

UNCLASSIFIED



TACTICAL AND TECHNICAL TRENDS

No. 12
November 19, 1942

Prepared for
ARMY GROUND AND AIR FORCES AND SERVICES OF SUPPLY
by
MILITARY INTELLIGENCE SERVICE, WAR DEPARTMENT

Not to be reproduced without authority of A.C. of S., G-2



UNCLASSIFIED

UNCLASSIFIED

CONTENTS

SECTION I

Page

Air

1. German Aircraft Cannons. 1
2. The German Rescue Buoy 2

Antiaircraft

3. Antiaircraft Defense of Motor Columns on the March . . 4
4. Japanese Antiaircraft Guns 6

Antitank

5. Italian 90-mm Multipurpose Gun 8
6. Soviet Antitank Defense 8
7. Armor Penetration of German Antitank Guns 10

Artillery

8. Additional Information on the German Schwere Wurfgerät 40 12
9. German 105-mm Gun 12
10. 305-mm Skoda Coast Defense Gun L/50 13
11. 210-mm German and Italian Howitzers 14
12. German Self-Propelled 150-mm Howitzer 15

Chemical Warfare

13. Japanese Incendiary Bombs. 17
14. Nitrogen Mustard Gases. 18

Engineers

15. Demolition Charge for 20-mm AA/AT Gun 20

Infantry

16. Winter Fighting in Russia. 20
17. German Tactics in the Final Phases at Kharkov. 27

Mecharized Vehicles

18. Crew and Communications of German Mark IV Tank. . . 30
19. Security Measures of a German Armored Division . . . 32

Military Intelligence

20. Some Enemy Practices Used in Interrogating Prisoners of War 33
21. Italian Measures for Concealing a Withdrawal 35

Ordnance

22. Operations of the German Tank Recovery Platoon. . . . 37
23. Propeller-Driven Sleds 37
24. Report of Italian Pilot on "Crows Feet" 40
25. Markings on German Motor-Maintenance Vehicles . . . 40

Quartermaster

26. New German Methods Against Russian Winter Conditions 41

SECTION II SOME EXAMPLES OF KATAKANA (PHONETIC JAPANESE)
USED IN COMMUNICATIONS

All correspondence pertaining to the bulletin should be addressed to the Dissemination Group, M.I.S.

UNCLASSIFIED

UNCLASSIFIED

Other publications of the Military Intelligence Service include:

Intelligence Bulletin, published monthly.

Special Series, published at least once a month, of which "The German Motorized Infantry Regiment" and "The Development of German Defensive Tactics in Cyrenaica--1941" are the most recent.

Campaign Studies, the most recent being "The German Campaign in Norway."

For copies of these publications, apply to the Dissemination Group, Military Intelligence Service, Washington, D.C.

U.S. task forces and overseas theaters of operations may reproduce items from Tactical and Technical Trends provided the classification is maintained and the source is cited.

UNCLASSIFIED

SECTION I

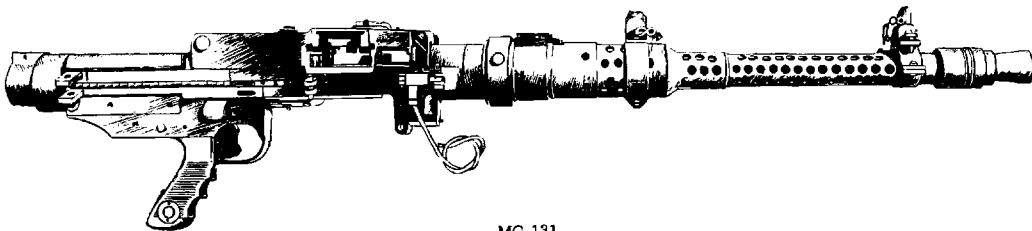
UNCLASSIFIED

AIR

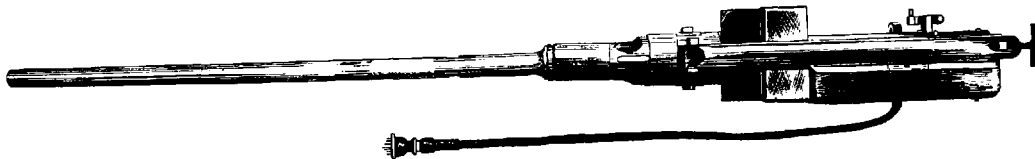
1. GERMAN AIRCRAFT CANNONS

There have been few radical innovations in the design of German small- or rifle-caliber machine guns, since these were developed to a high degree of efficiency before the war. Extensive changes, however, have been made in the design of some of the larger-caliber aircraft guns. While the 15-mm and the 20-mm types are still standard aircraft cannon, the Luftwaffe has brought into limited operational use a 30-mm cannon. It is anticipated that this may be used on late-model planes in the near future.

The MG-131 manufactured by Rheinmetal Borsig and the 151 patented by Mauser are among the most interesting developments in German medium-caliber armament. The accompanying sketches illustrate these types. These are commonly called machine guns because of their high rate of fire.



MG 131



MG 151

a. The MG-131

The MG-131 is a 13-mm air-cooled, recoil-operated gun, the ammunition being fed in a disintegrating metal, open-sided link belt, which is both light and flexible. This gun is distinctive in that the cartridges are detonated electrically. The current is broken when the gun is pointed toward the tail, wings, etc., and reestablished when the gun is aimed in the clear. This compact, light gun is of excellent workmanship and has a bore large enough to make possible the design of efficient AP and HE ammunition. The theoretical rate of fire is approximately 900 rounds per minute.

UNCLASSIFIED

UNCLASSIFIED

b. The MG-151

The MG-151 types (15-mm and 20-mm), found both in fixed and turret mountings, are notable for the simplicity of their mechanism and their high rate of fire. Although they are cocked and fired electrically, provision is made for hand cocking for servicing purposes and in emergencies. Ammunition for these guns is carried in a disintegrating metal belt similar to that used on the MG-131. A small electric lamp on the control board automatically lights when the gun is cocked, and indicates that it is ready to fire. For the 15-mm model the theoretical rate of fire is about 740 rounds per minute for AP, and 680 rounds per minute for HE. Rates for the 20-mm version are: AP, 800 rpm ; HE, 750 rpm.

2. THE GERMAN RESCUE BUOY

The Germans have developed de luxe buoys for flyers of the Luftwaffe brought down while operating over the English Channel. The Rettungsboje was constructed under the direction of the German Ministry of Air Navigation in 1941 at the suggestion of Generaloberst Ernest Udet. These buoys, called Generalluftzeugmeister after their sponsor, are anchored far offshore. They have saved many German airmen that ships or coastal planes might have been too late to rescue.

The buoys are of square or hexagonal construction and have a floor space of about 43 square feet with an 8-foot cabin rising above the float. On the upper deck of this cabin, there is an oval turret 6 feet high with a signal mast carrying a wireless antenna. Tube railings to which the distressed flyers may cling run along the outer circumference below and above the water line. A ladder leads up to the turret, in which there is a door opening into the cabin below.

A 320-foot red and yellow striped rope anchors the buoy at a fixed location, but allows a limited drift, thereby indicating the direction of the current to aircraft in distress. The buoy is painted light yellow above the water line, and red crosses against white oval backgrounds are painted on each side of the turret.

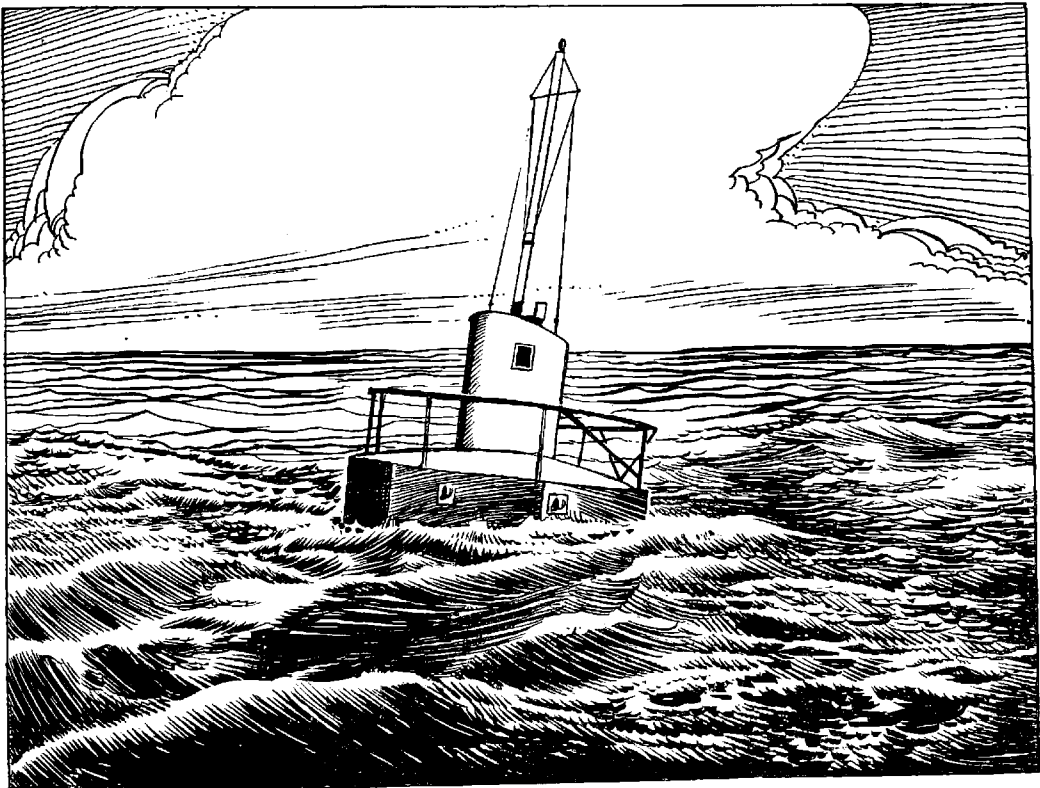
The cabin accommodates four persons comfortably for several days, and in an emergency, the crews of several aircraft can be taken care of. It is electrically lighted by storage batteries, but in case of a breakdown kerosene lamps or other lighting devices are provided. There are two double-deck beds and adequate cupboard space for first-aid equipment, dry clothing and shoes, emergency rations, and a water supply. Hot food may be prepared on an alcohol stove. Cognac to relieve chill and cigarettes to quiet the nerves are also provided. Games, stationery, playing cards, etc. afford diversion until rescue is effected. Depleted supplies are always immediately replaced upon the arrival of the rescue ship.

UNCLASSIFIED

UNCLASSIFIED

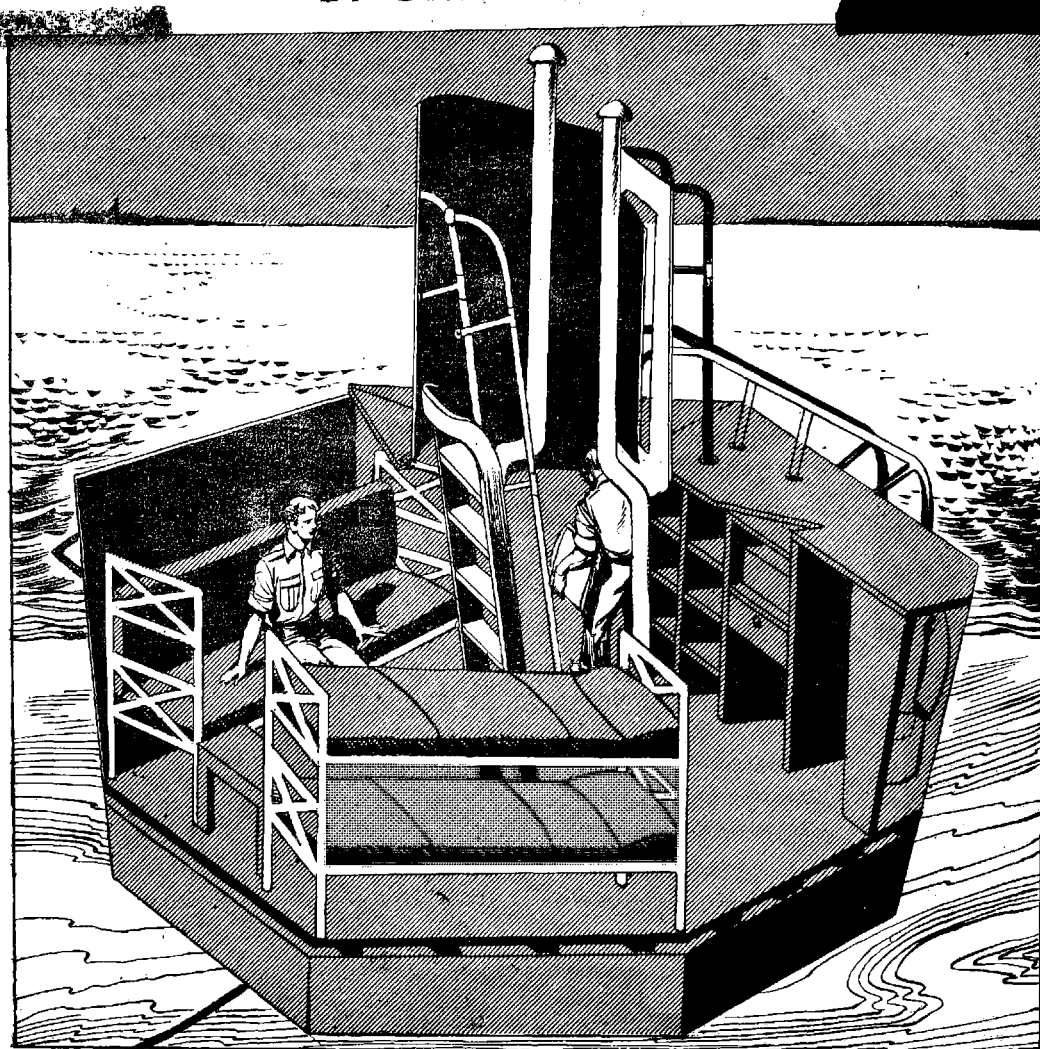
A tubular lifeboat is available for transferring the downed aviators from the buoy to the ship.

Signalling is accomplished by hoisting a black anchor ball and a yellow and red striped flag on the mast during the day. At night, red and white lights in the turret indicate that rescued men are on board. A white anchor light on the mast is visible for 3,000 feet or more. SOS signals giving the location of the buoy are automatically sent out by an emergency wireless transmitter. Signal pistols with red and white lights, white-light parachute flares, or a smoke, distress-signalling apparatus complete the signalling equipment. Other equipment includes plugs to stop up bullet holes in the walls of the cabin and a pump for the expulsion of seepage. The accompanying sketches illustrate these buoys.



UNCLASSIFIED

UNCLASSIFIED



ANTI-AIRCRAFT

3. ANTI-AIRCRAFT DEFENSE OF MOTOR COLUMNS ON THE MARCH

The following is an extract from a Russian publication on the organization of anti-aircraft defense of motor columns on the march.

* * *

Enemy reconnaissance is maintained by scout plane patrols approximately 20 to 35 miles from the advance elements and by timely establishment of stationary posts of air observation along the route of march. The stationary posts are provided with radio and other means of communication.

Air observation details are usually attached to the security detachments of the motor column.

In order to cover the movement of the motor column, pursuit aviation is

UNCLASSIFIED

UNCLASSIFIED

used either en route or at specific points, such as crossings and in defiles.

Pursuit aviation covers the motor column, patrolling at different altitudes over the region of its movement. Under conditions in which enemy raids are imminent and the information service is reliably organized, it is sometimes possible to place pursuit aviation in ambush near the route of the motor column.

One squadron of pursuit planes is capable of covering parallel columns along several roads on a front of 10 to 14 miles. If the front of the movement is wider, it is best to echelon the motor columns, allotting the pursuit aviation to one and additional antiaircraft artillery to the other.

Antiaircraft artillery is assigned to cover troops and motor transport along their entire route. If there is insufficient antiaircraft artillery, it is placed on sectors of the road most vulnerable to air assault, i.e., open terrain, crossings, or defiles. The batteries must be prepared for action and ready to open fire the moment the motor columns arrive.

Antiaircraft and heavy machine guns are used for covering troop motor columns against attack planes, dive-bombers, and scout planes of the enemy.

The distribution of antiaircraft machine guns is such that the whole motor column may be covered by their fire. These machine guns mounted in trucks move in the motor column at a distance of 1,200 to 1,800 feet from each other, always ready to open fire.

In transporting troops, motorized antiaircraft units manned by troops of the column, are used for air defense. Taking into consideration that many such units may be necessary, antiaircraft defense is organized along the march route as economically as possible.

If gas is sprayed from low altitudes, the motor column must leave the poisoned area and halt. In such cases, the drivers take measures to conceal their vehicles and then conduct a preliminary decontamination of the materiel and cargo. In case of heavy contamination of the vehicle surfaces, the canvas covering and the cargo must be taken off immediately and left on the side of the road, and the cargo covered with a new tarpaulin.

Large forests on the march route may be subjected to contamination prior to the time the motor column reaches them. Drops of the gas remain on the branches of the trees and get on the surface of the vehicles.

When contaminated forests are discovered, the march route is altered or the column stopped until decontamination of the sector has been effected.

As a rule, aviation contaminates forest roads from low altitudes, and consequently roads located one-half or one mile to the side of the contaminated area are usually not affected. These alternate roads are less convenient, but they often save time and effort otherwise employed in decontamination.

UNCLASSIFIED

UNCLASSIFIED

Dust from a motor column moving in a contaminated area is full of minute drops of gas. These drops, together with the dust, are carried in the air and are capable of producing casualties. Therefore, for the protection of personnel against gas, in addition to putting on gas masks, the windows of the cabs must be shut tightly and the distance between the vehicles must be maintained at 30 to 40 yards. For 2 miles after passing the contaminated area, the increased interval must be maintained.

4. JAPANESE ANTIAIRCRAFT GUNS

The following is a preliminary report based on recent examination of captured Japanese antiaircraft artillery weapons.

* * *

a. 75-mm AA Guns

The Japanese had three AA gun batteries of four guns each emplaced around their flying field and installations. They were placed in a generally triangular formation about 4,500 yards on a side. These guns were 75-mm on navy pedestal mounts. They have 360° traverse and 75° elevation. They fire HE shell with 30-second mechanical time and percussion fuzes.

There were no directors. At each position there was a 68-inch base coincidence range finder, navy type. Each gun has two telescopic sights mounted one on each side, with traversing handwheel on the right and elevating handwheel on the left. Lateral deflection, vertical deflection, slant range, and super-elevation are all set on the series of drums, disks, and dials on the left side of the mount. The lateral deflection drum turns on a spiral and the scale is graduated from 0 to 200. The slant-range drum has two scales; the outer scale is graduated from 0 to 7,000; the inner scale has a graduation of 100 opposite the 0 on the outer scale, and 300 opposite 6,000 on the outer scale. This range drum is rotated by a small handwheel. Inside the range drum is a disk which is rotated by another small handwheel which also moves a pointer laterally as the disk rotates. On the disk, covering about 1/6th of the surface, are curves graduated from 500 to 5,000 in units of 500, believed to be superelevation curves. All of this moves both lateral and vertical sights as the drums and disk move. In addition there is what appears to be an open sight mounted on a drum. This drum is graduated from 0 to 100 in each direction. The handwheel which turns this drum elevates or depresses the vertical sight only.

There was no fuze setter such as ours. There were two hand tools, one similar to a pair of long pliers with tits on each end which fit in the two slots on the bottom ring of the fuze, below the graduations. The other tool was shaped like a truncated cone, with handles on each side. It had a slot in one side which fits over the lug protruding from the side of the fuze. The fuze was set by holding with the first tool and rotating the second. It is not clear where the fuze

UNCLASSIFIED

UNCLASSIFIED

setting was obtained. It may be from the inner scale on the range drum which was graduated from 100 to 300. No charts were found which would seem to be used for obtaining fuze setting.

b. AA Machine Gun, Caliber .50

Near the gun position on the beach was a Japanese machine gun, caliber .50, air-cooled and gas-operated. It was fed by semicircular clips holding 30 rounds each. Both ball and tracer ammunition was found. The machine gun had a forward area sight, oval in shape, about 5 inches across by 3 inches high, with a small oval in the center about 1 inch across by 0.6 inch high. The vertical and lateral wires in this sight went all the way across, while the diagonal wires on each side went only from the outer to the inner oval. The rear sight was a small vertical rod with a ball tip.

c. 25-mm Gun

In a separate position along the beach was a pompom, about 25-mm* with three barrels. This was the newest and most modern AA equipment seen. The sighting system was on the same general principles as that of the 75-mm guns. There were two telescopic sights, one on each side. All other sighting equipment was on the left side. Lateral and vertical deflection are set on a kind of hemisphere. The lateral handwheel rotates the hemisphere; graduations around the lower edge are from 0 to 180 in each direction. There is a slot about 1/2 inch wide up one side, across the top, and down to the other side of the hemisphere; in this slot, a kind of streamlined, elongated bird sight slides. The slot is graduated from 0 at the top to 50 on each side. Time did not permit a thorough examination of this sighting equipment, so that it is not thoroughly understood. Range is set by either of two handwheels. One rotates a drum with scale graduated from 500 to 3,800 in red numerals. The other rotates a drum with scale graduated from 0 to 3,800 in blue numerals. The guns are fed by clips which hold about 15 or 20 rounds AP and tracer.

In operations against the Japanese in this theater, our fighters have reported accurate AA gun fire up to about 12,000 ft. A hurried study of this 75-mm AA gun equipment would seem to indicate that this is about the limit of accurate fire with this equipment. Captured Japanese aviators have expressed wonder and admiration of the accurate high-altitude AA gunfire of the Americans. One 90-mm AA gun battery shot down a Japanese bomber at 27,400 feet altitude.

* Although reported as about 25-mm, it is possible that the gun is a standard Japanese 20-mm.

UNCLASSIFIED

ANTITANK

5. ITALIAN 90-MM MULTIPURPOSE GUN

Shortly before the beginning of the last British offensive in Egypt, the ~~Italians~~ put into service a 90-mm multipurpose gun, whose muzzle velocity, range, and weight were given in the summary of Italian weapons in Tactical and Technical Trends No. 11, p. 45. It is now known that the length of bore is 53 calibers rather than 50, and that the practical rate of fire is 15 to 20 rounds per minute.

The gun has a steel monobloc barrel with a detachable breech ring, allowing the barrel to be changed. The weight in action is given as 11,220 pounds.

Normally, the gun is tractor-drawn on a four-wheeled Lancia Ro trailer, although a self-propelled model, utilizing a standard Italian tank chassis, has also been reported. In the case of the latter model, the tracks of the tank are apparently locked before the gun opens fire.

Since the characteristics of this gun are similar to those of the German 88-mm weapon, a correspondingly similar tactical employment may also be expected.

6. SOVIET ANTITANK DEFENSE

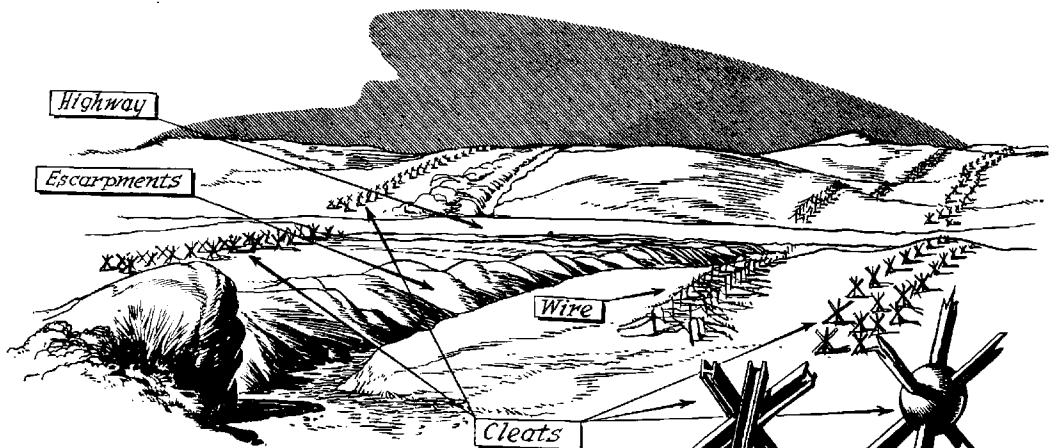
The following observations and sketches on passive Soviet antitank defenses were made by U.S. Military Attaches after a visit to the Gzhatsk-Vyazma front during the latter part of June 1942.

*

*

*

On every possible defensive position the Soviets have constructed barriers, barbed-wire barricades, escarpments, tank traps, and tri-railed cleats. All of these obstacles are supported by fortified dugouts and pillboxes of various sizes, so placed as to cover the approaches of the enemy units, which would be canalized by the barricades.



UNCLASSIFIED

UNCLASSIFIED

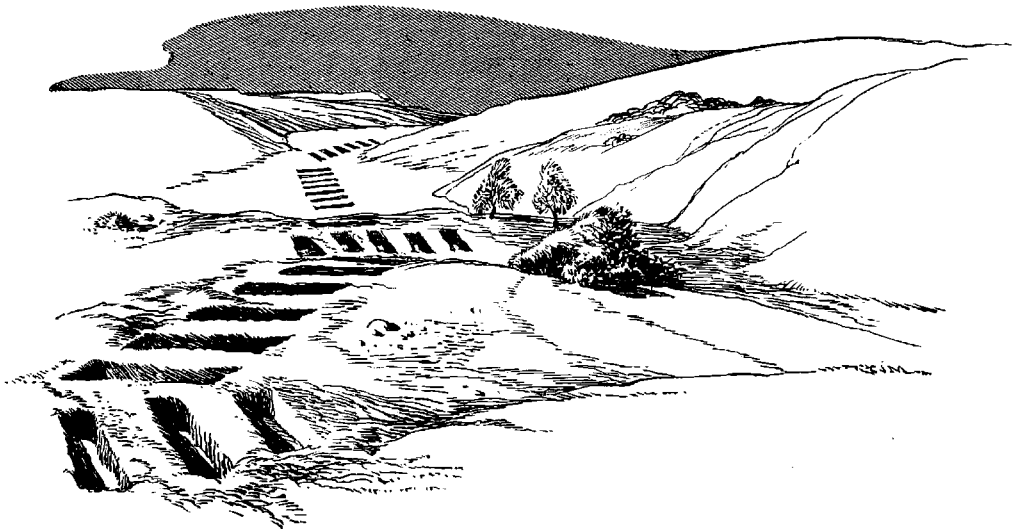
The main antitank escarpment extends perpendicularly from the road, either 200 to 300 yards out, or to a secure flank such as a woods or swamp. The ditch usually follows the contour of the terrain and is normally located on a forward slope so that the rear wall rises far above the front wall. The rear (Soviet) bank of a stream affords an excellent site for an escarpment. Escarpments are dug as nearly level as possible so as to retain water from the snows, rains, or swamps. Dirt excavated from the ditch is thrown to the rear ramp. The escarpment usually is dug about 10 feet deep and about 20 feet wide.

In front of the escarpment is usually placed a barbed-wire barricade of the same length and about 3 feet high and 10 feet wide. This wire is designed principally to keep enemy infantry from utilizing the escarpment as a trench.

The Soviets construct single or multiple rows of tri-railed or 6-inch steel I beams, or 3- to 4-inch pipes welded or bolted together and, depending on the terrain, place them in front or in the rear of escarpments, or sometimes in isolated positions. The advantage of this type of barricade is that it can be prefabricated in the rear and brought up and merely dumped into position.

Rows of posts in checkerboard fashion, 3 feet high and 10 feet wide, strengthen the system. In some areas entire groves of trees were cut down and cleared away, leaving only 3-foot stumps.

Another type of antitank obstacle (shown in sketch below) consisted of parallel ditches about 3 feet deep, 3 feet wide, and 30 feet long, and so spaced as to deny tanks sufficient clearance. Groups of such ditches would be placed at varying angles to neighboring groups, their purpose being to cause tanks to become hung on the edges.



Antitank obstacles and ditches are constructed under the supervision of engineers, but troops of the communication zone and civilians are used to do the

UNCLASSIFIED

digging.. There is no special equipment for digging, and it is all by hand.

7. ARMOR PENETRATION OF GERMAN ANTITANK GUNS

a. General

The following figures show the armor-piercing capabilities of the three standard German antitank guns, the 37-mm, the 50-mm, and the 88-mm, as well as of the new long-barreled 75-mm gun which is now replacing the old short-barreled 75-mm gun on the Mark IV tank and the Sturmgeschütz (self-propelled assault artillery). These figures are based on performance of an AP projectile against homogenous armor, and supersede previously published information in Tactical and Technical Trends.

b. 37-mm Antitank Gun

<u>Range (yards)</u>	<u>Penetration of Normal AP Projectile (inches)</u>	
	(at 90°)	(at 60°)
0	2.42	1.85
250	2.17	1.63
500	1.87	1.44
750	1.67	1.24
1,000	1.44	1.06
1,250	1.26	.91
1,500	1.10	.81

<u>Range (yards)</u>	<u>Penetration of Special AP 40 Projectile (inches)</u>	
	(at 90°)	(at 60°)
0	3.43	2.93
100	3.13	2.68
200	2.83	2.42
300	2.58	2.19
400	2.30	1.95

c. 50-mm Antitank Gun

(The new 50-mm gun in the Mark III tank has approximately the same characteristics.)

Range (yards)Penetration (inches)

(at 90°) (at 60°)

0	3.43	2.91
250	3.27	2.76
500	3.07	2.56
750	2.87	2.36
1,000	2.64	2.20
1,250	2.44	2.01
1,500	2.24	1.85

d. 88-mm Antiaircraft-Antitank GunRange (yards)Penetration (inches)

(at 90°) (at 60°)

1,000	4.72	4.21
1,500	4.17	3.66
2,000	3.66	3.15

e. New Long-Barreled 75-mm Gun in Mark IV Tank and SturmgeschützRange (yards)Penetration (inches)

(at 90°) (at 60°)

0	4.72	3.86
500	4.25	3.50
1,000	3.82	3.11
1,500	3.43	2.76
2,000	3.03	2.44

The length of the gun is given as 43 calibers.

8. ADDITIONAL INFORMATION ON THE GERMAN SCHWERE WURFGERAT 40

Tactical and Technical Trends, No. 8, p. 28, contained preliminary information on this new type of German bomb-thrower. Additional material from Russia includes the following details:

The HE projectile, which weighs 181 pounds, has a diameter of 11 inches and a maximum range of 2,088 yards, while the incendiary projectile has a diameter of 12 inches and a maximum range of 2,200 yards. The burst of the incendiary projectile is effective over an area of approximately 75 feet by 45 feet, and the burning petroleum in this area is reported to ignite any inflammable material to a height of 8 or 10 feet above the ground.

The Model 40 Wurfgerät is fired from a stationary mount, with 4 projectors to a mount. These mounts are normally arranged either in line or in checkerboard formation. The minimum distance between mounts is 6 feet, and between rows of mounts, 15 feet. Behind each row of mounts a strip about a yard wide is cleared of vegetation to prevent a possible fire caused by the rocket propulsion system.

The ignition of the projectiles is so arranged as to secure a 2-second interval between rounds. When the mounts are arranged in a series of rows, the last row is fired first.

Since fire is relatively inaccurate, there is a large zone of dispersion, making the weapon useful only for area firing.

Comment: This rectangular pattern of burst may be due to the fact that the projectile, with its blunt nose, does not penetrate, but bounces forward for several yards after impact, giving a pattern of burst which is longer than it is wide.

9. GERMAN 105-MM GUN

A recent report on the German 105-mm gun, called the 10-cm Kanone 18, gives some details not included in the summary of German weapons in Tactical and Technical Trends, No. 9, p. 46. This gun is a standard medium artillery piece, and the split-trail carriage is the same as that used with another German medium artillery weapon, the 150-mm howitzer. It may be either horse-drawn or split into two loads and motor-drawn.

Other characteristics are as follows:

Rate of fire	6 rpm
Length of bore	40 cals
Weight in action	11,220 lbs
Elevation	-3° to + 50°
Traverse	60°
Weight of HE shell	33 1/2 lbs

The ballistic characteristics for the HE shell are given in the following table:

<u>Charge</u>	<u>Maximum Range (yds)</u>	<u>Time of Flight (secs)</u>	<u>50% Zone (yds)</u>	
			<u>Length</u>	<u>Breadth</u>
Small	13,800	52	106	17
Medium	17,200	62	117	20
Large	20,600	70	128	22

The figure 208 was originally reported for the "50% zone, length, large charge," but 128 has been substituted as being more probable.

10. 305-MM SKODA COAST DEFENSE GUN L/50

The particulars and general description of the Skoda 305-mm CD gun L/50 have been received and are presented here for general information.

The 305-mm CD gun is constructed to meet all modern coast defense requirements. There are three particulars in which this gun is outstanding.

(a) It is long range and very accurate.

(b) The turret has a wide traversing arc, easily and speedily controlled by a specially constructed, electrically operated traversing gear, and hydraulic universal transmission. By means of this apparatus, the revolving speed of the turret is easily controlled, and the movement of a target can be accurately followed even at the longest ranges by using the hand-control wheel of the traversing gear.

(c) The elevating gear is likewise operated by an electric motor and universal transmission, giving easy and rapid control at long range. Again, a moving target can be accurately followed and covered by using the hand-control wheel.

The movement of the barrel into the loading position and back again takes place at high speed. This, in addition to the rapid feeding, loading, and firing devices, insures a very high rate of fire.

The gun is mounted in a revolving turret, which rests on the revolving half of a ball-race and is supported by a circular, walled platform. The fixed lower half of the race rests on an anchor ring bolted to the concrete bed. Between the armored wall of the support platform and the inner side of the surrounding concrete wall, there is a gallery in which runs the turret ammunition trolley. The revolving cupola rests on the top of this walled support platform, on a system of leaf springs which run around the whole circumference, so that, if hit by an enemy shell, the cupola descends upon the circular outer mantlet, and strain is taken off the support platform.

UNCLASSIFIED

Inside the turret itself are two platforms dividing the turret into three compartments, one above the other.

The particulars of this gun follow:

Weight of shell	925 lbs
Muzzle velocity	2,788 f/s
Maximum range	43,600 yds
Caliber	305 mm
Length of barrel	50 cals
Traverse	340°
Elevation	-4° to +45°
Maximum traversing speed	1/2° in 1 sec
Maximum elevating speed	4° in 1 sec

Weights:

Barrel and cradle	79,200 lbs
Armored cupola	638,000 lbs
Base of turret	264,000 lbs
Revolving turret	1,058,200 lbs
Mantlet and armorplate in gallery	391,600 lbs
Anchorage	145,200 lbs
Total weight of turret	1,595,000 lbs

11. 210-MM GERMAN AND ITALIAN HOWITZERS

On several occasions the Axis have used 210-mm howitzers in the North African campaigns. There are four known German howitzers of this caliber, and one Italian. Particulars of the Italian howitzer and the most modern of the German equipment are given below for comparison.

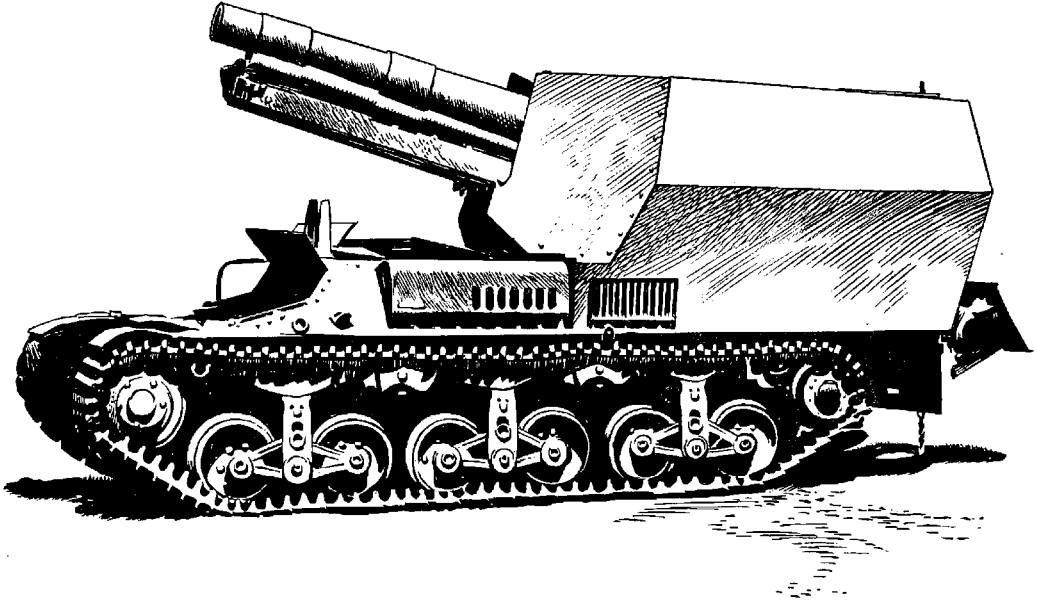
	<u>Italian 210-mm Howitzer</u>	<u>German 210-mm Mörser 18 Howitzer</u>
Length of bore	22 cals	25 to 30 cals
Muzzle velocity	1,730 f/s	1,815 f/s
Weight of shell	225 lbs	264 lbs
Maximum range	17,500 yds	18,300 yds
Elevation	70°	72°
Traverse	75°	360°
Weight in action	17.4 tons	13.2 tons
Weight in draft	20.9 tons	25.3 tons with platform
Method of transport		In two loads towed by a semitracked tractor.

UNCLASSIFIED

UNCLASSIFIED

12. GERMAN SELF-PROPELLED 150-MM HOWITZER

The 150-mm medium howitzer, sFH 13, has been provided with a self-propelled mounting, the chassis of the French tracteur blindé 38L, made by Lorraine.



The sFH 13 is equipment of the last war, superseded in first-line units by the 15-cm sFH 18. Particulars of the gun are:

Caliber	149.7 mm
Muzzle velocity	1,250 f/s
Maximum range	9,300 yds
Length of bore	17 cals
Number of grooves	36
Elevation	+5° to +45°
Weight of projectile	92.4 lbs

The particulars of the mount 38L are: length, 14 feet; width, 5 feet 2 inches; weight, 7 1/2 tons; engine, 70 horsepower; maximum speed, 22 miles per hour.

The sketch above shows the following details:

- (a) A fixed gun-house of not very thick plate
- (b) A limited traverse of not more than about 4 degrees
- (c) A spade on the rear of the hull that can be let down to take recoil stresses.

UNCLASSIFIED

It is notable that in this case an equipment firing a 92-lb shell to a maximum range of 9,300 yards has been mounted on a hull weighing no more than 7 1/2 tons.

This is another case in which the Germans have utilized a standard field gun to make self-propelled artillery. A recent picture shows another 150-mm howitzer, the 15-cm SIG 33, on a German Mark II chassis with the gun on a special mounting built into the hull. There is a three-sided shield no higher than the normal tank, instead of the very high box-like structure for the self-propelled sFH 13.

UNCLASSIFIED

13. JAPANESE INCENDIARY BOMBS

Examination of incendiary bombs dropped by the Japanese over Rangoon showed that the most common type contained, as incendiary filling, a large number of rubber pellets impregnated with phosphorus.

The bomb is 3 feet 4 inches long, 7 1/4 inches wide at the nose, and 9 inches wide at the fin; the latter is 1 foot 3 inches long by 9 inches wide; the cylinder containing the pellets is 7 inches wide and the casing 1/2 inch thick; the pellets are gray in color, 1 1/16 inches long and 1 inch in diameter.

The bomb has a high explosive charge in the nose cap. There is also a steel exploder tube running down the inside of the bomb body. The fuze is instantaneous, and, on explosion, a high fragmentation effect is obtained, the splinters from the nose cap having a very flat trajectory. Pellets are widely scattered, some having been located as far as 50 yards from the point of impact. On explosion of the bomb, these incendiary pellets ignite immediately or within a minute or two of falling. Each pellet produced a flame 4 to 6 inches high burning at a comparatively low temperature. They burn from 5 to 7 minutes, giving off a gray smoke, smelling slightly of burning rubber.

The pellets can be temporarily extinguished by throwing water over them or by covering with sand or earth. Since the pellets ignite after the water has evaporated or the sand has been removed, they should be picked up as soon as possible and placed in a bucket of water or other container and emptied on some open ground; they should be thinly spread out to allow them to burn out harmlessly. Any instrument except the bare hands or highly inflammable material may be used for picking up the pellets; very effective and cheap instruments can be made from old kerosene cans shaped into scoops, pincers, or tongs. In case of necessity the pellets can be picked up by means of two pieces of wood used as "chopsticks."

Sometimes a number of pellets remain in the bomb crater. They should be allowed to burn themselves out if the crater is in the open; the crater should then be widened, using a shovel or other tool in order to expose any further pellets, and these should be dealt with as explained above. If near inflammable material, the crater should be doused with water; the pellets can then be dug out and removed while the earth is still wet.

The pellets should not be allowed to come in contact with any part of the body; they should not be stepped upon as they may burn even through boots or shoes. Fragments of the bomb should not be touched since they will probably be covered with phosphorus, and tools used in dealing with the bomb should be thoroughly washed after use.

The introduction of this phosphorus bomb does not render the stirrup pump any less effective; where fires have been started, the stirrup pump can be brought into operation to control them, and the water will also temporarily extinguish the pellets until they can be picked up. Extreme caution however must be exercised by the No. 1 of the stirrup-pump party in approaching fires caused by phosphorus bombs, in order to avoid injury to himself through crawling over the

UNCLASSIFIED

pellets lying on the floor. It must be realized that the pellets are dangerous to handle or touch even when temporarily extinguished and apparently inactive.

14. NITROGEN MUSTARD GASES*

Germany is known to possess an almost odorless gas suitable for surprise attack by inclusion in an HE bombardment from the ground or from the air. Documentary evidence shows that the Germans refer to this gas as "Green Ring I." Here it will be called nitrogen mustard. It is only one of several gases with similar characteristics.

It is very probable that Japan also possesses quantities of a similar gas. The plural term "nitrogen mustards" might be used to include this whole group of odorless gases.

a. Physical Properties

In general, the nitrogen mustards are either liquids or solids with low melting points, pale yellow to colorless, and practically without odor. Their volatility varies, some being less volatile than mustard and some more volatile. They are fairly readily hydrolysed by water, but products of hydrolysis are toxic. The toxicological properties of this series of compounds are essentially similar.

Nitrogen mustard is a colorless liquid when pure, with a faint fishy odor; it is also sometimes described as smelling like soap grease. Experiments have shown that its odor is quite marked if the ground contamination is heavy. However, under ideal conditions, even low concentrations can be detected by smell.

Nitrogen mustard has a low freezing point and might therefore be used for high-altitude bombing or spray (if thickened). It is three or four times as volatile as mustard and therefore less persistent. Since higher concentrations are possible, it is more dangerous as a gas, though not as powerful as a vesicant. It would require special stabilization if used in hot climates .

b. Detection

The principal danger from the nitrogen mustards is considered to be that their vapors are not easily detected by smell. Munitions with a high bursting charge (20 to 30 percent HE) and containing these gases are indistinguishable from HE on detonation. The nitrogen mustard survives the detonation. By high-altitude spraying--day or night--troops might be subjected to nitrogen mustard

* The following information on odorless nitrogen mustard gases has been compiled by the Intelligence Unit of the Chemical Warfare Service.

UNCLASSIFIED

without knowing it. Again, troops might move into an area recently contaminated with nitrogen mustard without suspecting its presence; or a change of wind or temperature might result in a dangerous concentration undetectable by smell.

Under such conditions, chemical detection becomes necessary. There are three methods of detection now available.

(1) Detector paint or paper changes to bright red when in contact with liquid HS, M-1, ED, or nitrogen mustard, but is not affected by their vapors. By exposing the detector widely and making frequent inspection, sprayed vesicants are readily detected.

(2) The vapor-detector kit M4 will detect the presence of vapors of the various gases. It will be of special value in cases of odorless or non-irritant toxic gases in the presence of other odors, or in establishing the absence of any poison gas.

(3) Crayon vesicant detectors are useful in detecting definite spots of vesicants on materiel, etc. A special crayon for nitrogen mustards is being developed, although it is not yet standardized.

c. Physiological Effect

The effects of nitrogen mustard on the body are similar to those produced by HS. It is more dangerous to the eyes but less vesicant on the skin. Blindness may result in from 1 to 6 hours, blistering action may be delayed 24 hours, and death due to inhalation may be delayed as much as 4 days.

d. Protection

The gas mask affords a high degree of protection to face and lungs, while oilskin, rubber, and leather give approximately the same degree of protection as against mustard gas. Standard ointments and impregnated clothing relying on chlorination are not as effective as against HS. The greatest danger from this gas lies in the fact that eyes and lungs may be damaged before the presence of the gas is suspected, if reliance is placed on smell alone.

e. Decontamination

The best skin decontaminant for nitrogen mustard is soap and water. Clothing can be decontaminated by aeration and/or washing by the standard laundry method. The protective ointments are also effective.

For decontamination of materiel and ground, the standard methods of bleaching (see FM 21-40 par. 25 (e) (3)), boiling water, or swabbing with gasoline are effective.

15. DEMOLITION CHARGE FOR 20-MM AA/AT GUN

A German document captured in the Middle East states that the standard demolition charge for the 20-mm dual-purpose guns (models 30 and 38) consists of 20 special cartridges placed on the magazine feedway and plugged by means of sandbags. These cartridges contain a 3 1/2-ounce picric or TNT charge. The whole charge is fired by two standard "short" demolition sets, each consisting of a detonator and holder, 3 feet 3 inches of safety fuze, an igniter adapter, and an igniter. These demolition sets have a delay of 100 seconds. The two igniters are fired simultaneously.

Double ignition is provided in order to lessen the chances of a misfire.

INFANTRY

16. WINTER FIGHTING IN RUSSIA

The following article has been drawn from Russian sources and gives some information on certain aspects of winter fighting in Russia, but it should be remembered that this article refers to only one sector and that some of the comments concerning tactics as well as equipment might not hold true for other sectors of the front.

In the Mozhaisk area, around which the fighting described below took place, snow was lying about 3 feet deep in the open, and slightly more in the forest. The weather was very cold, with temperatures sometimes reaching -40 degrees Centigrade (-40 degrees Fahrenheit).

The ice on the Dnieper river near Vyazma and on the Moskva river near Mozhaisk, was thick enough to hold light tanks and artillery. Even heavy tanks could cross by using wide wooden tracks laid on the ice.

Because of the deep snow, infantry were able to move off roads and trails only with difficulty, medium and heavy tanks were barely able to get across country, and cavalry and artillery were confined to the immediate proximity of roads and tracks. Operations were consequently tied to existing communications, and very narrow frontages were employed.

Roads had to be constantly cleared of snow, and even parts of the broad Moscow-Minsk highway could be kept cleared only enough to permit two-way traffic.

Under such conditions, the Russians use some special ski troops, but these were not attached to every unit, and certain divisions operating in the Mozhaisk sector did not have them. Part of each infantry regiment, as well as the division motorized company, however, were trained to operate on skis.

The German organization included one trained ski company in each battalion and one platoon in every other company. This system was apparently

UNCLASSIFIED

not put into practice, for German skiers were few and poorly trained.

Since many Russians are accustomed to skiing before they are called up, 14 days are allowed for training the normal infantry soldier to operate on skis. The specialist ski troops are given a course of 2 months.

It is reported that during their initial advance the Germans employed a great number of motorcycles. During the winter operations, these were no longer in evidence, although great use was made of bicycles.

The Russian Fifth Army in this sector was operating astride the Mozhaishk-Smolensk road, on a front of about 35 miles, and its normal disposition was with six divisions forward and four in reserve. The division astride the main road worked on a frontage of about 3 1/2 miles, and the normal battalion frontage was about 1,100 yards. Since the advance was normally made along the roads and tracks, actual contact was usually on a very narrow front.

In general, the Russians sought to pin down the enemy garrison by fire, while their main infantry force came forward to finish off the defenders.

They always attempted to gain complete surprise when using these tactics, one of their objects being to deny the Germans time to set fire to buildings. Since surprise was considered so essential, ski parties were rarely accompanied by armored vehicles.

The ski parties were always well-supplied with Tommy guns, and frequently with machine guns and light mortars.

The heavy and medium mortars and antitank guns, pulled on small sleds, were also used. At a later stage medium or heavy tanks were sometimes brought up, either to help forward the main infantry attack or to extricate ski parties which had got into difficulties.

Although the Russians carried out frequent operations by night, the Germans, possibly because they previously had heavy casualties among personnel especially trained for night operations, did not seem to display so much interest in this type of fighting. In the early stages of the war the German troops, including armored units, had made extensive use of night attacks.

At one time during the operations in this sector, the whole of a Russian division's artillery was deployed within 200 or 300 yards of a road, some guns actually firing from the road in column. Although this deployment provided an excellent air target, German air activity was almost negligible, and the Russians could thus afford to take risks.

Russian artillery communications, both wire and radio, were reported good. They used excellent 1/25,000 maps which had enemy positions overlaid by Army Headquarters.

UNCLASSIFIED

UNCLASSIFIED

It was found that even deep snow does not lead to more "duds" than under normal conditions. Snow does, however, greatly decrease the fragmentation of shell fire.

In good light the observation of shell fire is much easier in snow-covered country than under normal, summer conditions, but if the light is bad, observation becomes very difficult. For observation, the Russians used a shell with a red smoke-box, experience having shown red to be the most effective color under snow conditions.

In the area between Mozhaïsk and Gzatzk, the forward German defenses were about 6 miles in front of their main line of resistance. All towns and villages were held as strongpoints, and where villages were some distance apart, they were joined by small defense areas established on roads and paths. These defense areas, however, tended to be rather disconnected and patchy except for the area close to the main line of resistance.

The German strongpoints were generally based on small posts which were designed to take one antitank or machine gun, and which were sited on commanding ground, in groups of four or eight, each post being connected to the other by snow parapet tracks. When time permitted, each post was dug down to a depth of about 4 feet, with a snow and earth parapet, and the whole roofed by logs and boards.

The Russian field defenses, on the other hand, were started with a snow parapet about 8 feet thick. Water was poured on this until it froze, making it bulletproof. If available, logs were used to strengthen it.

For later development, digging was nearly always possible where there was sandy soil. Other types of ground were loosened by charges exploded at a depth of about 4 feet.

The Germans and Russians both used a great deal of heavy wire in forests, with entanglements stretched from tree to tree. Though the German belts of wire sometimes proved a considerable obstacle, it was often found that they were not adequately covered by fire.

In open country the Russians used concertina wire, anchoring it about half embedded in the snow. Frequently they put it completely under the snow in order to obtain surprise, but the latter method, of course, was not used against skiers.

Russian antitank obstacles normally consisted of ditches, wooden posts of at least 6 inches diameter sunk at about 45 degrees, or crow's-feet of very heavy angle-iron. They also used a heavy, coiled, barbed concertina-type wire, buried under the snow to tangle tank tracks. The only effect of snow on antitank obstacles was to make them more difficult to locate and, therefore, more likely to trap a tank.

UNCLASSIFIED

UNCLASSIFIED

The Russians found that antitank guns can usually obtain excellent targets if they are sited to fire over areas covered by deep snow, which cuts the speed and maneuvering ability of tanks considerably.

Russian antitank mines were laid at any depth in the snow without their efficiency being affected. As a matter of fact, the more time the Russians had to prepare a minefield, the deeper they put the mines. Both Russians and Germans used a system by which their antitank mines under the snow were linked together in groups for sympathetic explosion.

The Germans soon developed a wooden mine, both for antitank and anti-personnel use, and this mine succeeded, to a large extent, in defeating the efficient Russian mine detector. Neither the Russians nor Germans appear to have made any use of dummy antitank mines.

The Germans used white, red, and green Very lights for signals, but the Russians generally managed to discover their meanings and gain valuable information.

In withdrawal, the Germans sited their defenses in considerable depth and used leapfrog methods of retirement. Each German division normally had a rear guard of an infantry combat team. Divisions usually withdrew on a front of about 6 miles.

The Germans followed a definite policy of destroying all buildings in villages which they evacuated, principally in order to deprive the Russians of accommodations. Destruction proved comparatively easy, since the buildings are normally made of wood.

There was one German armored division in this sector, and the unarmored portion of this unit was detached and used to hold a section of the line. The tanks which were deployed along the front in small groups of four to six were often supported by antitank guns. These groups stuck almost exclusively to roads and trails. The German system, when fighting a rearguard action, seemed to be to present the boldest possible front to the enemy by retaining these small groups on roads leading into the position, keeping them parallel to the new main line of resistance. At the same time they always endeavored to clear at least one lateral track immediately in rear of their main line of resistance, in order to facilitate reinforcement of threatened sections of the line.

German artillery was not very much in evidence in the Mozhaïsk sector, and there were few guns heavier than field artillery. The Germans relied mainly on mortars, infantry guns, and antitank guns.

In their main defensive positions the Germans sited their mortars in batteries of four or more, about 500 to 600 yards in the rear of their main line of resistance. Field artillery was sited in depth, although the forward batteries were usually not more than 1,600 or 1,700 yards back. Their normal reaction to any threat was intense fire from the 81-mm mortars, for which they seemed to

UNCLASSIFIED

have a more than adequate supply of ammunition. The Germans usually fired off everything available just before a withdrawal, and the Russians learned that when sudden and very heavy mortar fire came down, and no counterattack materialized, the Germans were almost certainly withdrawing. They were then able to take appropriate action.

In forest country the Germans made every effort to block tracks by felling trees and erecting abatis. Wire was used only on those positions which were to be defended for some time.

The Germans destroyed all bridges, both large and small, in their retirement. East of Vyazma they destroyed the railway very effectively, demolishing or removing all sections which the Russians had not already removed in their own retirement. It is of interest to note, however, that despite the destruction, the Russians got a locomotive through to Mozhaisk 7 days after the capture of the town.

The Germans used a large number of antitank and antipersonnel mines in their retirement, sowing them around demolished bridges or culverts in order to catch vehicles using detours. Some minefields were laid in great depth and entirely filled the clearing normally found at each side of main roads through the forest. They also used delayed-action mines and booby traps, although not to a very great extent. Booby traps were usually attached to bright objects like scissors, spoons, or badges.

Cooperation between small bodies of Russian infantry and their tanks appeared excellent. The infantry's sole method of communication with tanks was by light signals, and these were generally used to indicate a target or an objective to be attacked.

There were very few instances in this sector of German tanks attacking under cover of smoke. When smoke was used, it was apparently put down by a normal Nebelwerfer unit.

The reconnaissance unit of the 5th German Tank Division included a certain number of French Panhard armored cars. These vehicles have completely French armament, including coaxial antitank guns and machine gun, and are equipped with Michelin (heavy pneumatic) tires.

German guns on self-propelled mountings were encountered, but the Russians say that in this sector they were normally employed in a defensive role only.

In the earlier stages of the fighting the Germans were operating fairly actively with flights of three or four planes, but after winter came, their efforts were limited mainly to hit-and-run bombing raids by single machines, and during the Mozhaisk operations the Russians definitely had superiority in the air. Russian air units supporting the army work directly under the control of the army staff, for the Russians have no corps organization. There is an air force staff

UNCLASSIFIED

UNCLASSIFIED

officer at each divisional headquarters. The Russians claim that any request for air support from the commander of an infantry regiment will be answered by bombs on the ground within 1 hour, provided that aircraft are available.

Russian air support during the Mozhaishk operations consisted chiefly of bombing retreating German columns, taking full advantage of the extent to which the Germans were tied to the roads. In attacks against these columns, Russian aircraft armed with cannon soon found it advantageous to carry antitank projectiles. The importance of adequate anti-aircraft fire arrangements for such withdrawing columns needs no emphasis; and the Russians were greatly impressed by the intensity of the fire from German mobile anti-aircraft weapons and especially by the volume and control of small-arms fire.

German air attacks against Russian land forces, especially on roads, very often consisted of dive-bombing with 100-kilogram (220-pound) and, sometimes, 250-kilogram (550-pound) bombs. The accuracy of the German attacks, however, varied directly with the amount of anti-aircraft fire encountered.

For camouflage, Russian specialist ski troops wore white coats with attached hoods, while ordinary infantry not equipped with them usually rolled in the snow before going into action. This makeshift arrangement, which produced a mottled effect, was found especially good against a forest background. Similarly, the best form of vehicle camouflage proved to be a pattern of small blobs of white paint, laid on very thickly.

Against winter air observation it proved practically impossible to conceal work actually in progress. Tracks in snow also presented great difficulties, as did smoke from fires. Against ground observation the judicious piling up of snow was found effective, but white material was needed to conceal loopholes.

The Russians lubricated all their weapons with oil of a specially thin arctic type, and recoil mechanisms were also filled with a special liquid. Water-cooled jackets of machine guns were filled with glycerin. All lubricants used were said to be proof down to at least -50 degrees Centigrade (-58 degrees Fahrenheit). Small arms which gummed up were first wiped entirely dry, lubricated with kerosene, and then fired, before receiving normal lubrication.

Since motor transport of all types gummed up very quickly at low temperatures, the Russians provided heaters for all their vehicles. A 1 1/2-ton truck, for example, would get 1 heater; a heavy tank, 12. In addition, mobile heaters, such as those used for ungumming airplane engines at airdromes, were sometimes used.

The lighter Russian weapons were frequently carried on small sleds consisting of a superstructure on a pair of skis, while heavier sleds, for larger weapons, were often pulled along the narrow forest trails by four ponies harnessed in tandem. Also, about 50 percent of the German transport were reported to be working with sleds.

UNCLASSIFIED

The Germans' red tracer bullets proved very effective against the snow background; the Russians, except for their antiaircraft, had only white tracer.

The Russians gave troops operating in cold weather one hot meal around dawn and another after nightfall. During the day, however, troops existed on a field ration composed largely of bread. Food for the hot meal was cooked in field kitchens--small trailers on two wheels, several of which were towed behind one truck. The food was then sent forward on sleds, in small metal vacuum-flask containers.

As the Germans withdrew, they often burned the villages behind them, leaving the ground thawed around each house. The Russians at once dug this ground down to about 5 or 6 feet. It was then roofed over with logs, tarpaulin, or brushwood, and floored with brushwood, or with straw if available. A stove, with a pipe chimney, was installed in the dugout. These stoves were usually improvised from old oil drums.

Where there were no villages, the Russians would dig the snow in the forest down to ground level, and build up a thick snow wall around an area of 8 feet by 12 or 15 feet. Evergreen fir branches would be used to line the floor and walls, and the compartment would be roofed with more branches, as well as a tarpaulin, if available. Finally the inevitable stove and chimney were added.

For these winter operations, the Russian soldiers were provided with good thick underclothing, of which they frequently wore two sets. Over this was a thick shirt and pullover. Over the pullover went padded trousers and coat, and then an overcoat or the short sheepskin shuba. Headgear consisted of a fur cap, a winter cap, and, frequently, a scarf belonging to the individual soldier. The Russian soldiers wore two pairs of gloves: an inner pair with the first two fingers and thumbs free; and an outer pair of mittens, worn when the use of the trigger finger was not required. No blankets are carried in a Russian division.

On his feet the individual soldier wore the varlenki or felt boot. Socks were not worn under the varlenki, but a piece of cloth, 2 feet by 1 foot 6 inches, was wrapped about the feet and ankles. In deep snow, trousers were worn outside the varlenki and tied round the bottom to prevent snow getting inside the boot.

Russian opinion is that the varlenki is the most satisfactory footwear for snow, and that it has enough wear in it to last through a complete winter. Although it is a felt boot, the wear is less pronounced than might be expected, since the troops can always march on the soft snow by the road. The varlenki has the advantage of drying very quickly in front of a stove, although this is not usually necessary, for in Russia one normally meets a dry type of snow.

Certain specialist ski troops wear a special ski boot, but the ordinary infantry ski in their varlenki.

The Russians claim that they had very few cases of frostbite, and those

UNCLASSIFIED

UNCLASSIFIED

that did occur were nearly always due to carelessness. The most dangerous areas were found to be the nose and cheek bones, and for troops in short coats, especially skiers, the private parts. Ski troops were issued warm suspensory bandages. Unit commanders issued vaseline or goose fat to their troops to smear on their faces, when low temperatures combined with sharp winds.

The wounded had to be brought in as quickly as possible if they were to escape frostbite. They were collected by regimental stretcher-bearers using low sleds built on two skis.

The Russians claim that the cold had no numbing effect mentally unless the men were tired; that on the contrary it had rather an opposite result, and that troops could go on for long periods of time provided that they were kept on the move, the limiting factor being lack of sleep.

The Russians noticed an obvious drop in the efficiency of German troops when the temperature fell below -20 degrees Centigrade (-4 degrees Fahrenheit). In extreme cold, Germans frequently allowed themselves to be rounded up in houses rather than go outside and face the cold.

The winter clothing of Germans taken prisoner was definitely inadequate. A few wore a second overcoat, but quite frequently they had only their normal clothes. As a result, many suffered from frostbite.

For keeping open the roads in rear of their advancing troops, the Red Army relied almost entirely on large working parties of peasants, who produced excellent results. Snow ploughs were available but apparently were not utilized to any great extent.

On the Mozhaisk front, partisan fighters were very active behind the German lines, and the various guerrilla bands were in close touch with the Red Army commanders. Parties of 40 or so would come through the German lines, receive definite tasks, such as destruction of specific railway bridges, and return through the enemy lines by night. These partisan fighters were armed with rifles and a few Tommy guns and wore civilian clothes. A number of girls were to be found in these bands, which were composed mainly of middle-aged men.

17. GERMAN TACTICS IN THE FINAL PHASES AT KHARKOV

In the Russian offensive against Kharkov in May their forces became overextended and were encircled by the Germans. Here they encountered several innovations in the system of hasty fortifications which the Germans threw up to prevent a breakout. These defenses were built around the basic infantry strong-points, but the way the Germans used their combined arms and armored equipment is revealing.

Figures 1 and 2 in the accompanying sketches outline the systems set up

UNCLASSIFIED

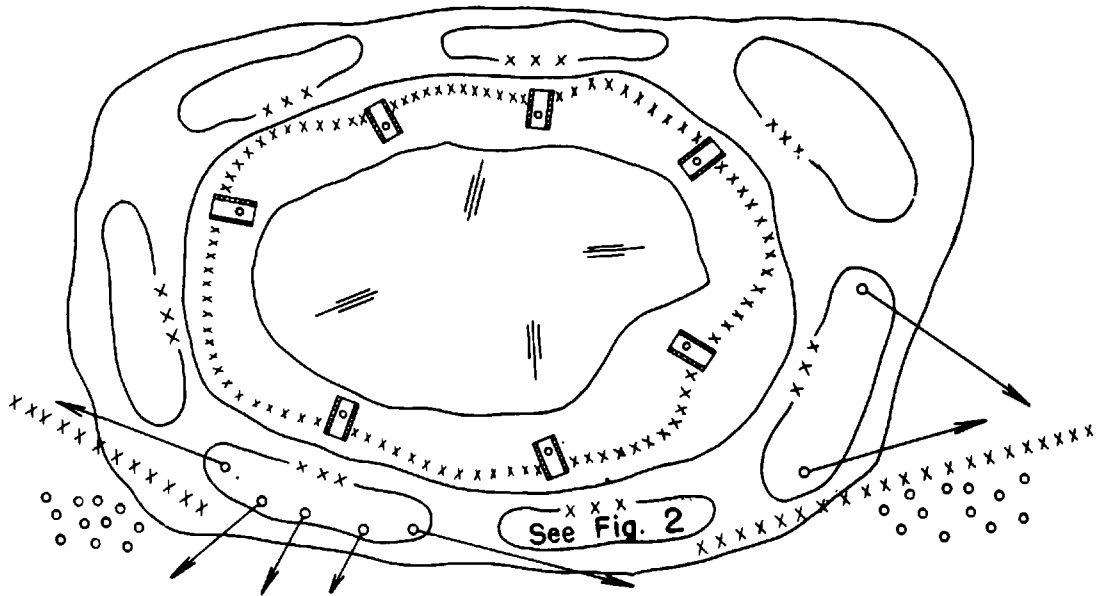


Fig. 1 - Center of resistance

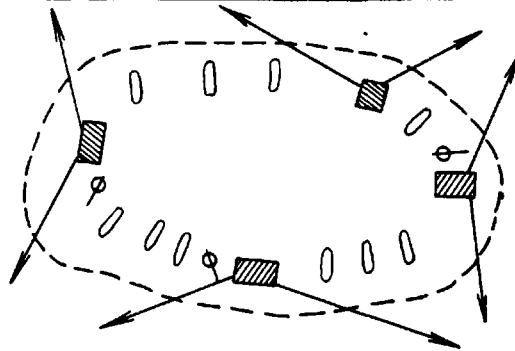


Fig. 2 - Strongpoint

LEGEND

- | | |
|--------|--------------------------------|
| ≡ | Artillery capable of 360° fire |
| ▢ | Tanks dug-in |
| xxxxxx | Wire entanglement |
| ○○○○○ | Mine fields |
| ⊙ | Antitank guns |
| ▨ | Dugouts |
| ○ | Fox holes |

UNCLASSIFIED

UNCLASSIFIED

by the Germans around the encircled Russian forces. The sites of the defense areas were selected so that each island of resistance could mutually support the ones adjacent to it.

Each island or center of resistance was formed by three concentric rings. Within the center ring, self-propelled artillery capable of all-around fire was emplaced. In the next outer ring, tanks were camouflaged and embedded in the ground so that they served as pillboxes for their machine guns and other armament. The outer ring was formed by entrenched infantry units provided with their normal infantry weapons, including antitank guns and mortars.

Wire entanglements were laid between the embedded vehicles of the second ring and along the channels of fire of the infantry weapons. Clever signaling devices such as cowbells and self-igniting firecrackers were hung on the wires and nearby bushes to warn of an enemy approach at night.

In the gaps between centers of resistance, minefields were laid and charted, and high-trajectory weapons laid to cover defiladed areas.

Outside this system of defensive areas which encircled the Russian troops, mobile combat teams were located, ready to rush to any part of the circumference that might be threatened either from within or without.

UNCLASSIFIED

MECHANIZED VEHICLES

18. CREW AND COMMUNICATIONS OF GERMAN MARK IV TANK

The duties of the various crew members of the Mark IV tank are generally similar to those performed by the crews of our own medium M3 and M4 tanks. A German training pamphlet captured in Libya gives the following details on the crew duties and communications of the Mark IV.

a. Duties of the Crew

The crew consists of five men: a commander, gunner, loader, driver, and radio operator. The latter is also the hull machine-gunner.

(1) Tank Commander

The tank commander is an officer or senior NCO and is responsible for the vehicle and the crew. He indicates targets to the gunner, gives fire orders, and observes the effect. He keeps a constant watch for the enemy, observes the zone for which he is responsible, and watches for any orders from the commander's vehicle. In action, he gives his orders by intercommunication telephone to the driver and radio operator, and by speaking tube and touch signals to the gunner and loader. He receives orders by radio or flag, and reports to his commander by radio, signal pistol, or flag.

(2) Gunner

The gunner is the assistant tank commander. He fires the turret gun, the turret machine gun, or the submachine gun as ordered by the tank commander. He assists the tank commander in observation.

(3) Loader

This crew member loads and maintains the turret armament under the orders of the gunner. He is also responsible for care of ammunition, and when the cupola is closed, gives any necessary flag signals. He replaces the radio operator if the latter becomes a casualty.

(4) Driver

The driver operates the vehicle under the orders of the tank commander or in accordance with orders received by radio from the commander's vehicle. So far as possible he assists in observation, reporting through the intercommunication telephone the presence of the enemy or of any obstacles in the path of the tank. He watches the gasoline consumption and is responsible to the tank commander for the care and maintenance of the vehicle.

(5) Radio Operator

He operates the radio under the orders of the tank commander. In action, and when not actually transmitting, he always keeps the radio set to "receive." He operates the intercommunication telephone and takes down any useful mes-

sages he may intercept. He fires the machine gun mounted in the front superstructure. If the loader becomes a casualty, the radio operator takes over his duties.

b. Communications

The following means of communication may be used:

- (1) External: radio, flag, hand signals, signal pistol, and flashlight.
- (2) Internal: intercommunication telephone, speaking tube, and touch signals.

For the radio, the voice range between two moving vehicles is about 3 3/4 miles and CW about 6 1/4 miles.

The flag is used for short-range communications only, and the signal pistol for prearranged signals, chiefly to other arms.

The radio set, in conjunction with the intercommunication telephone, provides the tank commander, radio operator, and driver with a means for external and internal voice communication, the same throat microphones and telephone receiver headsets being used for both radio and telephone.

When the control switch on the radio is set at EMPFANG (receive) and that on the junction box of the intercommunication telephone at BORD UND FUNK (internal and radio), the commander, radio operator, and driver hear all incoming radio signals. Any one of them can also speak to the other two, after switching his microphone into circuit by means of the switch on his chest.

For radio transmission, the switch on the set is adjusted to TELEPHONIE. The telephone switch may be left at BORD UND FUNK. Either the tank commander or the radio operator can then transmit, and they and the driver will all hear the messages transmitted. Internal communication is also possible at the same time, but such conversation will also be transmitted by the radio.

If the radio set is disconnected or out of order, the telephone switch may be adjusted to BORD (internal). The tank commander and driver can then speak to one another, and the radio operator can speak to them, but cannot hear what they say. The same applies when a radio receiver is available but no transmitter, with the difference that incoming radio signals can then be heard by the radio operator.

The signal flags are normally carried in holders on the left of the driver's seat. When the cupola is open, flag signals are given by the tank commander, and when it is closed, the loader raises the circular flap in the left of the turret roof and signals with the appropriate flag through the port thus opened.

The signal pistol is fired either through the signal port in the turret roof, through the cupola, or through one of the vision openings in the turret wall. The signal pistol must not be cocked until the barrel is already projecting outside the tank. It is only used normally when the vehicle is stationary. Its main use is giving prearranged signals to the infantry or other troops.

When traveling by night with lights dimmed or switched off altogether, driving signals are given with the aid of a dimmed flashlight. The same method is also employed when tanks are in a position of readiness and when in bivouac.

Orders are transmitted from the tank commander to the gunner by speaking tube and by touch signals. The latter are also used for messages from the commander to the loader, and between the gunner and loader.

19. SECURITY MEASURES OF A GERMAN ARMORED DIVISION

In the late spring of 1942, both the Germans and the British on the Gazala--Bir Hacheim line were building up strength for offensive action and, at the same time, organizing their own defensive systems to repulse the expected enemy attack. A captured German order issued by the Commander of the 15th Armored Division contains several interesting notes on these German defensive preparations.

Comparing the position of the division to that of a "spider lying in wait... for its victim," the commander ordered all elements of the division to be ready for action as follows:

- (a) All front-line troops, immediately upon attack by the enemy;
- (b) A specially designated task force, within an hour;
- (c) The remainder of the division, within 3 hours.

Instructions were given for thorough ground reconnaissance to be carried out by all units down to and including platoons. Artillery observers were ordered to take positions much farther forward than normally, since "otherwise,, after the first shot, dust develops and there is no possibility for direction of fire."

Apparently a tank company, in addition to the normal armored-car patrols, was to be held in readiness for action at all times. This company, however, was not to be committed unless the enemy attacked in force, and above all, was not to engage routine enemy patrols.

Just as the tank company was to be held as a reserve, the remainder of the division's tanks was not to be committed until the artillery and Panzerjäger units had engaged the enemy. Apparently, the German commander expected the

British attack to consist primarily of tanks.

In addition to the regular minefields, dummy minefields were ordered laid. The commander emphasized that a great deal more attention should be given to making these fields realistic, pointing out that a captured British document indicated that the German dummy minefields were ordinarily too easily distinguished from the real ones.

Knowing that the British had a justifiable fear of the 88-mm gun, the commander ordered that dummy 88's be constructed with trucks and old telephone poles.

In addition to these measures of deception, dust generators (no description given) were to be used for simulating vehicle movements; and captured British trucks were to be camouflaged as tanks.

Great emphasis was laid on utilizing existing materiel to the utmost to achieve greater combat effectiveness. Unit leaders were requested to submit suggestions on how a larger amount of ammunition and fuel could be carried by the existing transport facilities. In this connection they were asked to discard all possible material and equipment which would be unnecessary for combat.

MILITARY INTELLIGENCE

20. SOME ENEMY PRACTICES USED IN INTERROGATING PRISONERS OF WAR

By resorting to tricks and subterfuge to entice the unwary, the enemy hopes to extract information of value from captured prisoners. Here are some of these tricks as recently reported.

In a building set aside for interrogation, prisoners are questioned in a half-hearted manner and are then transferred to another room where they find three or four other "prisoners." These prisoners are, in fact, Italians or Germans speaking perfect English. To avoid detection they are often dressed in a uniform of a service other than that to which the real prisoner belongs (for example, RAF when the prisoner is in the army, South African when the prisoner is English).

A smiling Nazi may say in an attempt to ingratiate himself, "England and Germany should be fighting together. We don't hate one another."

Sometimes a prisoner is not questioned for several days--perhaps weeks. If he is in the hospital, a "wounded" German or Italian is sent along who has been in England and speaks some English. He has all the charm of a Fuller brush man, and gradually lets it leak out that he is anti-Nazi, and perhaps has a row with a fellow Nazi. He takes his time, and gradually the conversation veers round to the war.

Real interrogators use another method to get prisoners to talk. "We know so much there is nothing you can tell us," he remarks, as he flips over a lot of important-looking papers. He then attempts to provoke the prisoner into proving that he is not the ignoramus the interrogator tells him he is.

The prisoner may be marched into a tent lighted by one flickering lantern. There is a good deal of side-play. The interrogator snaps out the routine questions: "Name - rank - number?" When the next question is greeted with silence, the sentry is ordered to leave the tent. The interrogator fingers his revolver. "I don't want to resort to methods we dislike," he says, and hopes the prisoner will believe the opposite. He may be taken into a confined space, such as an armored car. The interrogator talks in a low voice, and explains that he wants some important information and he is determined to get it. He is candid. "You are alone, you have a family. You want to live. It is nice to be a hero when someone is looking, but you are alone."

The note of death is constantly repeated in an attempt to break down morale. The interrogator, however, is not going to kill the goose which may lay the golden egg; besides, there are thousands of enemy (German and Italian) prisoners, and news of what happens in German prison camps travels fast.

Breaking down resistance and morale is the first object of the enemy interrogating officer. To encompass this, physical fatigue is often induced by forced marches, light rations, and inadequate shelter. Another trick is the spreading of fantastic tales about Russian reverses, Japanese successes, and Allied losses. Then there is the time-worn trap: "Your comrades have told us everything so why don't you?"

In a Nazi or Fascist state, everyone is a suspect of the secret police. They are long practiced in eavesdropping, and this experience is used in war-time. If other methods fail, prisoners are put together in the most innocent-appearing circumstances. A hidden microphone reveals to a listening enemy any matters of military interest that are talked about.

The answer to these tricks, and there are others, is the maintenance of rigid silence.

Direct interrogation is a war of attrition between prisoner and interrogator, and the battle is lost by the one who tires first. If it is the interrogator, the prisoner is passed on as "no good" to join his countrymen in a prisoner-of-war camp. If, however, he tries to bluff the interrogator by giving him false information, or to appease, by giving half-truths; if any chink is found in his armor of silence, he will often remain for weeks and weeks under process, much to his own personal discomfort. The tough prisoner is not only admired by the enemy but, if he wins out, fares better in the end. Thus the attitude of "name, rank, and number only" not only serves country and comrades, but is without doubt in the best interests of the individual.

Conversations on military matters must always be resolutely avoided; plans to escape discussed only in the open. Further, attempts to persuade a prisoner that he can relieve the anxiety of his family, by broadcasting must be resisted. Such offers are made to build up enemy radio propaganda.

Finally, personal papers should never be carried into battle. Most insignificant pieces of evidence, personal letters, hotel bills, tickets, give clues to a competent interrogator.

21. ITALIAN MEASURES FOR CONCEALING A WITHDRAWAL

Camouflage in the desert is ordinarily much more difficult than in the woods, fields, and villages of more familiar terrain. It is possible to use the inevitable dust, however, to prevent the enemy from making exact estimates of the number of vehicles being moved. The following captured Italian order gives some details of measures taken by the Italians to conceal a withdrawal.

"During the next few days, the withdrawal of troops from the sectors of the Trento Division and the remainder of the 5th Light Division has to be concealed, and the arrival of numerous reinforcements has to be simulated. To this end, the following directions will be carried out. The measures must not be clumsily executed or they will fail in their purpose.

"It will be especially important to maintain lively patrol activity and to attack the enemy repeatedly at night, thus creating the impression that an offensive is imminent. The simulated motor transport movements must be carried out under the guidance of an experienced officer. The Trento Division is requested to send in, by orderly officer on the previous evening, particulars of the measures it intends to carry out during the following day and night.

"The Division will order the employment of planes from time to time.

"April 28---The following measures will be carried out.

"In the morning until 0900 hours, and after 1800 hours in the evening, the 8th Machine Gun Battalion and Bollbrinker Battalion of the 5th Tank Regiment are to keep up a lively traffic in the direction of the front, raising much dust. The 8th Machine Gun Battalion will form 2 or 3 motor transport columns of about 15 vehicles each, and the Bollbrinker Battalion will form one such column to maintain traffic on the different roads and trails leading to the front. During the day, single vehicles are to be used to raise dust. In addition, the 5th Tank Regiment will simulate heavy traffic running in both directions on the El Adem--Capuzzo road, as far as 40 km east of El Adem, every day.

"Battery A, 75th Artillery Regiment, is to simulate the presence of a battalion by frequent firing by platoons, and by the use of sniping guns. Harassing fire will be laid down. Ammunition consumption is to be approximately

equal to that of the battalion to date.

"The Bollbrinker Battalion is to use its immobilized tanks to give the enemy the impression that the position is being held in the same strength. Every opportunity must be taken to capture enemy tanks or vehicles of any type.

"The 8th Machine Gun Battalion must maintain its patrol activity on the level of that carried out up till now by the 8th Machine Gun Battalion and the 200th Engineer Battalion together. Prisoners are to be taken if possible. At night, patrols are to fire rounds frequently and send up white Very lights (red Very lights in case of enemy attack, green in case of enemy tank attack).

"Frequent radio test-calls within the divisional system, and with the von Herff Group, will be made according to oral instructions to the 3d Signal Company.

"April 29---The Trento Division will organize a lively traffic (with large numbers of vehicles from the division trains) in the direction of the front in the early morning and evening, so as to create the impression of further reinforcements. Under the command of an officer, vehicles are to be formed in columns, like those of the 8th Machine Gun Battalion and the Bollbrinker Battalion on April 28. During the daytime, single vehicles will be used to simulate heavy column traffic in both directions...[More details on where heavy traffic is to be simulated.]

"Battery A, 75th Artillery Regiment, will continue its tasks of April 28, but will increase its ammunition expenditure.

"The 8th Machine Gun Battalion will maintain patrol activity as on April 28.

"Radio activity will be continued as on April 28...

"April 30---All measures ordered April 29 will be continued on an increased scale. This applies particularly to the vehicle movements by the Trento Division, the 8th Machine Gun Battalion, and the Bollbrinker Battalion, designed to simulate the arrival of reinforcements; this applies also to the fire of Battery A, 75th Artillery Regiment.

"Special actions by assault detachments will be ordered for the night of April 30 to May 1."

ORDNANCE

22. OPERATIONS OF THE GERMAN TANK RECOVERY PLATOON

British sources give recent information on the methods employed by the recovery platoon of (tank) workshop companies. This information was obtained from prisoners of war.

The towing vehicles and trailers of the platoon are sent forward to regimental headquarters and operate under its direction.

The principle now used is to have two or three recovery vehicles forward with the fighting units. These vehicles advance in the line of attack and cruise across the width of the battle front. The Germans believe that hostile forces will be preoccupied with the German tanks and will not bother with the recovery vehicles, no matter how close they are.

If a member of a tank crew orders the driver of a recovery vehicle to tow his tank to the rear, the former assumes responsibility for the action--in case it later proves that the damage is negligible and could have been fixed on the spot by the repair sections. However, asking that a damaged vehicle be towed away is always permissible if it is in danger of being shot up.

The towing vehicle usually goes forward alone and tows a disabled tank away by tow ropes. Towing is used in preference to loading on the trailer, as this latter operation may take 20 minutes (regarded by a prisoner as good time under battle conditions).

The recovered tanks are towed to an assembly point behind the combat area, where they are lined up so as to protect themselves as far as possible. Trailers may be used to take back the disabled tanks from this point to the workshop company.

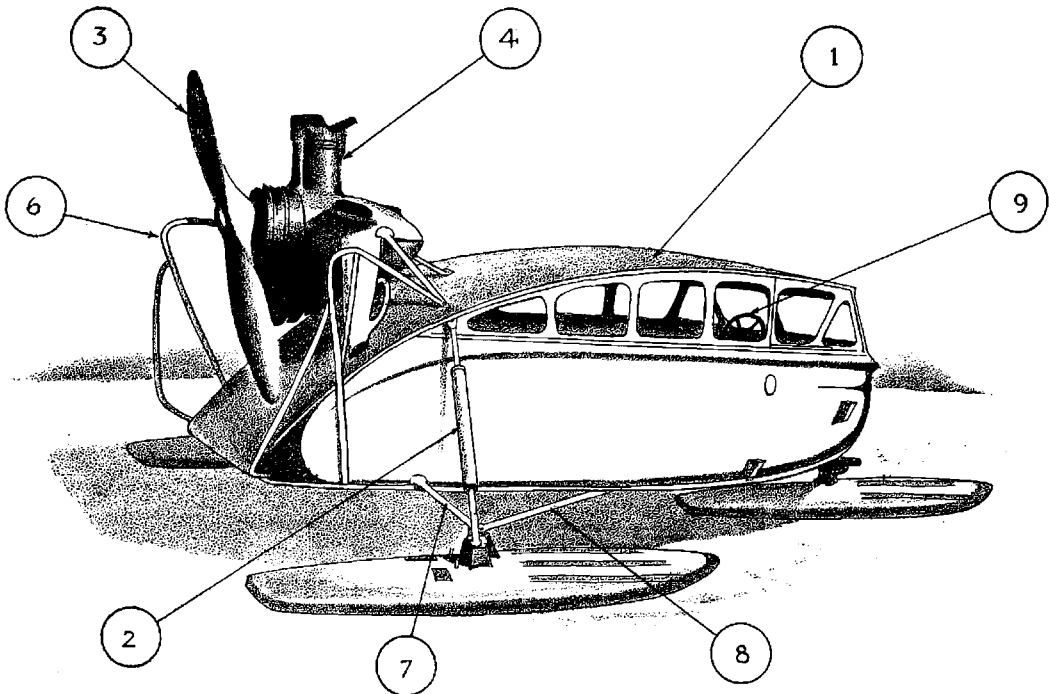
According to this report, however, trailers are being used less and less, and their use is confined mainly to roads. On roads, they enable a higher speed to be maintained, do not weave as much as a towed tank, and do not cut up the road surface. On the desert, trailers would be used on bad ground rather than where there is good going.

The PW's reported that drivers of recovery vehicles did front-line duty for about 8 days at a time; then they worked at the rear, between assembly point and workshop.

23. PROPELLER-DRIVEN SLEDS

The severity of the Russian winter, with its heavy snowfalls, creates serious transportation problems. This is particularly true in northern Russia, where lack of roads formerly made dog- or reindeer-drawn sleds necessary for transport. Soviet technical skill and ingenuity, however, have successfully coped with the problem by developing mechanized sleds, which have good traction both on hard-packed snow and soft new snow.

The most satisfactory and efficient type of mechanized sled for winter transport has been found to be the aero-sled, powered by an airplane-type engine and mounted on either three or four skis.



The accompanying sketch shows a general view of the Soviet NKL-16 aero-sled with an M-11 motor. All accepted types of aero-sleds have a closed streamlined cabin (1) which transports six to eight persons plus freight, depending on the horsepower of the motor and design of the sled. The cabin is mounted on shock absorbers (2), which are connected to the three (or four) skis. The motor (4) is generally mounted in the rear with the pusher-type propeller (3) and a guard (6). The skis are connected to the body also by means of universal-joint semiaxles (7) and "unloading" connecting rods (8).

This three-rod type of mounting of the skis insures proper shock absorption and fixes the skis rigidly in relation to the body of the sled. A turn of the steering wheel (9) causes the front ski to turn. In the four-ski type aero-sleds of the latest design, the two rear skis glide in the tracks made by the front skis. The brakes are applied by pressure on a foot pedal which causes 1 to 1 1/2-inch metal rods to protrude from the bottom of the skis and engage in the snow. An air-cooled motor in aero-sleds eliminates radiator and water complications in the cylinder sleeves and lends to light design.

The following discussion of various aspects of the problem of transport operations by aero-sled is taken from a recent issue of a Soviet trade magazine.

"Aero-sleds must satisfy certain technical requirements. For example, the supporting surface of the skis must completely safeguard the sled from falling through the snow or getting stuck in it. Experience in the U.S.S.R. has proved that the load weight of the sled while in movement must not exceed 1,200 to 1,350 pounds per square yard of supporting surface. The total weight of the loaded sled must not exceed 33 pounds per engine horsepower.

"Other essentials include durability of construction, using inexpensive, plentiful materials. The driver and crew must be protected from headwinds and must be able to observe the road to the front and on both sides. Brakes are needed to assure safe descent on steep inclines, especially on slippery and rolled roads. The propeller must be equipped with some form of guard to prevent accidents.

"It may be said that the essential qualities of aero-sleds are: simplicity of manufacture, low cost, ease of repair, and good driving power.

"The improvement of travel qualities of aero-sleds can be accomplished by: reducing the weight of the sled by lighter construction, reducing the load capacity (a serious disadvantage), or increasing the traction power of the propeller. The latter may be accomplished by improving the design of the propeller, or using a motor of greater power. It may be considered that the present models of aero-sleds yield roughly a power effort of the propeller equivalent to 6 to 6.5 pounds per motor horsepower.

"Although the average speed in actual work is lower, it is possible to drive aero-sleds at a speed of 20 to 30 mph, depending on the snow surface and the experience of the driver.

"As the Soviet Union lacks winter roads, the opportunities for using aero-sled transportation are very numerous. For that reason, in spite of the favorable achievements in design and efficiency for use over even rough snow and ice, many improvements can yet be made. A switch to the use of heavier fuel, as well as to simple and inexpensive motors and steel propeller, should be combined with further perfection of body design and of moving parts."

On the basis of sketches of aero-sleds which have appeared recently in the Soviet press, it seems probable that the Russians are employing aero-sleds as combat vehicles, both as a reconnaissance car mounting a heavy machine gun, and as an armored fighting vehicle with a sizable-caliber gun mounted in a revolving turret. No details, however, are available on this aspect of the employment of aero-sleds.

24. REPORT OF ITALIAN PILOT ON "CROWS FEET"

Tactical and Technical Trends, No. 11, p. 36 described this particular metal spike and its special use on highways and landing fields,

The pilot of an Italian bomber who happened to land on a field where the Germans had apparently dropped these spikes, describes his experience. He states that they came as a surprise and caused considerable confusion. Both tires on his plane were punctured when taking off. He was not aware of what happened until coming in for a landing and it was with difficulty that the plane was kept from turning over.

Despite efforts to get them off the field, it was stated that some spikes always remained. When dropped on loose and sandy surfaces, the spikes were sometimes completely buried and were not discovered, and worked up into the aircraft tires when run over.

25. MARKINGS ON GERMAN MOTOR-MAINTENANCE VEHICLES

It is evident that motor-maintenance vehicles should bear distinctive markings by which they may be readily identified. On the other hand, an order captured from the Germans would appear to indicate that such vehicles should not be so clearly marked as to permit easy identification by enemy observers.

The above-mentioned order was captured from a German reconnaissance unit operating in North Africa and reads as follows:

"It is forbidden to mark gasoline and oil supply trucks with distinctive yellow or black-white-red disks, and these must be removed. Enemy aircraft can destroy easily recognizable gasoline and oil supply vehicles with incendiary ammunition. Gasoline supply trucks and gasoline-and-spare-parts supply trucks are to be marked with a blue 'B' made to stand out slightly by a pale yellow outline around its edges. Vehicles belonging to maintenance groups, sections, and light detachments are to be marked with a special 'J'."

QUARTERMASTER

26. NEW GERMAN METHODS AGAINST RUSSIAN WINTER CONDITIONS

No Russian campaign could safely be undertaken without taking into account the challenge to an invading army's staying power to meet the hardships and danger imposed by "General Winter."

It is reported that the German Wehrmacht intends to make large-scale use this winter of diesel oil as a radiator fluid for motorized equipment in Russia, to protect motors both against low temperature and penetrating winds. Diesel oil will be used in normal motors which require draining during long stops and require the heating of oil before motors can be restarted, and also used in those few motors now being equipped with built-in warming apparatus. The use of oil was determined after experiments revealed that it has a freezing point below -40 degrees Centigrade, a boiling point higher than water, does not corrode motors or radiators, leaves no residue, and is more readily available and transportable on the Eastern Front than other chemical cooling fluids.

Since no advance preparations had been made last year to meet such weather conditions, German equipment became unusable, or usable only with great difficulty in many sectors. This experience, plus study and improvement of Russian methods and apparatus, have enabled German engineers to make the following adjustments:

(a) German batteries are too small for eastern winter conditions, and in fact electric starting becomes impossible at -30 degrees Centigrade. Since it is impossible to replace batteries, the use of other starting equipment has become necessary. Heating devices for batteries for ordinary operation have been installed in the form of small benzine lamps in closed battery compartments.

(b) Heavy motors, chilled by cold and steady penetrating wind, are impossible to start without preheating the cooling fluid and oil. This was done last winter by hot-air heating devices improvised on the spot, as well as by draining and warming the cooling fluid. On the other hand, many Soviet heavy motors were equipped with built-in auxiliary starting motors, which, after running about 30 minutes and heating the cooling fluid were able to start the main motor. Germany has adopted an improved version of this Soviet development for use on new equipment.

(c) Germany's main desire was to develop a method whereby heavy motors could be started almost immediately. This requires heating of both cooling fluid and oil before starting. The Russian auxiliary motor has been refined and improved by the addition of an oil-line break-valve to the ~~water~~ line, which enables the heating of both oil and fluid within a very few minutes operation, and thus the main motor can be started in but a fraction of the time required by the original Russian equipment. This improvement is stated to operate most satisfactorily.

(d) With special fuel, the Otto motored equipment can still make use of electric starting apparatus.

(e) Diesel oil makes most satisfactory cooling fluid for winter use in all motorized equipment including that started mechanically or by hand.

SECTION II

SOME EXAMPLES OF KATAKANA (PHONETIC JAPANESE)
USED IN COMMUNICATIONS

SOME EXAMPLES OF KATAKANA (PHONETIC JAPANESE) USED IN COMMUNICATIONS

This article is presented for the purpose of clarifying some of the mystery in which, to the layman, the Japanese language is shrouded. Also, it is to be hoped that it will stimulate some interest in the language, especially on the part of communications personnel.

It must be pointed out that there exist no short cuts enabling one to acquire a comprehensive knowledge of this language. Years of unremitting labor are required to master even the fundamentals of writing Japanese kanji (the classic language, which is basically Chinese); however, kana, or phonetic Japanese writing, can be learned in a short time. Communications personnel may, with practice, intercept and transcribe some portions of coded messages which use kana.

a. The Japanese Written Language

(1) Chinese Characters (Kanji)

It was not until the fourth or fifth century of the Christian era that the Japanese felt the need of putting down their thoughts in writing. They had no alphabet, and since their only intercourse with the then known world was with China to the west, they proceeded to borrow, along with many other things, their writing system from that country.

The Chinese writing system is about as difficult a thing to learn or to use as man's mind has ever invented. It started out being a sort of picture language with each word represented by a simplified picture. This system was all right for words like "horse" or "fish," words that could be drawn, but it would not do for more abstract words like "duty," "courage," or "honesty." Obviously, the writing system had to develop far beyond simple pictures, which it did more than 3,000 years ago. But Chinese writing never lost some of its original pictorial quality. There still is one symbol, if not picture, for each word. As a result, there are thousands of symbols, or characters, as they are usually called, in use today in China.

The Chinese system was not a handy one for the Japanese to borrow, but it was all they knew. They had to supplement it with other written signs (kana), developed by themselves, which showed sounds, the way our alphabet does, and not ideas, the way the Chinese characters do. But even after inventing these phonetic writing systems, they still kept to the Chinese characters. They were pronounced quite differently in Japan than in China, because the two spoken languages are not at all alike, but still they represented the same idea. Consequently, most Chinese words can be read and understood by Japanese, and many Japanese words can be read and understood by Chinese. This is not true for pronunciation.

(2) Phonetic Characters (Kana: Katakana and Hiragana)

In katakana and hiragana each character represents a sound, but, unlike English letters, each is made up of a consonant followed by a vowel, i.e., ka, ki,

etc. Exceptions are the vowels a, e, i, o, u, and the consonant n. The katakana consists of 50 somewhat angular symbols which, apart from their use on aircraft, are used by the Japanese mainly for transcribing foreign sounds, and in notices, official documents, telegrams, ships' names, etc. Inscriptions in katakana are usually written from the right, either vertically or horizontally, but on occasions are written from left to right as in English. The hiragana syllabary compares with katakana as our script letters (a) compare with block printing (A). It also consists of 50 forms, but they are cursive in shape and are used in writing letters, in some newspapers, etc. These characters are seldom used for aircraft markings or for depicting ships' names.

In writing out the kana sounds in our alphabet, the following rules are invariably used.

a	ア	as in <u>fa</u> ther
i	イ	as in <u>ma</u> chine
u	ウ	as oo in <u>loo</u> t
e	エ	as a in <u>ha</u> y
o	オ	as in <u>o</u> h

A table of the characters used in the katakana syllabary follows:

ア a	カ ka	サ sa	タ ta	ナ na	ハ ha	マ ma	ヤ ya	ラ ra	ワ wa	
イ i	キ ki	シ shi	チ chi	ニ ni	ヒ hi	ミ mi	イ i	リ ri	ヰ (w)i	
ウ u	ク ku	ス su	ツ tsu	ヌ nu	フ fu	ム mu	ユ yu	ル ru	ウ u	ン n
エ e	ケ ke	セ se	テ te	ネ ne	ヘ he	メ me	エ (y)e	レ re	ヱ (w)e	
オ o	コ ko	ソ so	ト to	ノ no	ホ ho	モ mo	ヨ yo	ロ ro	ヲ wo	

Sometimes katakana symbols are used with Japanese numerals and the result is confusing. The katakana for se (セ) and for ha (ハ) look confusingly like the numerals shichi (七) seven, and hachi (八), eight.

0	〇	rei
1	一	ichi
2	二	ni
3	三	san
4	四	shi
5	五	go
6	六	roku
7	七	shichi
8	八	hachi
9	九	ku
10	十	ju (to)

Exceptions: By placing two dots called nigori to the right of the character, a hardened and slightly different consonant sound is produced. The ha column becomes ba, bi, bu, be, bo; the ta column, da, ji, zu, de, do; the sa column, za, ji, zu, ze, zo; the ka column, ga, gi, gu, ge, go. Thus カ (ka) becomes カ[°] (ga), etc. A small circle (called hannigori) on the right side of the characters alters the reading to a softer sound. For instance, if placed on the right hand side of the ha column, ha (ハ) becomes ハ[°] and represents the sound pa. Hi (ヒ) becomes pi (ピ), etc.

b. Application of Katakana to Aircraft

As most Japanese aircraft are marked with characters from the katakana syllabary, it is essential that intelligence officers should have some knowledge of the characters used. In aircraft markings, the katakana syllabary is mainly used; therefore, should a float plane crash or be sighted bearing the under-mentioned markings -

ナ ガ ラ ー

upon referring to the katakana syllabary it would be observed that the first symbol represented the sound na, the second ga, and the third ra; the assembled syllables give "Nagara," the name of a Japanese cruiser. It would, therefore, be established that the float plane was from this cruiser, and that the cruiser was probably in the vicinity. The dash after the character for ra simply

indicates a prolonged sound.

c. Maps and Mapping

Since katakana is phonetic, the Japanese use this syllabary to represent most foreign place names except common geographical names which are written in kanji. This fact makes it possible, with a knowledge of katakana, to read most Japanese maps excepting those of either Japan or China. The following are examples of geographical names written in katakana.

<u>Katakana</u>	<u>Romaji or Romanization</u>	<u>English</u>
ブリスベン	(Bu-ri-su-be-n)	Brisbane
ソロモンズ	(So-ro-mo-n-su)	Solomons
カーペンタリヤ	(Ka-pe-n-ta-ri-ya)	Carpentaria

An interesting example of the use of katakana in connection with Japanese maps recently came to light in the discovery of some maps together with a canvas bag labelled in Japanese "Reconnaissance Satchel," containing documents and found floating on the sea near the place of crash of a Japanese heavy bomber in the Southwest Pacific area.

A few days later, a mutilated body was washed ashore at about the same place, on which a small diary and note-book and other documents were found. The documents on the body established the identity and the rank of the man, who was a Naval Shosa - i.e., Squadron Leader or Lieutenant Commander. It is also clear from the documents that he had been a Hikocho - i.e., Flying Leader of a Naval Air Group, up to April 1, 1942, when he became attached to an Air Group.

One of the maps is inscribed Hikocho in one place, and in equivalent symbols on another part of the map. This suggests that the maps were almost certainly in the custody of this man.

One of the maps had written on it the name of a flight sergeant whose card was found among the documents in the reconnaissance satchel. It appears, therefore, that the Hikocho was responsible for the maps and all the documents it contained.

Among the maps were:

- 1 Naval Air Headquarters secret map,
- 5 Hydrographic section maps,
- 3 Naval air navigation charts,
- 4 Hydrographic survey charts.

The following general points of interest are disclosed by the maps:

- (a) The Japanese had a series of secret maps, covering the eastern part of New Guinea and the Solomon Islands. One captured secret map shows that the Japanese had considerable knowledge of "secret" information about a certain island.
- (b) One map gives detailed information of airdromes, anchorages, buildings, radio stations, gun emplacements, repair facilities, the numbers and types of inhabitants, and the availability of gas, food, and water in a certain South Pacific area.
- (c) For the purpose of reference, several of the maps are gridded in pencil. The grid lines are drawn from north to south and from east to west at intervals of 20', and each interval from north to south and from east to west is marked with katakana syllables, sometimes with a pair of syllables. The katakana syllables appear to follow a sequence which sometimes corresponds to the sequence in which the katakana characters appear in the Japanese syllabary given above, and sometimes follow the sequence in which they are found in a well-known Japanese poem called the "Iroha song." The poem includes all the katakana syllables. To say that a man knows his Iroha uta is to say that he knows his ABC's.

The Katakana Syllabary in the Iroha uta arrangement follows. The characters are given here in sequence as they occur in the poem.

The first row of characters in each column is the katakana; the second row is Romaji (Japanese for Roman letters); and the third row is the code, dot and dash equivalents.

イ	i	--	ル	ru	----	ナ	na	---
ロ	ro	----	ヲ	wo	----	ラ	ra	...
ハ	ha	----	ワ	wa	---	ム	mu	-
ニ	ni	----	カ	ka	----	ウ	u	---
ホ	ho	---	ヨ	yo	--	ヰ	wi	-----
ヘ	he	.	タ	ta	--	ノ	no	----
ト	to	-----	レ	re	----	オ	o	-----
チ	chi(ti)	----	ソ	so	----	ク	ku	----
リ	ri	---	ツ	tsu(tu)	----	ヤ	ya	---
ヌ	nu	----	ネ	ne	----	マ	ma	----

ケ ke ----	キ ki ----	モ mo ----
フ fu ----	ユ yu ----	セ se ----
コ ko ----	メ me ----	ス su ----
エ e ----	ミ mi ----	シ n ----
テ te ----	シ shi (si) ----	" (nigori)
ア a ----	エ we ----	〇 (hannigori)
サ sa ----	ヒ hi ----	- (long sound)

U, we, wi, and o are sometimes omitted from the sequences used; in one case o is used instead of wo. It is not yet apparent when or how the two sequences are used, nor is it clear what the starting point is of each sequence on the maps. It may be that the starting point is an arbitrary one fixed on the map and that the two maps are similarly marked for use on a particular occasion or occasions, one map being left at the base and the other taken into the air for the purpose of reference in communication during a flight.

(d) As stated, the grid intervals cover 20' of latitude and longitude respectively. For the purpose of subdividing these intervals for closer reference, the maps on which the grids are marked contain a key which in one case subdivides 4 of the grid squares into 16, each square being subdivided into 4 smaller ones. In the other instance, the same principle is followed, but the illustration of it covers 16 of the primary grid squares instead of 16 subsidiary squares, the primary squares not having been subdivided for the purpose of the illustration.

	167° 0'E.	167° 20'	167° 40'E.
20° 20' S.	ア a	イ i	カ ka
	ウ u	エ e	ク ku
20° 0'	サ sa	シ shi	タ ta
	ス su	セ se	ツ tsu
19° 40'			テ te

The grid map illustrates the employment of katakana as arranged in normal sequence. The same method of marking has been found on other captured maps.

d. Communications in Code

When the kana syllabary is used in radio or telegraphic communications, katakana is habitually employed. It should be remembered that this is the printed or typewritten form, and that the receiver of the message, when transcribing the code, would use hiragana. This corresponds to ordinary penmanship as compared to the typewritten or printed letter.

(1) Kana Code Signals with Morse Equivalents

The following is a list indicating Japanese kana code signals with the Morse equivalents. The last two signals on the list (i, . . , nigori) and (un, , hannigori) are not kana signals, but are used to change the initial consonant of certain kana from the values in column 3 to those of columns 4 or 5. They always follow the kana. For example: -... is ha, -... .. is ba, -... is pa. Unless operators are trained in kana reception the above would be copied as follows: -... as b, -... .. as b i, and -... as b un.

As previously shown, nigori is indicated in kana characters by the sign (^) placed to the right of the character, and hannigori by the sign (°) also placed to the right of the character.

	Morse	Kana	Romaji	Nigori	Hannigori
a	..	イ	i		
aa		ロ	ro		
ar		ン	n		
as		オ	o		
au	-	キ	wi		
aw	--	テテ^	te	de	
b	-...	ハ バ パ°	ha	ba	pa
bt	-	メ	me		
d		ニ	ni		
c	---	ホ ボ ホ°	ho	bo	po

	Morse	Kana	Romaji	Nigori	Hannigori
dm	--- --	ユ	yu		
dn	--- .	モ	mo		
e	.	へべへ	he	be	pe
f	--- .	チヂ	chi (ti)	ji (di)	
g	--- .	リ	ri		
h		ヌ	nu		
id	--- .	トド	to	do	
j	--- --	ヲ	(w) o		
k	--- .	ワ	wa		
ka	--- .	サザ	sa	za	
ki	--- .	キギ	ki	gi	
kon	--- .	エ	e		
kn	--- .	ル	ru		
l		カガ	ka	ga	
m	--	ヨ	yo		
mk	--- .	スズ	su	zu	
mm	--- .	コゴ	ko	go	
mn	--- .	ソゾ	so	zo	
mr	--- .	シジ	shi (si)	ji (zi)	
mu	--- .	ヒビビ	hi	bi	pi
mw	--- .	ア	a		
n	--	タダ	ta	da	
o	---	レ	re		
p	--- .	ツツ	tsu (tu)	zu (du)	

	Morse	Kana	Romaji	Nigori	Hannigori
q	---.-	ネ	ne		
r	...-	ナ	na		
s	...	ラ	ra		
t	-	ム	mu		
u	...-	ウ	u		
ua	...--	ミ	mi		
ut	...--	ノ	no		
v	...--	ク ク	ku	gu	
w	...--	ヤ	ya		
wl	...--	エ	(w) e		
wn	...--	セ セ	se	ze	
x	...--	マ	ma		
y	...--	ケ ケ	ke	ge	
z	...--	フ フ フ	fu (hu)	bu	pu
i	..	ニ	nigori		
un	...--	ハ	hannigori		

(2) Code Signals for Numerals

The following is the list of code signals employed for the transmission of numerals. The normal signals, abbreviated signals, and the romanized rendering of the Japanese sound occasionally used for number representation during communication are listed, as well as Morse and kana equivalents;

	Morse	Kana	Romaji	Normal	Abbreviated	Romanization
n	--	タ (一)	ta-1	...--	--	hi
z	...--	フ (二)	fu (hu)-2	...--	...--	fu (hu)
s	...	ラ (三)	ra-3	...--	...	mi

	Morse	Kana	Romaji	Normal	Abbreviated	Romanization
m	--	ヨ (四)	yo-4	-	--	yo
a	.-	イ (五)	i-5	.....	.-	i
t	-	ム (六)	mu-6	-----	-	mu
r	...-	ナ (七)	na-7	---...	...-	na
w	---	ヤ (八)	ya-8	-----	---	ya
v	...-	ク (九)	ku-9	-----	...-	ku
o	----	レ (〇)	re-0	-----	----	re

(3) Code Signals for Punctuation

Following is a list of auxiliary signals used for punctuation, etc.:

Period	-----	.....
Paragraph	-----	.....
Parenthesis (open)	-----	.....
Parenthesis (closed)	-----	.....
Long sound	-----	.....
End of message	-----	.....
Code or abbreviated numerals	-----	.....
End of part (interrogation)	-----	.....
End of transmission	-----	.....

(4) Abbreviation and Procedure Signals

Following is a list of some of the abbreviations and procedure signals:

	Morse	Kana	Romaji	Meaning
ahr	-	イヌナ	i nu na	Here is a message. (I shall continue transmission.)
as		オ	o	Wait.
asmn	-	オソ	o so	Send slower.
awk	-	テワ	te wa	Switch to telephone.
dq	-	ホネ	ho ne	Break sign. (Body of message follows.)

Morse	Kana	Romaji	Meaning
eeeeeee			Error.
e a ...-	ヘイ	he i	Close station.
gt ----	リム	ri mu	Government telegram.
gw ---.---	リヤ	ri ya	Will use abbreviations or code.
ar .----.	イナ	i na	No, negative.
k --	ワ	wa	Go ahead.
kas --.....	サラ	sa ra	Repeat entire message. (Will repeat.)
lar -.	カン	kan	Readability.
larm -.-	カンヨ	kan yo	Good readability, can read.
larmu -.-.-	カンヒ	kan hi	Poor readability, cannot read.
lart -.-	カンム	kan mu	Cannot hear.
mmar -.-.-.-.	コン	kon	Jamming, interference, static.
m --	ヨ	yo	Local.
rwni -....	ナセ	na se (na ze)	Why.
r ...-	ナ	na	Understood, received.
mrmmw -.-.-.-.-	シア	shi a (si a)	I have traffic.
mrr -.-.-.-.	シナ	shi na (si na)	I have no traffic.
ur ..-.-.	ウナ	u na	Urgent.
uy ..-.-.-	ウケ	u ke	I have a message for you.
ud ..-.-..	ウホ	u ho	Interrogation.
umm ..-.-.-	ウコ	u ko	Receiver.

	Morse	Kana	Romaji	Meaning
ve	...--			End of message.
x	--- --	マ	ma	Relay message.
mmr	-----	ヨシ	yo shi (yo si)	Yes, affirmative.
zw	--...--	フヤ	fu ya (huya)	Transmission not clear.
zz	---...---	フフ	fufu (hu hii)	Code signal is not clear.

(5) Airman's Code of Abbreviations

The following is a list of the Japanese airman's code of two-syllable abbreviations of military terms. Each abbreviation requires exactly two Japanese Morse signs. The code words Hara and Ware are substitutions and such words as Naru and Yuku are given arbitrary meanings. The list dates from September 1939, but it is believed to be still in common use.

Full Expression	Abbreviation	Katakana	Equivalent	Code	Translation
Gun	kun	クン	ku n	...- -...-	army
Shidan	shita	シタ	shi ta	---... -	division
Ryodan	riyo	リョ	ri yo	--- - -	brigade
Rentai	ren	レン	re n	--- -...-	regiment
Daitai	tai	タイ	ta i	- - - -	battalion
Chutai	chu	チュウ	chi u	...- -...-	company
Shireibu	shire	シレ	shi re	---... - - -	headquarters
Hohei	hohe	ホヘ	ho he	--- -	infantry
Yaho	yaho	ヤホ	ya ho	- - - - -	field artillery
Juho	shiho	シホ	shi ho	---... - - -	heavy (med) artillery
Kihe	kihe	キヘ	ki he	---... -	cavalry
Hohei	hou	ホウ	ho u	--- - - -	artillery

Full Expression	Abbreviation	Katakana	Equivalent	Code	Translation
Koshaho	koho	コホ	ko ho	-----	AA artillery
Shicho	shichi	シチ	shi chi	-----	transport
Kikanju	kika	キカ	ki ka	-----	machine gun
Hikoki	Hiko	ヒコ	hi ko	-----	aircraft
Yugun	ware	ワレ	wa re	---	our troops
Teki	teki	テキ	te ki	-----	enemy
Uyokutai	uyo	ウヨ	u yo	---	right wing
Chuotai	chiwo	チヲ	chi wo	-----	center
sayokutai	sayo	サヨ	sa yo	-----	left wing
Yobitai	yohi	ヨヒ	yo hi	---	reserves
Dalissen	ise	イセ	i se	-----	first line
Zenei	see	セエ	se e	-----	advance guard
Koei	koe	コエ	ko e	-----	rear guard
Hontai	hon	ホン	ho n	-----	main body
Zempei	sen	セン	se n	-----	vanguard
Kohei	kou	コウ	ko u	-----	rear party
Sento	seto	セト	se to	-----	head
Kobi	kohi	コヒ	ko hi	-----	extreme rear
Shomen	men	メン	me n	-----	front (in meters)
Jucho	chiyo	チヨ シヨ	{ chi yo shi yo }	-----	depth (in meters)
Shuryoku	shiyu	シュ	shi yu	-----	main force
Ichibu	ichi	イチ	i chi	-----	part, partial
Shugo	shiu	シウ	shi u	-----	assembly, concentration

Full Expression	Abbreviation	Katakana	Equivalent	Code		Translation
Tenkai	ten	テン	te n	-----	-----	deployment
Zenshin	susu	スス	su su	-----	-----	advance
Teishi	toma	トマ	to ma	-----	-----	halt
Taikyaku	hiku	ヒク	hi ku	-----	-----	retreat
Jinchisenryo	chin	チン	chi n	-----	-----	occupation of a position
Naru	naruru	ナル	na ru	-----	-----	preparations for attack completed
Naranai	nara	ナラ	na ra	-----	-----	preparations for attack not complete
Yuku	yuku	ユク	yu ku	-----	-----	attack making progress
Yuri	yuri	ユリ	yu ri	-----	-----	fighting developing favorably
Totsugeki	totsu	トツ	to tsu	-----	-----	charge
Tsuigeki	tsui	ツイ	tsu i	-----	-----	pursuit making progress
Furi	furi	フリ	fu ri	-----	-----	situation unfavorable
Soshi	soshi	ソシ	so shi	-----	-----	have been checked
Toppa	toha	トハ	to ha	-----	-----	break through (at....)
Horu	horu	ホル	ho ru	-----	-----	field work is continuing
Kuru ya	kiya	キヤ	ki ya	-----	-----	(locality) appears to be preparing for attack
Teisatsu	tei	テイ	te i	-----	-----	state of ....(locality) and....(unit) is to be investigated and reported upon
Meirei	mei	メイ	me i	-----	-----	issue orders to...(unit)

Full Expression	Abbreviation	Katakana	Equivalent	Code		Translation
Sampeigo	san	サン	sa n	-----	-----	fire trench
Hoheijinchi	hochi	ホチ	ho chi	---	---	artillery positions
Tetsujomo	tetsu	テツ	te tsu	-----	----	barbed-wire entanglements
Hikojo	hara	ハラ	ha ra	-----	---	airdrome
Higashi	hika	ヒカ	hi ka	----	----	east of....(locality)
Nishi	nishi	ニシ	ni shi	----	-----	west of....(locality)
Minami	mina	ミナ	mi na	-----	---	south of....(locality)
Kita	kita	キタ	ki ta	-----	--	north of....(locality)
Mae	mae	マエ	ma e	-----	-----	in front of....(locality)
Ato	ato	アト	a to	-----	-----	behind....(locality)
Muko	kau	カウ	ka u	----	---	towards....(locality)
Wataru	wata	ワタ	wa ta	---	--	from.... to....
Migi	miki	ミキ	mi ki	-----	-----	right
Hidari	hita	ヒタ	hi ta	-----	--	left
Gozen	ze	ゼ	ze	-----	--	a.m.
Gogo	go	ゴ	go	-----	--	p.m.