds	Casualty.	D-Stoff. 1 green band	Collongite or No. 5	Yellow body, 1 white band	Buromushian-ben-jiru. 1 green band	PD.
Phosgene	Lung irritant	Musty hay	Casualty.	T-Stoff. 1 green band	Harassing.	Yellow body, 1 white band	Buromushian-ben-jiru. 1 green band	CC. 1 green band.
Xylyl bromide	Lacrimator	Pungent - lilacs	Harassing.	Harassing.	Harassing.	Yellow body, 1 white band	Buromushian-ben-jiru. 1 green band	CC. 1 green band.

f. British and American Symbols (Abbreviations) Identical

The British and American authorities have recently adopted the same symbols for the common war gases. The standardized symbols (or abbreviations) are used in the chart.

The band markings of the American and British armies remain different and the British tie up band markings, code letters and numbers with their various gases. These, however, are secret, and cannot be included in this chart. The American band markings are shown for comparison with the known Axis markings.

Comment

Information on all markings is scarce due to the fact that gas has not been used yet by the Germans or Italians. Drastic changes in this chart probably will be required when and if gas warfare breaks out. It is more than likely, if gas is used by the enemy, that one or more of the gases shown on the accompanying chart will be employed. Officers in the field, regardless of the branch of service to which they may be attached, should always note very carefully any shell markings and color bands. This information with their reports should be forwarded promptly together with a complete description of the ammunition. In this way locations and date of use can be identified with all field laboratory reports.

ENGINEERS

7. PRINCIPLES OF CAMOUFLAGE

Camouflage became a major military tactic in the first World War when the French formed a "section de camouflage" and the British organized their own camouflage service as a unit of the Royal Engineers. In 1917 with the growing submarine peril, "dazzle painting" of war vessels and merchant ships was commonly applied. Since then a specially trained corps of experts in camouflage has been maintained by the armed forces of all countries. With the development of air power, the branches and services of this activity have grown in importance.

The following report contains some interesting material as developed at the British Camouflage Training Center in the Middle East and stresses the theoretical side of camouflage and its application in nature and in war.

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Attention is called to the growing tendency, especially in the Middle East Theater, towards offensive, and away from defensive camouflages. In the battle of El Alamein and in subsequent battles of the British 8th Army during the past year, the offensive nature of camouflage technique has been noticeable.

The following summaries of the different divisions cover briefly the theoretical background, the application in nature and the application in war.



The fundamentals of camouflage as given in the school may be set down in six different divisions as indicated in the appropriate letter designations shown herewith.

a. Similar Color (or Background Resemblance)

(1) Theoretical Aspect

Every solid object appears in the field of vision as a patch of color differing more or less markedly both in hue and brightness from its surroundings. Such differences of color and tone provide the main clues which enable the eye to record, and the brain to perceive, an object's presence and identity.

It therefore follows that an important step towards the reduction of visibility or conspicuousness of any object lies in the modification of its color and tone to harmonize as closely as possible with its immediate surroundings.

(2) Application in Nature

The principle of color resemblance, or assimilated coloring, is widely employed in nature. Every major environment with a dominant type of color affords innumerable examples of the principle,--different members of the fauna wearing a concealing dress or uniform closely matching the surrounding country.

In the snowlands, white is the color employed by many mammals and birds such as the snowy owl, Greenland falcon, polar bear, and American polar hare. In the surface waters of the sea, blues, greens and grays predominate on the bodies of fishes such as the mackerel, tuna, herring and others. In the stony or sandy desert, light cinnamon, ochre, buff and sandy colors are found to be those worn by animals belonging to many groups--including birds (such as the desert larks, sand grouse, bustards, nightjars), mammals (such as the small African fox, jackal, jerboa), and many lizards, snakes and insects. Finally, in the ever-green foliage of tropical rain forests, green is the color usually adopted, as illustrated by many parrots, parrakeets, fruit pigeons, woodpeckers, tree lizards, tree frogs, tree snakes, and innumerable smaller forms such as beetles, praying mantis, leaf insects, grasshoppers, caterpillars and spiders.

A number of animals undergo a seasonal color change that is correlated with changes in their surroundings, as exhibited, for example, by the ptarmigan, and mountain hare, which in the spring shed their white winter colors and become brown or gray. Others such as flat fishes, squids, and certain lizards are capable of rapid, and sometimes almost instantaneous color change in accordance with the color of the background against which they come to rest.

(3) Application to War

The principle of color resemblance has obviously wide possibilities on military camouflage, and it is one which should never be neglected as a first and fundamental step towards reducing the visibility of any target--from the largest



to the smallest--whether it be a large installation or a tent, a railway or a small artillery piece, a tank or an individual soldier.

The color to be used will depend upon the predominant color of the surrounding country. For obvious reasons, the principle can be applied with greatest effect in the case of static targets, since mobility is bound to involve some changes in the color of the background against which an object is likely to be seen or photographed.

In such circumstances, the advisability of changing the color must not be overlooked. A gun or vehicle colored for cultivated surroundings in Europe will be an extremely conspicuous object in the Western Desert; so will a khaki-clad soldier when seen against the snow.

One of the devices most frequently employed in natural camouflage is that which is known as cryptic coloration. A cryptically colored animal is one which is so tinted and patterned that it is very difficult to see when viewed against its natural background, for example, the zebra or tiger.

No cryptic coloration can be devised which is effective in all circumstances. When an object is so colored that it is conspicuous against its surroundings by reason of its hue, there are two methods of concealment:

- (a) To move the object to a background of suitable color, or
- (b) To change the coloration of the object.

Most cryptically colored animals have an instinctive tendency to resort to the right background and there to remain motionless as long as they wish to be hidden. It is not enough, however, to resemble the background simply in color and pattern; a cryptically colored object must be so oriented that its pattern is coincident with that of the background, which, therefore, brings in behavior.

b. Behavior

(1) Theoretical Aspect

Frequent association, in the mind, of the physical make-up, actions and associated features of an object, allows one to immediately distinguish the object subsequently when observing only a portion of the characteristics,--the mind supplying the missing characteristics.

If, however, as in camouflage, an object is cryptically colored and placed on a suitable background but is not oriented correctly, if its movements do not conform to that which it is supposed to resemble, or, if its tracks are not the tracks of the object it is supposed to be, a question is raised immediately in one's mind and, by deduction, the true identity may be ascertained.



(2) Application in Nature

In nature, animals, insects, fish, and birds are disguised and sometimes resort to false behavior to mislead their enemies in defense, and their prey in offense.

Among animals, when the object to be imitated is normally motionless, the disguised creature also remains that way, thereby achieving some advantage such as food or safety. If the object copied is one which is usually in motion, for example weeds or leaves drifting in water, the animal imitates these movements with great exactness.

(3) Application in War

The application in war can be for defense or offense. It follows then, that when supplies and material especially, are cryptically colored and against a suitable ground, the object simulated must be followed in every detail; for example, a truck camouflaged to look like a haystack moving across the landscape and leaving tracks behind it, does not act as a haystack normally does and is therefore quickly detected.

c. Countershading

(1) Theoretical Aspect

Countershading is a system of compensating coloration whose function is to counteract and nullify the visual effects of light and shade. The effect of countershading is to produce on a solid object an illusory appearance of flatness.

Owing to the effect of unequal illumination falling upon its different surfaces, a solid object of uniform color presents to the eye the well-known appearance of light-and-shade, or relief, to which is due its appearance of solidity. By this means alone an object can be distinguished as a solid form even when it is placed before a background whose color and texture exactly match its own.

When any solid body is observed in its natural state its upper surfaces seem to be more brightly illuminated than its lower surfaces. This is because in nature the source of light is from the sun and the effect of this top lighting is to lighten the tone of the upper surfaces, while the lower parts, being in shade, appear darker.

By the use of paints or colorings and darkening the upper surfaces, and lightening those beneath and grading the tones on the sides from the dark to the light, it is possible to counteract the effect of the natural light and shade, and thus render a rounded body apparently flat. By careful countershading in this manner an object will become completely invisible at a short distance when placed before a suitable background.



(2) Application in Nature

Countershading is a concealing medium commonly found in nature such as the coloration of wild animals, the majority of mammals, birds, reptiles and fishes being colored darkest on the back, white on the belly, with intermediate tones graded round the flanks.

(3) Application in War

In military camouflage this principle of countershading is applicable to objects of all sizes. Upper surfaces should be painted and textured so as to conform to the color and tone of the surrounding country (background) and the sides graded and toned from this to the white which the under surfaces and parts in shade should be painted.

d. Disruption

(1) Theoretical Aspects

Observation of distant objects shows that their visibility depends upon their forming a continuous patch of color, bounded by a specific outline, which stands out more or less conspicuously against a darker or lighter background.

The eye is more readily attracted to circular markings and secondly to straight regular lines or symmetry, than to irregular lines, for in nature straight regular lines seldom exist. However, where in nature they do practically exist, nature has absorbed them in disruptive coloring.

When a combination of circles and straight lines are put together in a given manner they immediately suggest to the mind the distinguishing features of a certain object, i.e., the outline of a truck as seen from a distance is composed of definite straight and curved lines, which immediately call to one's mind that it is a truck and not a house.

Due to the natural intermingling of light waves reflected from an object and recorded by the eye or camera, greater differences in color are necessary for resolving them into their recognized elements. Likewise structural outline may be fortified by paralleling the shape with a lighter or darker color, or it may be diminished by cutting across the structural outline (disruption). The value of disruptive patterning depends upon its ability to nullify those clues upon which the eye depends for recognition by breaking up the visible continuity of surface and the regular outline which bounds it, thus transforming what is really a continuous surface into what appears to be a number of discontinuous surfaces and distracting attention from the object as a whole.

(2) Application in Nature

Application of disruption may be found in all forms of life, one of which is the very common marking stripes which pass from the bodies to the limbs or



wings of many wild animals, fishes, birds, and insects.

A common structural disruptive pattern may be seen in the zebra. The black marks of the zebra are close to right angles with the outline it presents when seen at a distance, and similarly, the stripes on frogs, which pass from the body to the two leg portions when in contracted position.

(3) Application in War

Application of disruptive coloration in war may be made to any object of military importance.

In general, elements of a disruptive pattern should be carried across adjacent surfaces of an object; e.g., from the roof to the walls of a building; from the hull into the upper parts of a ship. Such patterns cause discontinuous surfaces to appear continuous, whereas a break in the pattern at construction points emphasizes the very features which it is desired to obliterate.

e. Elimination of Shadow

(1) Theoretical Aspect

Shadow may be cast or retained by a surface, the shadow cast being a lessening in the intensity of light reflected from a surface because of an object between the light source and the major reflecting plane. The retained shadow represents the areas of shadow on the surface of, or within, an object, due to the obstruction or exclusion of light by structural features; such as the dark interior of a vehicle seen through a window or back curtains, or the inside of a tent, seen through the open tent flaps.

Since shadow is caused by necessary structural design, and shadow is recorded by the eye or camera because of absence of light, its obliteration may be obtained by including it in a non-significant pattern of an applied medium. Such medium itself reflects less light and thereby becomes less recognizable.

(2) Application in Nature

One of the most common applications of shadow elimination in nature is that of camouflaging the eyes of all forms of wild life. Those forms of wild life which depend upon natural camouflage for protection have a black or dark brown irregular patch which includes the eye and passes across the structural shape of the body. (Certain fowl extend their wings to the ground to include their body shadow.)

(3) Application in War

A special application of this principle is seen in the use of patterns to conceal typical structural details which, without proper treatment, are liable to provide a clue to recognition. Such features are the dark patches seen under the



chassis and mudguards of vehicles; the box-like recesses above the rear wheels of trucks; outline of shadow on track guard of tanks; elimination of ground shadow of buildings and structure, etc. The visible shape of such patches may be distorted by their inclusion within a dark patch of color of non-significant shape, so that the tell-tale clues to recognition are no longer present.

f. Features

(1) Theoretical Aspect

Disguise--visual deception--is effected not by the concealment of the existence of an object, but by the concealment of its nature or by the suggestion with dummies of objects or activities calculated to mislead the enemy. Disguise is the most specialized of all camouflage activities which depend upon it ultimately, for their success. Disguise is never confined to mimicry in appearance only: it is also a matter of deportment (in nature) and organized discipline (in war).

(2) Application in Nature

In nature, disguise may be defensive or aggressive in function, either serving to deceive a hunter as to the nature, posture, or whereabouts of his prey; or allowing the hunter to approach, to ambush, or to allure his quarry undetected. In the first case, the misleading appearance will deter or deflect attack by potential enemies; in the second, it will facilitate the capture of prospective victims.

Those features of disguise of a passive or defensive function may be found in caterpillars, stick-insects, etc., which simulate the appearance of twigs, certain tree frogs and moths which resemble the bark of trees, crabs and fishes resembling sea-weed.

Those whose function it is to draw attack away from a vital target to a non-vital target or dummy objective may be observed in butterflies with dummy eyes on their wing tips, which deflect attack by birds away from the head to a non-vital part of the body.

Those whose function is bluff, intimidation and threat may be found in various animals which resemble other animals feared by their own enemies, e.g., certain caterpillars which when being attacked resemble snakes; various insects which display large eye-like markings on their wings; various beetles and spiders which resemble, in appearance and habits, ants and wasps which are distasteful or dangerous to their natural enemies; other spiders which prey upon the ants which they themselves resemble.

Those features of disguise which have an aggressive function may be classified for approach, ambush or allurement.

Disguise which enables an animal to approach its prey or enemy undetected, through resemblance to some object which is not feared or suspected, may be found in certain fish, chameleons, and praying mantes which resemble leaves and



are able to approach their prey without being recognized.

Disguise which offers static concealment, or ambush may be found in ant-lion larvae which trap their prey from a concealed position dug in the sand; certain large frogs which cover themselves with sand and leaves and thus surprise prey approaching within striking distance.

Disguise which suggests an object, a target, attractive to a hunter, or to an enemy, and thus draws attack where it can suddenly and effectively be countered, may be found in various fishes which, though while camouflaged, attract their prey towards themselves by displaying a bait, e.g., having the tongue converted into a dummy worm; praying mantes resemble a flower and thus attract the insects upon which they feed.

(3) Application in War

Disguise in war as well as in nature can play a defensive or offensive function and follows in the same sequence as presented above in nature.

Those passive or defensive features of camouflage may change an object to appear like something innocuous or of no interest to the enemy; e.g., defended houses and pill boxes resembling native dwellings, haystacks, etc., observation posts constructed in dummy tree stumps, dummy dead horses or men, etc. Or, disguise whose function it is to draw attack away from a vital target to a non-vital or dummy objective; e.g., dummy dumps, gun positions, decoy fires, etc.

Those features of disguise whose purpose it is to bluff, intimidate or create a threat may be made of dummies or other types of deceptive devices--in defense to delay, or prevent attack by creating a false impression of force; or in an offensive role--to mislead the enemy as to present dispositions or future intentions; e.g., dummy defensive positions, dummy tanks or other material, and other deceptive contrivances which give the appearance of units or formations where none exist.

Those features of disguise which have an aggressive function for approach, ambush, or allurement may be found in such forms as: (for disguised approach;) the Trojan horse, sun shields and sniper suits.

For ambush, such installations as antitank guns in quick-release tent coverings, heavy machine guns in quick release brush covering, etc; and, in allurement or decoy, such disguise as mystery ships; feigned retreats; and all forms of "booby traps".

8. ENGINEER LESSONS FROM SICILY

Some points learned from the Sicilian operations are briefly listed in the following:

a. Mechanical Equipment

(1) Division rear area operators of mechanical equipment require further training to bring them to a satisfactory standard of efficiency.

(2) Due to faulty waterproofing and minor mechanical defects some bulldozers were laid up for repairs as long as 24 hours.

(3) Blades should be fitted to all bulldozers before landing.

(4) To give sufficient night vision a window with a steel shutter which can be opened is required for armored bulldozers.

b. Beach Tracks

(1) Beach tracks must be wide enough to allow two way traffic, so that an exit is not blocked by one damaged vehicle.

(2) Fascine or corduroy mats must be provided to prevent the track from being torn up by tracked vehicles.

c. Engineer Reconnaissance

(1) Houses required for dressing stations and the like, must be thoroughly searched early for booby traps of which many may be expected.

(2) Enemy minefields must be more clearly marked, once their locations have been determined.

d. American Naval Pontoon Piers

(1) These piers were an undoubted success. They were used in two ways:

With both ends fixed. In this case the sea end is attached to a tank landing ship which is "flooded down" (bottom resting on sea bed) to form a stable pier to which incoming ships can tie up and unload. The shore end of the pontoon pier is also flooded to rest on the bottom to give a firm footing.

With the sea end free. In this case the pier has to be moved or swung to tie up with the incoming craft. Using this method it is essential to have a compressor available to blow out the water in the flooded pontoon at the shore end before the pier is moved.

(2) The surface of the ramps must be of a type that remains non-skid when wet.

[REDACTED]

e. Mine Detectors

It is stressed again that mine detectors (and radio sets) must be water-proofed to prevent them becoming unserviceable during landing.

f. Engineer Tools

All tools brought ashore must be in first class order to avoid, for example, heads of sledge hammers coming off.

g. Landing of Supplies

In some cases Bailey bridges, pipelines, and bulk fuel storage material were loaded with vital small parts missing. Loading of engineer supplies must be supervised by engineers.

INFANTRY

9. SOME BASIC PRINCIPLES OF COASTAL DEFENSE

Allied Forces have successfully completed one of the greatest landing operations of all time in the invasion of Sicily and the Italian mainland. The world expectantly awaits Allied landings on the Axis occupied coast anywhere from Norway to Spain. The following translation of notes made by a German officer formerly attached to a corps responsible for Channel Coast defense indicates the manner in which the Germans have organized the Channel Coast defense.

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a. Selection of Defense Areas

Owing to the shortage of troops, the defense will be organized into defense areas. A complete disposition in depth of the defense areas cannot be maintained at normal strength. As to the selection of the defense areas, the following essentials will have to be taken into consideration:

- (1) Where does the enemy have facilities to land?
- (2) Which landing beaches has access into the interior?
- (3) Where are there important installations, the possession or destruction of which is of interest to the enemy?
- (4) Finally, consider which parts of the coast do not lend themselves to landing operations (waters where navigation is difficult; islands constituting bastions off the coast; cliffs, wooded terrain, marshes, zones offering few lines of communication), and the sectors where landings are possible or likely will stand out.

b. Initial Organization of Defense Areas

For the moment, defense areas will be constituted and occupied only in those regions which lend themselves to landing operations. These areas will be selected subject to the following conditions:

(1) Weapons must command the greatest possible stretch of terrain. Consequently, it is not advisable to site guns on high points which overlook the general terrain, because then the beaten zone is restricted, and furthermore the weapon can not engage objectives within short range. In this manner, the risk of letting the enemy penetrate under the angle of fire is eliminated and it is not necessary to cope with defiladed areas.

(2) The defense areas will command as large a sector as possible. Owing to the shortage of troops, the number of supporting areas will be so reduced that the observation of the whole of the coastal sector will be impossible. By day, therefore, it will be necessary to place parties with sufficient striking power between the defense areas; whenever possible, one rifle squad equipped with a light machine gun. The method of alarm to be adopted in case of an enemy approach will have to be clearly explained and made known to every man in form of a special order. By night, patrols will be carried out by bicycle whenever possible.

c. Organization of the Sectors

Each company will retain, whenever possible, one platoon in reserve. The machine-gun companies will be split up in platoons and placed under command of the rifle companies--one platoon will be back, whenever possible, together with the battalion reserve. Heavy machine guns and light trench mortars should in principle be retained with the mobile reserves. The motorcyclists of the regiments are to be so grouped as to constitute heavy machine-gun groups.

With regard to the use of the machine guns, it is advisable, despite the present weakness in strength of the units, to keep the company organized in twelve rifle squads. It is necessary to remember then that the squads are weaker. The fastest possible means of liaison with all the defense areas will have to be ensured. All the defense areas will be connected with the C.P. by telephone if possible, or in any event by messenger. Where there is a shortage of telephone lines, steps will be taken to set up a relay system of communications. If, owing to the extent of the sector, no one company can be spared as battalion reserve, every available man will be used for counter attack, including transport and headquarters personnel, etc. The necessary training will be given at the earliest possible moment.

Sector commanders will not only make arrangements with the commanders of other arms of the Wehrmacht as to their role in the event of landings, but from now on they will also incorporate in their defense plan all the weapons in their sector. In this way some of the weapons will be available for use at other points where they are absolutely necessary.

[REDACTED]

d. Use of Artillery

Coastal batteries will not be placed in exposed positions close to the shore. They will be sited chiefly at the main points of resistance. Beyond the fact that they are exposed to enemy fire if sited at open spots, they are furthermore out of action as soon as the enemy has landed, by being exposed to direct attack.

Therefore they will be sited far enough inland and under cover, but in such way that they can engage the coastal belt during a landing. This use gives better results than the engagement of objectives at sea. When batteries are sited in the open it is absurd to have an observation post at a distance of 200 to 300 yards from the position. The very reason for siting batteries in the open is to enable both observing and firing from the same place.

Batteries will only be given one fire task. It is not enough to work out the firing data, plans must also be made for coordination. Use will be made of all existing means of communication. Radio sets will be kept as far as possible mobile so that they can be transferred to another observation post. In many quarters it is said that in the event of a successful enemy landing, the coastal batteries would be able to reverse their fire towards the land. This procedure only offers possible chances of success if corresponding observation posts have been installed. Firing from the map amounts to a waste of ammunition and endangers own troops.

e. Conduct of the Landing Battle

As regards the conduct of battle, the following may be said in brief: defense areas will be defended whatever the conditions may be, even if the enemy has landed and broken through. Local reserves will be used in the counterattack. If the counterattack fails, it will be necessary to block the enemy's advance from positions in the interior; these positions to be reconnoitered beforehand, must be held until the planned counterattack by larger reserves produces its effect.

10. JAPANESE TACTICS--ARAKAN CAMPAIGN

The following extracts taken from a recent report on the Arakan Campaign, of the period from April 27 to May 16, 1943, are given here to point up some phases of Japanese operations connected with this campaign. It should be remembered that in the particular area pertaining to this action, there are flat, coastal plains interspersed with numerous, small, tidal waterways; flat cultivated areas at this season of the year (spring) are dry and untended, with small foothills covered with light growth merging into thick jungle country in the Mayu mountains rising to 2,000 feet.

[REDACTED]

a. Defensive Tactics

When the Japanese is on the defensive, he digs in and stays there. He either prepares his position before occupying it, or if that is impossible, continually improves it during the night, resting and sleeping during daylight hours. His system of supporting fires is excellent and his placing of machine guns and mortars superb. He is prepared to sacrifice some of his own men as a result of mortar and artillery fire on his own positions, if they should be penetrated by his enemy. These casualties are few because of the overhead cover invariably furnished for his prepared pits and dugouts.

b. Weapons Employed

All of the Japanese guns so far fired in this area were thought to be the 75-mm mountain gun with a maximum of 9,000 yards in range. The Jap usually hauled this gun to the top of a hill to fire it. From the locations it is believed that the gun is a pack type and that these positions were chosen first because the Jap prefers simple conduct of fire and secondly because it is thought the guns have difficulty in clearing crests. There was an apparent shortage of ammunition since the guns did not fire often and when they did, not very many rounds were used on a target. Their adjustment usually consisted of one or two shots fired into an area after which they fired for effect. Guns were usually fired singly or in twos or threes, and with the exception of the battles before Donbaik, Htizwe and Indin, (see Tactical and Technical Trends, No. 32. p. 29) never over 4 guns were fired at any one time. The British knew that some Jap ammunition was of an incendiary nature but they believed that it was not phosphorous loaded and they stated that it probably contained gasoline or a volatile liquid of a similar nature. The explosion of this shell produced an orange-colored burst with large volumes of black smoke. Only once has the Jap been known to use 4 guns together in the form of a battery fire mission and although more than 4 guns have fired (as mentioned above) on a single target, this fire converged from separate localities. He frequently fired his guns and mortars simultaneously not only for their effect, but it is thought, so as to confuse our forces as to the exact location of his heavy weapons. His high explosive shell had both a delayed and a slightly delayed action fuse. He confined himself almost entirely to harassing types of fire and in this he was fairly accurate. His usual ranges were, it is believed, from 6,000 to 7,000 yards. On one occasion only, and then at two different times, he concentrated his guns on counterbattery. He has attempted interdiction but without success and has not fired for destruction. He was particularly successful in his counterbattery fire at first, in that his observers occupied high ground overlooking the British position at Donbaik from which they could spot at night all the guns on the front. Once, it is stated, in a surprise bombardment he delivered the fire of all his guns presumed to be 10 in number, on the British batteries in turn. The latter consisted at that time of 26 pieces, 3 of which were put out of action. The British artillery manned their guns and were successful in silencing the enemy. Later in the morning the Jap produced this same form and intensity of fire but the British were more nearly ready at this time and the duration was only one to two minutes. British artillerymen believe that they put out of action as many Japanese guns as they lost, although no exact data were ever available.

[REDACTED]

c. Use of Dogs

The Japanese used dogs on this front. Those observed had the appearance of the ordinary village mongrel or so-called "pi" dog. In the day time these dogs were seen coming up to our forward defended positions and when they discovered our men, they barked and went back. This may be fanciful and simply a coincidence. On another occasion, one dog and two men formed a scouting party, the dog preceding the men, and when he encountered the smell of our nearby troops he was observed to run back and warn the approaching Japanese scouts. On another occasion, six Japanese in an open glade of the jungle were observed to halt while passing through and their leader barked like a dog several times. Several minutes later a dog appeared with a scrap of paper, probably a note, tied to his neck. After looking at the piece of paper the patrol set off again accompanied by the dog. In no cases did the dogs appear to be imported but from their looks were those indigenous to this section of Burma. (It is believed that these dogs are not highly trained but that their propensity for friendship to man is being utilized as described. No dogs were on duty with the British forces).

d. Use of Animal Barking

The Jap has used cock-crowing and hyena barking as a means of signalling at night. He frequently puts out red lanterns and also uses red Very lights in his rear areas.

ORDNANCE

11. JAPANESE EQUIPMENT FOUND ON KISKA

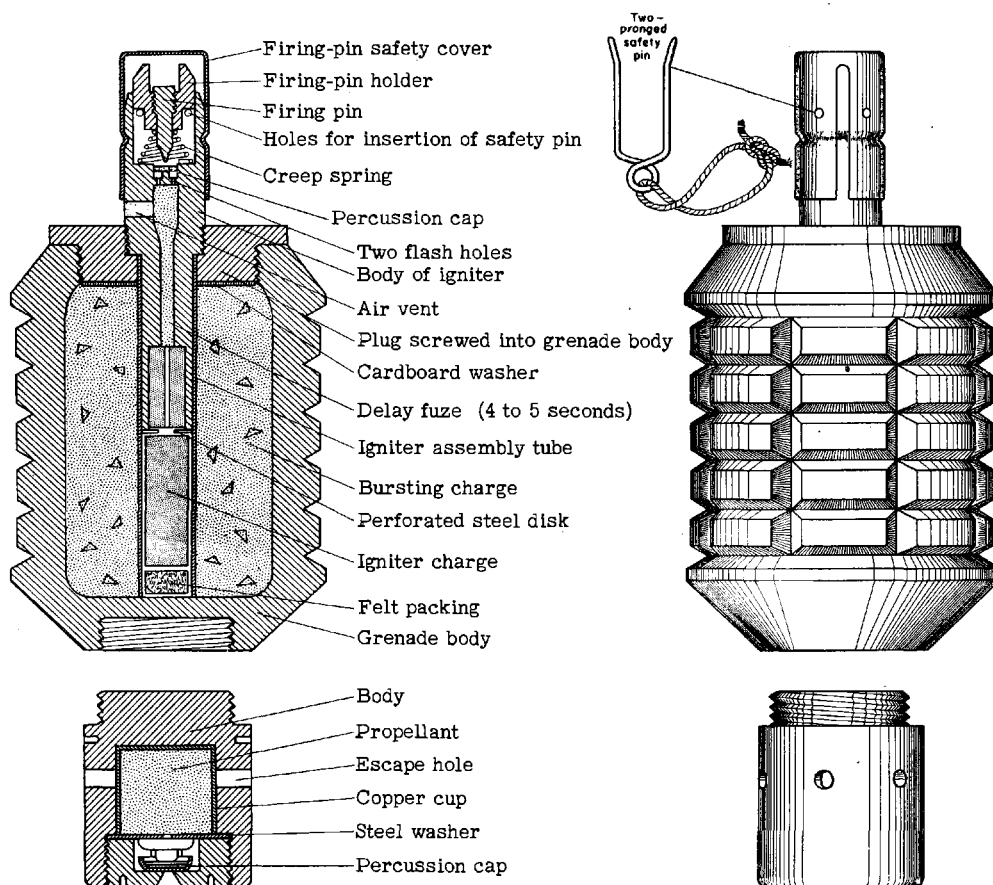
Recent searches over the area abandoned by the Japanese at Kiska, as indicated from American sources, have resulted in the location of many hand grenades Type 91*, with attachment on the base, permitting grenade to be fired from the Model 89 grenade thrower. Gun ammunition for the 13-mm machine gun having almost the same dimensions as our 50-mm caliber, was also recovered. What was described as a new lighter and smaller type grenade with no serrations being of the concussion type also was found. The oldest among these had a date of manufacture of August 1942.

Model 93 land mines at one particular spot were laid so that each mine was wired upside down and connected to a can containing 30 blocks of TNT. This method was said to increase the explosive force three or four times, and enlarged thereby the danger area.

The Model 91 (1931) hand grenade can be either thrown or fired from the Model 89 grenade discharger. It can also be modified for use as a rifle grenade

*The Type 91 is practically identical with the Type 97 except that the latter has no propellant charge container.

by substituting a tubular tail fin assembly for the propelling charge. This type can be recognized by the serrated black body, the brass safety cover and the perforated shell propelling charge screwed to the base.



JAPANESE TYPE 91 HAND GRENADE

The Model 97 hand grenade is believed to be carried by all Japanese front-line troops. This type hand grenade is easily recognized by its serrated black body as well as its brass fuze, which is identical with the fuze on the Model 91. The Model 97 can be used as a booby trap by pulling the safety pin and placing it under planks, chair seats, or the like. The weight of a man on the fuze is sufficient to function it.

12. GERMAN SPIKE BOMBS

A heavy type of nose spike for use on German bombs has been recently reported. It is thought that they are used to prevent ricochets in low level attacks. The bombs on which the nose spikes are affixed are termed Stachelbomben or "Stabo". They must be of the best quality and be specially shaped at the nose to take the spike. (See sketch next page).

The spikes used in the SC 50* and SD 70** bombs are made in one piece but those used in the larger bombs are in two pieces. Additional data pertaining to these bombs follow:

<u>Bombs</u>	<u>Total Weight</u>	<u>Details of Spikes</u>		
		<u>Length</u>	<u>Diameter</u>	<u>Marking on Tail</u>
SC 50	136.4 lb	18.8 in	1.8 in	Yellow stripe
SD 70	158.4 lb	18.8 in	1.8 in	Red stripe
SC 250	620.4 lb	22.8 in	3 in	Yellow stripe
SC 500		24 in		

13. JAPANESE AIR BOMBS (ARMY AND NAVY)

There is no separate Japanese air force such as the RAF and Luftwaffe and aerial operations are carried on by special departments of the Army and Navy. There is, therefore, a very distinct difference between the aircraft, bombs, fuzes, etc., produced by these two departments, both of which seem to have developed quite independently. Army aircraft are land-based entirely, whereas Navy aircraft are both carrier-based and land-based. Bomb racks, release mechanisms and fuze arming devices are quite different.

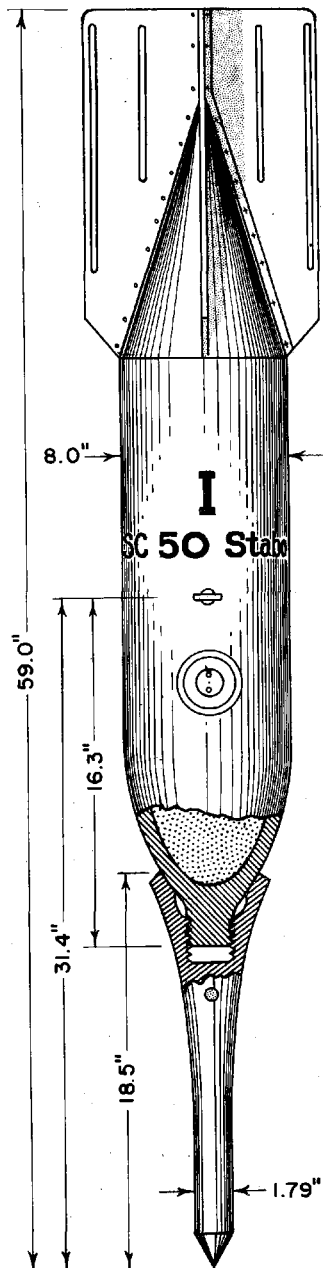
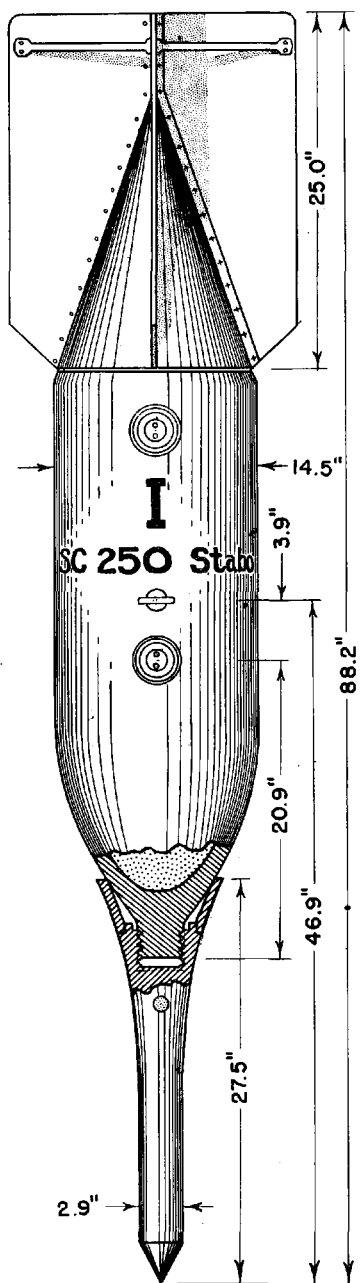
Listed below are the main general distinctions between army and navy types of bombs and fuzes. It is fully realized that these distinctions do not exist in all cases.

a. Body Construction

Army types have a screw-in nose-piece, and a tail unit welded to the main body. In naval types the tail cone is connected to the body by a separate internal insert; the nose is located by rivets or a weld, while the tail-unit is affixed by set screws; it is thus possible to remove the tail piece easily, by removing the set screws but not the nose piece. Suspension lugs are quite different because of the different types of release mechanisms; the army type is rectangular and hinged, while the navy type is a fixed U-bolt.

*SC designates a thin wall high-explosive bomb, achieves its effect chiefly by blast.

**SD designates a bomb which has a thick casing and achieves its effect chiefly by fragmentation.



TWO GERMAN SPIKE BOMBS

[REDACTED]

b. HE Fillings and Exploders

The general HE filling in army bombs is picric acid, contained in waxed cardboard containers and comprising three portions - nose, body, tail. Each portion is a loose fit inside the bomb and is retained by wax. The usual HE filling in navy bombs is hexanite and anisol mixture, or trinitroanisol, poured into the casing; the tail cone filling - if present - is separate and divided from the main portion by a cardboard washer. There are small standard army type boosters which initiate the main fillings, by means of an auxiliary picric acid booster. No navy standard type auxiliary boosters exist, the main fillings being initiated direct by a large standard booster screwed directly into the fuze base.

c. Markings

Markings on bombs give an indication of the arsenals in which manufactured. Some arsenals, such as at Tokyo, Osaka, Nagoya, Sakai are military; others (e.g. at Kure) are naval. Each arsenal has its characteristic Japanese inscription. It is thus easily possible to find the type (i.e. service) of bomb by noting the arsenal of manufacture. Naval munitions are usually marked with an anchor.

d. Bomb Classification

The following is a list of Japanese army and navy aircraft bombs taken from a British official source. It may be noted that bombs dropped on one area are normally of the same service. In the Ceylon raids (carrier-based aircraft) naval types were dropped.

e. Army Type Bombs

- 0.73 lb HE hollow charge
- 2.2 lb antipersonnel, incendiary
- 26.4 lb thermite incendiary (alleged)
- 33.1 lb HE antipersonnel
- 66.1 lb HE general purpose
- 110.2 lb HE general purpose
- 110.2 lb HE general purpose (modified)
- 110.2 lb phosphorus incendiary, Type 97
- 110.2/132.2 lb HE, incendiary, phosphorus
- 220.2 lb HE general purpose
- 550.8 lb HE general purpose (alleged)
- Leaflet bomb

f. Navy Type Bombs

- 110.2/132.2 lb thermite incendiary
- 132.2 lb wax incendiary
- 132.2 lb HE general purpose Type 97
- 132.2 lb HE general purpose
- 132.2 lb HE general purpose Type 98

[REDACTED]

132.2 lb HE general purpose Type 99
550.8 lb HE general purpose Type 1
550.8 lb HE general purpose Type II
550.8 lb HE semi armor-piercing (alleged)
550.8 lb HE incendiary
1,102.0 lb HE semi armor-piercing (alleged)
1,652.4 lb HE AP

14. GERMAN MOBILE SHOPS

The vast mechanical equipment of the panzer division requires a great amount of repair and maintenance work; therefore, every unit of the division-- as well as the division itself -- has its own repair organization. The success of an attack, or the fate of the troops, often depends on the adequate repair facilities available at the right time. Frequently, the repair of some minor damage which cannot wait until the repair unit of the division arrives, might mean the success or failure of an engagement.

The following article taken from the October 1943 issue of the Ordnance Digest, published monthly by the Ordnance Department of the U.S. Army, describes the German mobile shop trucks and how certain features of these units compare with similar ones in use by our Army.

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Field Service maintenance officers have made an examination of captured German mobile shop trucks at Aberdeen Proving Ground. These mobile shops are mounted on 4 1/2-ton Diesel-powered chassis, with dual rear wheels, and with front and rear drive.

The spare truck is mounted on a cargo-type body. The parts were stored in six steel cabinets, with various-sized drawers to accommodate the large and small parts. The drawers were made of steel, and have wooden dividers, with felt linings. The parts in the truck were for automotive equipment, and an item of great interest was noted--the number of spare parts that were stamped "Made in U. S. A." Another outstanding surprise was the absence of rust preventatives and grease, yet the parts were in fair condition, with only a slight amount of rust on them.

This particular spare-parts truck had been assembled in Germany early in 1943 and had been driven approximately 450 miles. The presence of the spare parts that had been made in the United States indicated that Germany had not only accumulated tremendous reserves but, despite 4 years of war, still has available some material from stock piles.

[REDACTED]

The German spare-parts truck compared favorably, in many respects, to our spare-parts truck. Both have cargo-type bodies and similar steel cabinets.

The German electrical mobile shop truck was equipped with a special van-type body which resembles our own van-type trucks. This body was equipped with a collapsible top similar to our new ST-6 body. The collapsible top construction was apparently made to conserve shipping space, as the top of the van body can be lowered to the same level of the truck cab. Another outstanding feature was the light construction of the van body. It was made of press-board or masonite. However, it appeared to be in fair condition notwithstanding the hard usage received.

Most of the tools in the electric repair truck were lost. There was some welding equipment, Diesel injection pump testers, oil and fuel analyzers, electrical testing equipment, a sewing machine, and a bench drill press. The benches, which were of steel cabinet type construction, had wooden drawers containing mortised recesses in which to fit the hand tools.

In the mobile machine shop truck, the hand tools were stored in recessed wooden drawers, similar to those in the electric repair truck. These hand tools included such types as pullers, valve refacers, body repair tools, punches, and wrenches. While the hand tools did not consist of a large variety of different classes of tools, they did include a large assortment within certain categories. As an example, expansion reamers covered sizes from 4 mm to 52 mm. In some cases extra sets of taps and dies were calibrated in inches rather than in millimeters. This apparently was to take care of equipment the Nazis expected to capture from our forces. All micrometers were missing from this truck.

An extract from a report from the North African Theater of Operations states "...of particular note are the quantities of precision instruments (gages, star gages, micrometers, etc.) which are made available as standard equipment (in German mobile shops), and the arrangement of all tools and parts drawers to provide fitting compartments for each type and kind of item. Also highly worthy of note are the chests provided for each type of weapon, containing special tools and small spare parts. Another thing that caught attention is the locked compartment for tools for the maintenance of the vehicle itself, providing fitted drawers for the tools and including spare spark plugs, fuzes, and other small emergency items..."

Lists of equipment and maintenance manuals were found in the electric repair truck and also in the machine shop truck. These lists are now being translated for further study.

In general, the pattern of the German mobile shop trucks follows that of the United States Army mobile shops.

15. GERMAN AT GRENADE RIFLE

The Germans have converted their Model 39 antitank rifle Pz.B.39* (see MIS Special Series No. 14, May 25, 1943 German Infantry Weapons p. 34) into a weapon for firing the rifle grenade. The new rifle is called Granatbuchse 39, with "Gr. B. 39" on a plate fastened over the original Pz. B. 39 stamped on the receiver.

a. Description of the Modified AT Rifle

It is an adaptation of the German antitank rifle, Model 39, fitted with a cup grenade-launcher of the usual design, but the rifle is altered by the following modifications:

- (1) The barrel has been shortened, and the carrying-handle moved to the rear
- (2) The bipod, of the usual design but fitted with extended legs, is attached to the rear of the barrel
- (3) The butt is laterally offset and strengthened by the insertion of a welded cross-member and is no longer able to be folded
- (4) A special sight is attached to the left of the receiver. The front sight is in the form of a frame fitted with cross wires, and graduated from 0 to 150 meters. The rear sight is a notched bar (see sketch).
- (5) Weight complete. 23.15 lbs
- (6) Total length overall. 4 ft 3/16 in
- (7) Total length of barrel 23 1/4 in
- (8) Breech chamber. 4 5/16 in

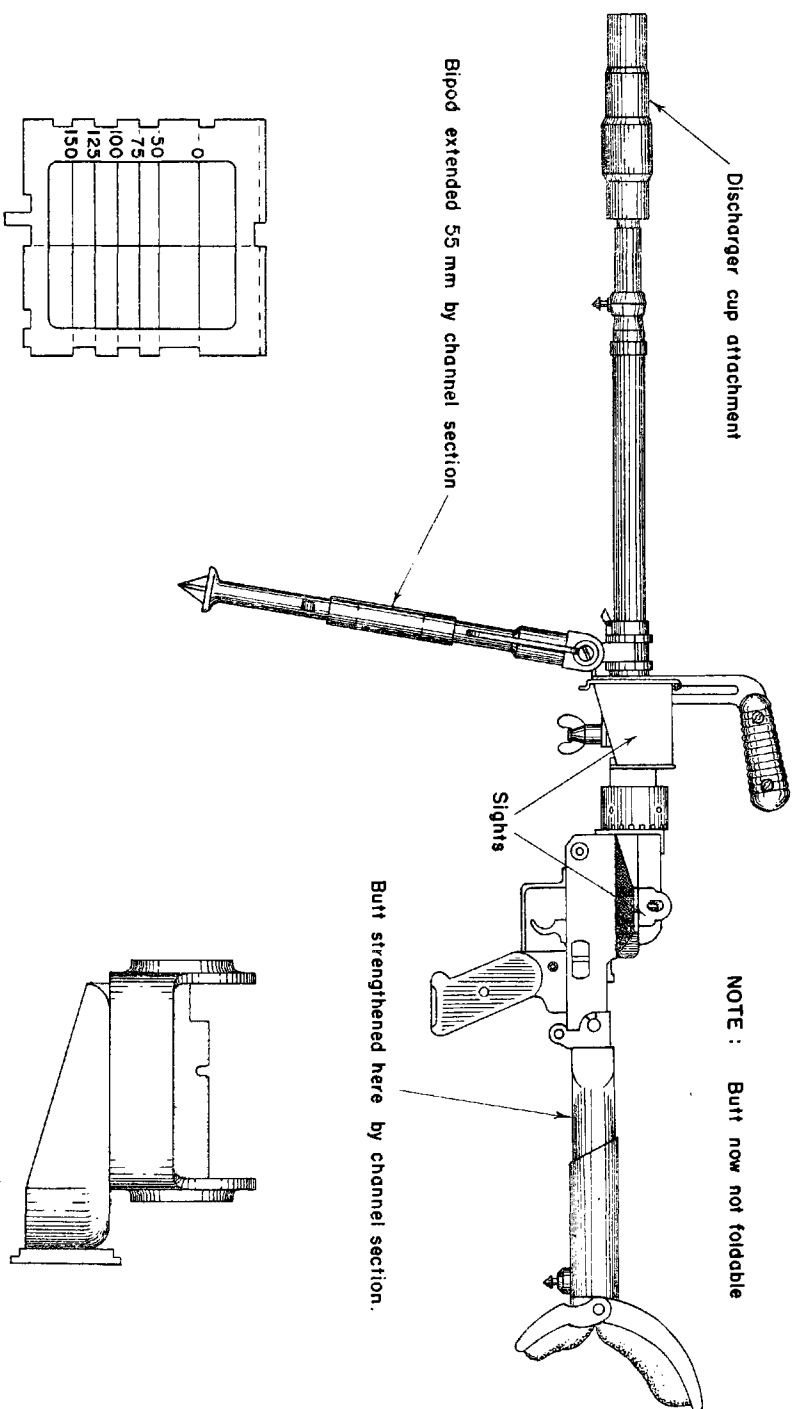
b. Ammunition Fired

The three types of ammunition used are the same as those designed for the rifle grenade, (see Tactical and Technical Trends No. 36, p. 34). There is an antipersonnel, HE grenade weighing nine ounces, known as G. Spgr (Gewehr Sprenggranate); an AP grenade (Gewehr Panzergranate), abbreviated G. Pzgr, and the heavy AP grenade, both hollow charges, (Grosser Gewehr Panzergranate) Gr.G.Pzgr. While undoubtedly the antipersonnel grenade can be fired, it would be an unusual munition for an antitank rifle. The normal ammunition would be the AP grenade--the ordinary 8.8 oz Gewehr Panzergranate and the heavy, Grosser Gewehr Panzergranate. The latter is capable of piercing about two inches of armor.

These grenades are packed with the suitable blank cartridge for each type, in black containers with a white spot on the end for the AP grenades and a gray, for the HE. These blank cartridges are not interchangeable between different types of grenades.

According to one German authority, the heavy AP grenade has a range of about 100 meters, and according to another, 136. There may be two propelling cartridges. The range of the light AP is stated as 250 yards. In using the grenade

*Panzerbuchse - antitank rifle



GERMAN 7.92-MM AT RIFLE
(MODIFIED FOR GRENADE DISCHARGER)

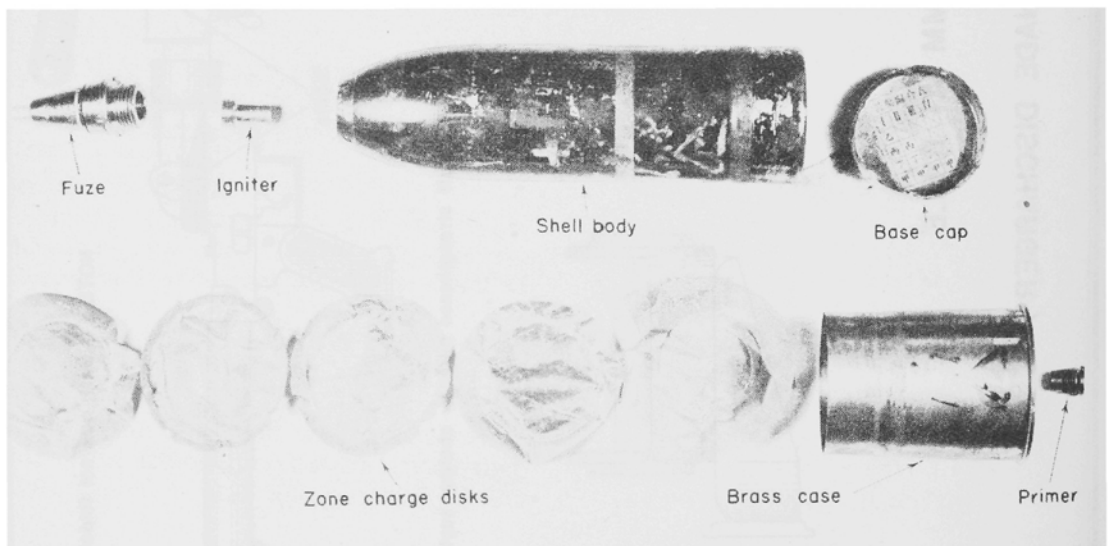
sights on the AT rifle with the heavy grenade, 125 meters on the sight corresponds to a range of 100 meters and 100 meters to 75.

16. JAPANESE 70-MM HOWITZER AMMUNITION

Since publishing the account of the Japanese infantry battalion howitzer, type 92, Mod. 1932 (see Tactical and Technical Trends p. 7 No. 34) data have come in from the Aberdeen Proving Ground concerning the ammunition. The more significant points in the report follow.

a. General

This ammunition is semi-fixed, has a HE projectile with a point-detonating, instantaneous, percussion fuze, and a brass cartridge case which has one igniter charge with four zone charges. These charges are disks contained in what appears to be oil-cloth. The igniter disk wrapper is light blue in color and those of the other four zone charge disks are dark blue. The brass cartridge case contains a screwed-in percussion primer. This primer was found to be interchangeable in the Jap 37-mm, 70-mm and 75-mm field gun ammunition, and is possibly used in other Japanese artillery ammunition.



JAPANESE 70-MM HOWITZER HE SHELL

b. Details

The following characteristic data were obtained by examining one round of this ammunition.

Weight of complete round	9 lbs 8 oz
Weight of projectile	8 lbs 5 oz
Weight of detonator	Not known
Weight of picric acid booster	1.54 oz
Weight of TNT bursting charge	1 lb 1 oz
Weight of propellant	Not known
Weight of cartridge case w/primer	1 lb 3 oz
Overall length of complete round	14.36 in
Length of projectile w/fuze	11.47 in
Length of projectile w/o fuze	9.21 in
Length of cartridge case	3.94 in
Diameter of bourrelet *	2.744 in
Diameter of copper rotating band	2.803 in
Diameter of neck of cartridge case	2.806 in
Diameter of base of cartridge case	3.948 in
Diameter of base of percussion primer	.628 in

c. Color and Marking

Location

- | | |
|--|---|
| (1) Yellow band | Stenciled around body of projectile approx. 2 in, above rotating band 3/8 in wide |
| (2) Main body of projectile painted black | Projectile body above and below rotating band |
| (3) Other markings indecipherable | Stenciled in white approx. 1 inch in height on side of projectile between rotating band and yellow band |
| (4) Yellow label | A yellow label was pasted on cardboard disk used as a stopper for the powder charges in the cartridge case, marked in undecipherable Japanese characters. |
| (5) ⁺  9 圭 昭 ^{**} | Stenciled on base of cartridge case were the characters shown on opposite side. |
| (6)  8 儿 昭 | Stenciled on base of primer were the characters shown on opposite side; 1st line, undecipherable, 2nd line, August? 197. |

Comment: From the brief examination given this ammunition, nothing was found to be unusual or unique. The small amount of propellant would indicate the weapon has a very low muzzle velocity. According to W.D. Technical Manual 30-480, the maximum velocity is 850 f/s.

*Greatest diameter at head of shell.

**September 1940 with arsenal stamp.

GENERAL

17. DEFENSE OF POPULATED PLACES

Emphasis on the vital importance of inspiring efficient leadership, and understanding of troop psychology, and a discussion of tactical principles, feature a recent German document concerning the defense of populated places. The following article is a translation of the document, which was written by an officer serving on the eastern front.

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a. The Leader

The leader is the soul of the defense. The fighting power, strength of the defense, and the spirit of the unit depend entirely on the leader. The leader, in turn, depends entirely on his men.

The defense of a town can only be directed from the town itself. It is nonsensical to attempt to direct the defense of a town from the rear. The leader must breathe the same air, take part in the same combat phases, as the common soldier. The leader must possess energy and must perform his mission with undaunted fanaticism. He must be able to act on the spur of the moment. Better to do the wrong thing once in a while than to act too late. He must be filled with optimism. He must be young and alert--there are young leaders who are 50 years old. Ruthlessness and hardness are always necessary. Yet the leader must feel for his men. Cold, rational beings will never be able to inspire enthusiasm, among the men. The leader must be able to give orders and state his intentions clearly and concisely.

Overcoming fear is the greatest victory man can gain. Some fear is inherent in every human being; the leader, too, cannot free himself from it. Even in desperate situations, the leader must be able to force weak men to stick it out. He who runs away will be shot. He who weakens must roughly be barked at. Better to beat up a weakling and thus save the situation than to lose the fight.

b. The Men

As troops engaged in the defense of a town are usually a mixture of several units, they do not possess the combat efficiency of a closely knit group. Leading such troops is a most difficult task. It is therefore necessary to form small groups and appoint sub-leaders. Sectors and boundaries must be clearly defined. An all-round defense must be planned. The leader in each sector must be thoroughly aware of the great responsibility resting on him. Every opportunity must be seized to instruct the men, to question them about their mission, to strengthen their self-confidence and to inform the sub-leaders about the situation. Every man must know the intentions of the leader. The men must believe in their invincibility and every one feel that he is stronger than 100 attacking Russians.

[REDACTED]

Men must be freed from the tank phobia. The men inside the tank are only human beings, who are just as frightened as the defenders, if not more so. The soldier must know that individual tanks are helpless in a town. Don't hesitate, therefore, to let such tanks pass through the lines. Tanks in motion don't hurt anything.

The soldier should be familiar with every possible situation and with the methods for defense in each case. His optimism must be refreshed time and again. Occasionally the leader might even start a good latrine rumor. The efficient functioning of the guard reliefs and provision for rest, warmth and food is vital.

c. The Position

Wherever possible, reverse slope positions which cannot come under enemy observation should be selected and scouting patrols for combat reconnaissance continuously sent out. During the frost, snow forts can be built. (See Tactical and Technical Trends No. 22 p. 20) Defenders should remain close to warm places; and should not hesitate to leave unoccupied a seemingly important hill if it is fairly distant. Small, narrow antitank foxholes should be dug on the outskirts of the town, as in cases of artillery fire, buildings are mantraps. The heavy weapons should be ready for action. Areas not covered by antitank guns must be closed by minefields and covered by fire. Reserves of ammunition and food must be accumulated, cattle and food-stuffs protected, and dogs shot. Attached artillery will usually have to learn how to fight in far advanced positions. Provision for early evacuation of wounded is necessary.

d. Antiaircraft

Russian low-flying attacks are usually ineffective. This is true also of their bombing attacks. Thus, everybody is to go under cover and only one light machine gun and one squad will remain to fire on planes.

e. Antitank Combat

Tanks usually move slowly through towns, fearing minefields and unexpected obstacles. Tanks are fought with AT and incendiary charges, with mud thrown against the slit, and by using every other means. At night, the field of fire may be lighted with flames and concentrated fire directed on the tanks. Each soldier must know the tank's weak points, what weapons it carries, where it cannot fire. Tanks that have lost their mobility are still in fighting trim. It is necessary, therefore, to blow them up or to fight them until they burn. Experience teaches that the Russians use "destroyed" tanks for artillery observation posts or as machine-gun emplacements; therefore from time to time such tanks in front of our own position should be fired on.

f. Use of Assault Guns

The self-propelled assault gun is an outstanding and much-feared weapon.



It is especially well suited for house-to-house fighting against an enemy who has broken through. Do not let assault guns fight against heavy Russian tanks since the assault gun's armor is too weak.

g. Signal Connections

At least one wire connection must be functioning at all times. Therefore, several must be laid and checked constantly. Radio equipment and batteries must be ready for immediate use. Whenever conditions permit, transmission may be in the clear.

h. Lighting

Lighting facilities are needed to enable the men to find their weapons and equipment without delay at night.

i. Water

Drinking water must be boiled, and tea prepared for the guards whenever it is possible to do so.

j. Barrage Fire

Exact barrage areas for mortars and infantry guns must be established and heavy machine guns sited to give flank protection to reverse slope positions. Hills can be combed with heavy machine guns and 20-mm AA. An advance observer, with a radio connection, should be constantly in the front line.

k. Care of Weapons

Weapons are inspected constantly to see that all are ready for action. Weapons "sweat" when taken into warm rooms; they should be dried at once. Oil or grease can not be used during freezing weather as such lubricants freeze and cause jams; petroleum or a gasoline-petroleum mixture is preferable. Machine-gun ammunition belts must be kept filled and in good order.

l. Conduct of Fighting

If the enemy penetrates a town at night, he must be cut off at daybreak and driven out with bunches of grenades and single hand grenades. Dominating hills are to be held by the smallest possible number of men, and in reverse slope position, in order to avoid unnecessary large losses. Massed Russian infantry attacks will be affected by organized hurrah-shouting by our own troops. This strengthens our own morale and confuses the enemy.

m. Conclusion

The focal point in winter fighting for a town is the town itself, since it is the center of warmth. It is much more effective to concentrate on the defense of



the town and a few hills nearby, or on the defense of the town only, than to scatter one's forces by occupying hills far off. In the event of a strong attack it will not be possible to send prompt support to these hills.

If the town should be entirely surrounded it will be the duty of the leader to continue the defense as before. The enemy will have to depart sometime. Since he will freeze to death, he cannot camp in the open for an indefinite period in order to keep the town cut off. An enemy who has been beaten off repeatedly will become cautious and hesitating. Relief will arrive eventually. Only mind and will power will triumph over any weapon.

18. GERMAN CURRENCIES IN OCCUPIED COUNTRIES

With Allied occupation of European countries in its first stages, the monetary problem is one which must be met. Some years ago, the Germans considered this situation, and perhaps their experience may be of value.

a. The Problem

German occupation of foreign countries has given rise to four different sets of difficulties in the field of finance.

- (1) The collapse of the currency of the invaded country;
- (2) Prevention of over-extension of the circulation of German national money - the Reichsmark;
- (3) The re-establishment of local currency, (a) in Russia, (b) in capitalistic countries;
- (4) Provision for an army currency that could be used by the troops, anywhere that German troops might be. In addition, it was desirable from the German viewpoint, to extract from the occupied territories as much gold and silver that they could seize to support the German domestic currency, and to prevent an inflationary price rise in the occupied countries which would add to German difficulties.

b. Rejected Solutions

At first glance, it might have seemed the simplest solution to sweep away all national currencies, and replace them with one general central European issue controlled by the Reichsbank. This obvious solution, however, was open to objection, as the financial status of the occupied or conquered nations varied greatly -- for example wealthy Holland and poverty stricken Croatia; moreover, the degree of punishment meted out to conquered peoples differed from one another. Poland and Greece are being wiped out; Holland, Luxemburg, Denmark and others will, if possible, be incorporated into the Reich. Therefore no attempt has yet been made to establish a general currency. Finally, to have extended the use of the Reichsmark into conquered countries, another apparently natural step, would have placed German national currency, physically, in the hands of people who were enemies of the Reich.

c. The Solution Adopted

(1) Reichskreditkassen (Reich Credit Offices)

One of the most interesting German innovations in this war was the development of special itinerant banks of issue to follow the invading German columns and establish themselves in the principal cities in the occupied areas.

These banks, the so-called Reichskreditkassen (Reich Credit Offices), were introduced in the Polish campaign, where they worked in particularly close conjunction with the army. On the basis of the Polish experience, certain administrative modifications of the system were made by the decree of 3 May 1940.

A council of administration for the Reichskreditkassen was established at that time with representation from the Reichsbank, the Finance Ministry, the Economics Ministry, the Oberkommando, and the Commander-in-Chief of the army. The Reichsbank provided the greater part of the personnel of the new Reichskreditkassen and maintained close administrative and technical connections with them. The head offices were maintained in Berlin, affiliated to the Reichsbank.

(2) Special Currency - Reichskreditkassenscheine

The Reichskreditkassen were responsible for the issuance of special notes (Reichskreditkassenscheine) to the armed forces in occupied areas. The notes, which were issued in denominations of 1, 2, 5, 20, and 50 marks, were legal tender only in the country in which they were issued and were not negotiable in other occupied territories or the Reich.

The rate of exchange between the RKK-scheine and the currency of the occupied country was fixed by the occupation authorities immediately after the entry of the army. The local banks were required to accept the notes at the official rate. The use of ordinary German banknotes by the troops was strictly forbidden, except in those areas such as Danzig, the Polish Corridor, Alsace and Lorraine which were officially or unofficially incorporated into the Reich.

The RKK-scheine were designed to place the entire burden of the occupation on the country in which they were issued and to prevent any indirect drain on German stocks or diversion of German production arising from an unrestricted filtering-back of notes into the Reich. In addition, it was anticipated that the influx of the notes into circulation would alleviate the temporary shortage of local currency resulting from panic hoarding and the exodus of refugees from the area. This proved to be the case, particularly in Poland and Belgium, where the central banks followed the established governments into exile and took the note supply with them.

The issuance of RKK-scheine was considered a temporary expedient and resorted to only for the payment of troops and for the purchase of minor supplies locally. The actual distribution of the RKK-scheine among the troops was left to the regular army paymasters, who were issued the currency in advance. The



technical personnel of the Reich Credit Offices was concerned instead, with extending emergency banking facilities to areas in which the normal monetary and credit facilities had been disrupted by the occupation.

(3) Reich Credit Offices -- Banking Operation

The Reich Credit Offices were authorized to function as credit institutions in occupied areas and carry out a wide variety of transactions. This was deemed necessary to ensure that the German forces would not be hampered by an internal credit crisis in the occupied area. The offices were permitted to invest in commercial bills, drafts, and secured advances of a maximum term of six months; to take non-interest bearing deposits; to hold deposits of securities and other objects of value; to carry on all types of banking operations, other than the acceptances business; and to regulate the general flow of money and credit within the occupied territories.

The scope and length of activity of the Credit Offices subsequent to the early stages of occupation depended upon local developments. In those areas which were incorporated promptly and completely into the Reich, the respective offices of the Reichskreditkassen became branches of the Reichsbank, which proceeded to take over their assets and liabilities.

In those countries which were stripped of normal monetary and banking apparatus by the destruction of records and evacuation of essential banks, the RKK constituted the nuclei for the establishment of new banks of issue. This took place in Poland, Belgium, and Yugoslavia.

In those areas in which the pre-invasion monetary and banking structure was left relatively intact, the emergency functions of the RKK were gradually reabsorbed by the existing statutory central banks.

In all cases, as soon as the occupation was consolidated and the Germans arrived at a satisfactory agreement with the existing central banks or established a new central bank, the issue of RKK-scheine was suspended. Thenceforth occupation troops were paid in local currency made available through the local central bank out of "occupation costs". Disbursements were through the regular military channels. RKK-scheine promptly disappeared from circulation, being taken in exchange against local currency by the central bank for the account of the Treasury of the occupied state.

The RKK-scheine system as utilized in the 1940 campaigns continued without major modification until mid-1942, when a new type of special currency, Wehrmachtbehelfsgeld or "Armed-forces-auxiliary money" was developed.

This auxiliary money was the solution adopted to handle the situation in certain friendly countries in which the issue of local currency sufficient to cover the soldiers' pay would seriously disturb the local finances. The first expedient adopted was to issue special "canteen-money" as part-payment of German troops in Rumania and Bulgaria. This "canteen-money" was valid only in military canteens,

[REDACTED]

soldiers' hostels, and similar service organizations.

Later the issue of armed-forces-auxiliary money was begun in Bulgaria. It consists of a new type of 1, 5, 10, and 50 pfennig notes issued by the Reichskreditkassen. The notes are issued for internal army purposes, where they are worth 10 times their "face" value. Outside the army organization they are worth only face value, which eliminates the danger of their being put into wide circulation. The auxiliary money differs from the "canteen-money" in that it can be used by the soldier, without loss, for savings or sending home to his family.

Under the present system, the RKK-scheine are kept in reserve for emergency use, mainly to provide a currency in areas in which fighting is actually in progress. In order that their issue can be accomplished without preliminary formalities should the occasion arise, they have remained legal tender in the occupied countries although they have de facto been withdrawn from circulation.

SECTION II

JAPANESE DEFENSE OF A CORAL ISLAND

JAPANESE DEFENSE OF A CORAL ISLAND

The vastness of the Pacific with its multitudinous small islands presents many problems of defense. The following article is based on excerpts from a translated Japanese tactical treatise involving a study of the dispositions to be made for the defense of a hypothetical coral island. The study contemplates the utilization of field fortifications when landing operations are threatened by an enemy who is superior in air and sea power. There are many points which are not covered in this article, but it is being published as it is, in the hope that it will be of some value.

* * *

a. General

The organization and establishment of positions differs depending on the size of the island, the garrison's forces, weapons, and materiel, the situation of beaches where it is possible for the enemy to land, and many other factors. However, in case the strength of the garrison is comparatively small in relation to the size of the island, if an attempt is made to defend the island by stationing troops all around the shore line, the defense will be weak everywhere. Therefore, it is best to organize defense areas at important places so as to hold securely the important installations, with a large force being held in reserve. The intervals between defense areas should be covered by fire and obstacles should be constructed in these intervals. If necessary, small supporting points between the main defensive areas may be occupied with a part of the forces.

For obstacles within the island, it is necessary to select types of obstacles which will not show in aerial photographs so that the enemy cannot determine our dispositions for defense.

The plan of defense should be to destroy the enemy at the water's edge, but should he land, he will be annihilated by counterattacks.

b. Garrison of Defense Areas

The garrison of the defense areas differs, depending upon the mission, the size of the area occupied, and other considerations. However, on a coral island, ordinarily from one to two companies are necessary for the garrison of a defense area. The frontage assigned varies according to the type, number, etc. of the weapons which are to be located in the defense area, but if two platoons are placed on the front line, one company would be able to hold a front of 550 meters*. If the interval between platoons is covered by the coordinated fire of heavy machine guns from the platoon areas (the interval between platoons being 500 to 600 meters),

*To convert meters to yards add roughly 10 percent to the number of meters.

[REDACTED]

c. Method of Determining Frontage

The frontage assigned to the various units is determined by using density of fire as the standard.

(1) Conditions

Density of fire required for stopping an attack dead--5 shots on one meter of front every minute. Minimum limit of density of fire--3 shots on one meter front every minute. (These include rifle, LMG, and MG).

Rate of fire--rifle (10 shots per minute)
--LMG (150 shots per minute)

The heavy machine gun is used for flank defense. On the front, rifles, LMGs, etc., are used according to a fixed plan, or to fire at will on important targets. The degree of density, however, in each sector is not calculated.

(2) Frontages Covered by Various Units

(a) Squad front covered = 50 to 90 meters
 11 rifles firing 10 rounds per minute = 110 rounds per minute
 1 LMG firing 150 rounds per minute = 150 rounds per minute
 Total = 260 rounds per minute

260 divided by 5 shots per meter per minute = 50 meters
260 divided by 3 shots per meter per minute = 90 meters

Therefore, 50 to 90 meters frontage.

(b) Platoon front covered = 200 to 300 meters
 3 rifle squads on front line - 50×3 = 150 meters
 90×3 = 270 meters
 With heavy grenade squads on front
 line = 200 to 300 meters

(c) Company front covered = 400 to 600 meters
Two platoons on front line - $200 \times 2 = 400$ meters
 $300 \times 2 = 600$ meters

Therefore, 400 to 600 meters frontage.

Garrison Strength

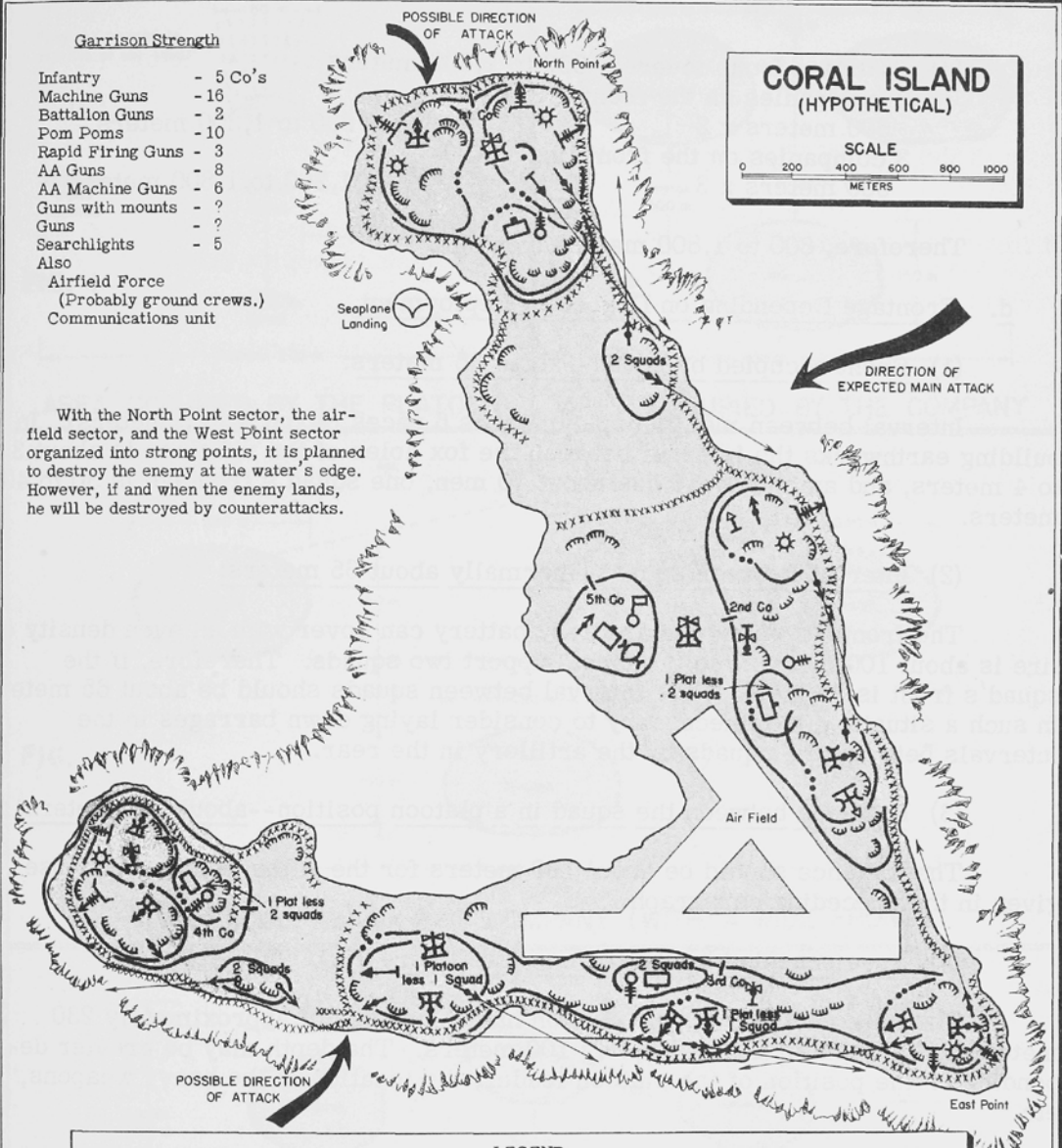
Infantry - 5 Co's
 Machine Guns - 16
 Battalion Guns - 2
 Pom Poms - 10
 Rapid Firing Guns - 3
 AA Guns - 8
 AA Machine Guns - 6
 Guns with mounts - ?
 Guns - ?
 Searchlights - 5
 Also

Airfield Force
 (Probably ground crews.)
 Communications unit

With the North Point sector, the airfield sector, and the West Point sector organized into strong points, it is planned to destroy the enemy at the water's edge. However, if and when the enemy lands, he will be destroyed by counterattacks.

CORAL ISLAND (HYPOTHETICAL)

SCALE
 0 200 400 600 800 1000
 METERS



LEGEND

(Japanese Symbols)

☼ - Aircraft Warning Post.
 xxxx - Barbed Wire
 ~~~~ - Fire Trenches  
 ⚡ - Armored Car Unit  
 ⚡ - Battalion HQ  
 ⚡ - Company Commander

[Symbol] - Reserve Troops  
 [Symbol] - AA Gun Position  
 [Symbol] - AA Machine Gun  
 [Symbol] - Rapid Firing (AT) Gun

[Symbol] - Defense Guns (No. of guns indicated by horizontal lines across arrows.)  
 [Symbol] - Machine Gun  
 [Symbol] - Light Machine Gun  
 [Symbol] - Pom Pom

- 
- (d) Battalion front covered = 800 to 1,800 meters  
2 companies on the front line - 400-600 meters x 2 = 800 to 1,200 meters  
3 companies on the front line - 400-600 meters x 3 = 1,200 to 1,800 meters

Therefore, 800 to 1,800 meters frontage.

d. Frontage Depending on Degree of Deployment

(1) Front occupied by squad--about 35 meters:

Interval between men in deployment is 6 paces (about 4 to 5 meters). In building earthworks the interval between the fox holes of the riflemen is about 3 to 4 meters, and as one squad has about 10 men, one squad's frontage is 30 to 40 meters.

(2) Interval between squads--normally about 65 meters:

The frontage which one artillery battery can cover with an even density of fire is about 100 meters, so it cannot support two squads. Therefore, if the squad's front is 35 meters, the interval between squads should be about 65 meters. In such a situation, it is necessary to consider laying down barrages in the intervals between the squads by the artillery in the rear.

(3) Distance between the squad in a platoon position--about 100 meters:

The distance should be about 100 meters for the same reasons as those given in the preceding paragraph.

(4) Area occupied by the platoon (see figure 1.)

The area occupied by the platoon has a frontage of approximately 230 meters and a depth of approximately 100 meters. The depth may be greater depending on the position of the platoon leader, the location of the heavy weapons, etc.

(5) Area occupied by the company (see figure 2.)

The area occupied by the company has a frontage of approximately 550 meters and a depth of approximately 400 meters.

(6) Area occupied by the company when a wide front is assigned and the interval between the front line platoons is covered by machine guns (see figure 3.)

When there is a wide company front and the interval between the front line platoons is covered by machine guns the company frontage will be approximately 1,000 meters and the depth approximately 400 meters.

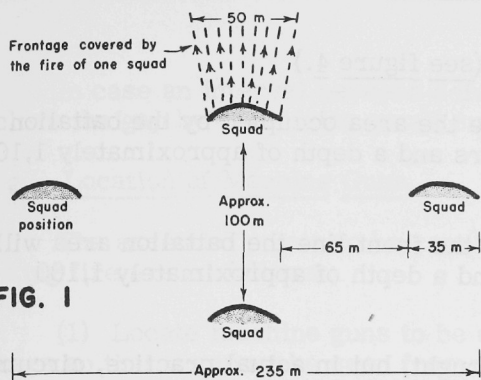


FIG. 1

AREA OCCUPIED BY THE PLATOON

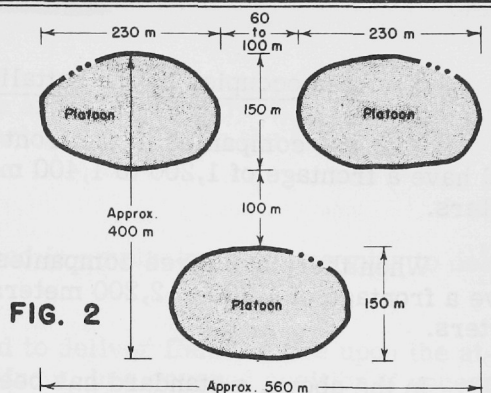


FIG. 2

AREA OCCUPIED BY THE COMPANY

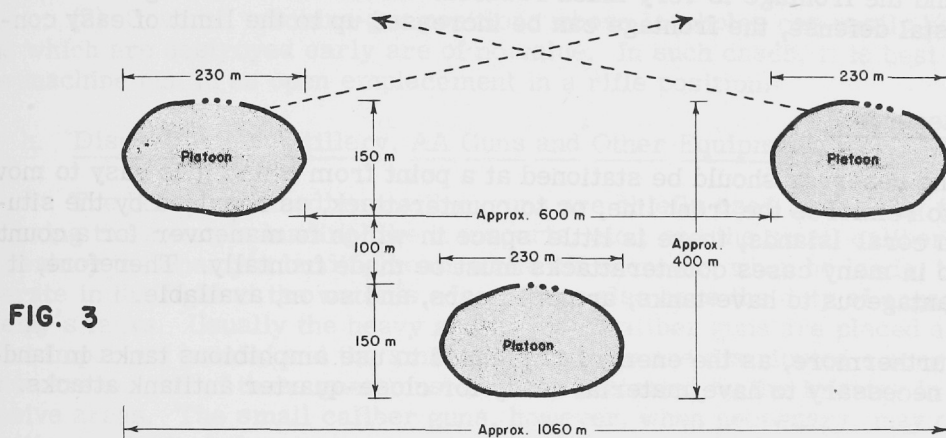


FIG. 3

AREA OCCUPIED BY THE COMPANY (WITH A WIDE FRONT)

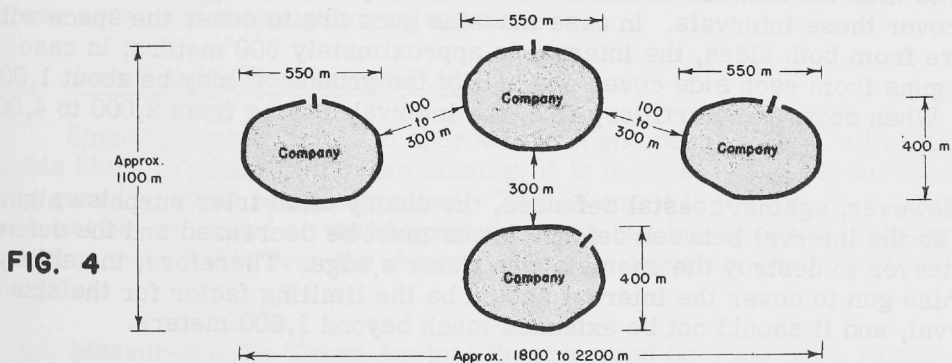


FIG. 4

AREA OCCUPIED BY THE BATTALION



(7) Area occupied by the battalion (see figure 4.)

With two companies in the front line the area occupied by the battalion will have a frontage of 1,200 to 1,400 meters and a depth of approximately 1,100 meters.

When there are three companies in the front line the battalion area will have a frontage of 1,800 to 2,200 meters and a depth of approximately 1,100 meters.

In the above, a standard has been sought, but in actual practice, circumstances will vary so much that it is not possible to follow this standard rigidly. In case there is much dead space, the capabilities of the weapons cannot be fully utilized and the frontage is very much reduced. In the case of firing over water as in coastal defense, the frontage can be increased up to the limit of easy control.

e. Reserves

The reserves should be stationed at a point from which it is easy to move them up to reinforce the front line, or to counterattack, as required by the situation. On coral islands, there is little space in which to maneuver for a counter-attack, so in many cases counterattacks must be made frontally. Therefore, it is very advantageous to have tanks, armored cars, and so on, available.

Furthermore, as the enemy has planned to use amphibious tanks in landing, it is necessary to have material ready for close-quarter antitank attacks.

f. Interval Between Defense Areas

The interval between defense areas will vary with the type of weapons used to cover these intervals. In case machine guns are to cover the space with cross-fire from both sides, the interval is approximately 600 meters; in case machine guns from each side cover one half of the ground, it may be about 1,000 meters. When covered by artillery fire, the interval may be from 2,000 to 4,000 meters.

However, against coastal defenses, the enemy often tries surprise night attacks, so the interval between defense areas must be decreased and the defenders must endeavor to destroy the enemy at the water's edge. Therefore, the ability of the machine gun to cover the interval should be the limiting factor for the size of the interval, and it should not be extended much beyond 1,000 meters.

The enemy's landing must be prevented by blocking the intervals between defense areas with obstacles as well as by covering it with fire. Wire entanglements are commonly used as obstacles, and in areas where it would be easiest for the enemy to land, wire entanglements and land mines are used together. Charged wire entanglements can be used effectively.

[REDACTED]

In case an interval between defense areas is very great, it is necessary to close the gap by organizing small support areas between the defense areas.

g. Location of Machine Guns

The essential points to be considered in emplacing machine guns to deliver flanking fire are as follows:

(1) Locate machine guns to be used to deliver flanking fire upon the attackers so that it cannot be seen from the front, in a covered position if necessary, and so that the loophole cannot be fired on, thus preventing the enemy from advancing upon the position.

(2) Covered machine-gun positions whose loopholes can easily be seen and which are destroyed early are of no value. In such cases, it is best to place the machine gun in an open emplacement in a rifle position.

h. Disposition of Artillery, AA Guns and Other Equipment

The heavy and medium caliber guns are chiefly used in shelling the ships covering the enemy's landing, the transports, etc., and the small caliber guns are to destroy the enemy's landing boats while off shore or, when he lands, to co-operate in the fight at the water's edge. They also have the duty of engaging the enemy's tanks. Usually the heavy and medium caliber guns are placed at the most important points, and the small caliber guns are distributed among the defense areas. All of these guns must be fully protected by the infantry in the defensive areas. The small caliber guns, however, when necessary, may occupy positions outside defense areas, or a part of them may be held in reserve.

It is essential that other important equipment also be placed within the defense areas and thoroughly protected.

i. Location of Observation Posts

Since the enemy plans to approach at high speed at night with highly maneuverable ships to make a surprise landing, it is necessary to keep an especially strict guard to avoid being surprised. To this end it is necessary that the observation net be organized so that important areas can be observed from several directions and so that even the comparatively unimportant areas will not be unwatched.

j. Measures to be Taken Against Bombing and Shelling from Enemy Ships

Coral islands are generally level and it is difficult to utilize the terrain for the protection and concealment of positions and installations. It is most necessary to use camouflage to conceal the positions and the disposition of weapons, etc., and to use dispersal to limit damage. Of course, it is to be expected that there will be strong, permanent installations built to stand up under shelling and bombing, but these cannot be built to meet an emergency. Ones which are strong

[REDACTED]

enough to be proof from bullets and shell fragments may be considered advantageous. Furthermore, the heavy weapons, etc., used for flank defense should have light covers; the other weapons should be uncovered, and completely camouflaged. At the same time reserve positions should be established and, emplacements for the weapons should be constructed near the position to prevent damage during shellings and bombing.