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SECTION II A GERMAN SPEARHEAD IN THE KIEV OPERATION

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

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Intelligence Bulletins, published monthly.

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SECTION I

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NOTE

Because of an error in printing, the following correction should be made in Tactical and Technical Trends, No. 10 October 22, 1942.

Transpose pages 16 and 18.

1. ITALIAN CIRCLING TORPEDO

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The British Navy has recently made known the recovery of an Italian circling parachute torpedo, which has a number of characteristics that distinguish it from any other torpedo of its kind.

After the torpedo had been rendered inoperative and examined, it was found to have no depth-setting device and would therefore travel on the surface of the water with a probable wake. It is 19 inches in diameter, approximately 8 feet long, and weighs about 700 pounds, the weight of the explosive charge being nearly 200 pounds. The torpedo has a maximum speed of 6 knots, and a running time of about 30 minutes. It is equipped with a three-blade propeller and a 250-volt electric motor.

Features of the torpedo that differ externally from other Italian circling torpedoes are listed below:

- (a) The position of the impact fuzes.
- (b) The use of a ring bolt for the carrying fitting.
- (c) The location of the switch on the under side, port quarter.
- (d) Propeller streamlined flush with the body of the torpedo.
- (e) 19-inch instead of 18-inch diameter.

Internal differences which characterize the torpedo include the following features:

- (a) 250-volt instead of 220-volt motor.
- (b) Motor speed of 3,700 rpm instead of 2,880 rpm (geared down to 750 rpm).
- (c) Mercury switch on the battery. (Hitherto not found.)
- (d) Spring-loaded tail switch operated by a spring-loaded rod inside the after-part of the propeller shaft.
- (e) Starboard helm setting. (Others are set for port helm only.)

The rudder of the circling torpedo is actuated by the arm bearing on the eccentric projection of the cog-wheel, which is driven by the worm on the propeller shaft. The torpedo moves to starboard in a series of increasing circles.

Of the three fitted switches, one is an external hand switch on the port quarter and one a mercury switch on the battery, cutting out when the torpedo head lies approximately 45 degrees depression to horizontal. The third switch, which is spring-loaded, is placed inside of the after-part and is held open by a roller bearing and a disc fitted around the propeller shaft. The disc is secured by a spring-loaded rod inside the propeller shaft and projecting inside the propeller boss, where it appears to be held by a parachute lug and a plug, which is soluble. When the plug dissolves, the spring-loaded rod ejects the parachute lug, and simultaneously brings the disc further aft, permitting the spring-loaded switch to close and the motor to start.

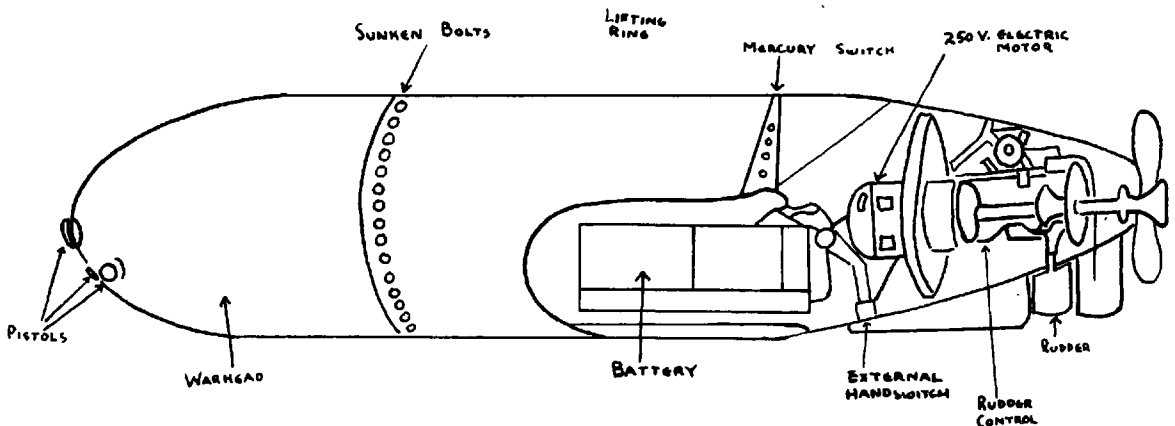
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It is believed that the torpedo had been dropped about two months prior to its recovery, as it was heavily corroded. Since the corrosion prevented the unscrewing of the impact fuze, it was decided to remove the war head complete and recover the propulsion machinery, etc. This was successfully accomplished and the war head rendered inoperative. Following the examination of the torpedo, the propulsion machinery and other parts of the mechanism were dispatched to London for further study.

It is believed that circling torpedoes have been used only experimentally up to the present time. When employed against convoys, the pilot would probably not have to maneuver his aircraft within close range of antiaircraft fire in order to score a hit, but could drop the torpedo at a reasonably safe distance and immediately resort to evasive tactics. The average running time of the torpedo, which is from 30 to 40 minutes, would give an additional advantage. A weapon of this kind would, therefore, present a serious problem to a convoy.

This type of torpedo might also be used against large vessels lying at anchor. They could best be protected against such an attack either by being surrounded with lighters made fast to the ships or by being anchored in an area enclosed by a barrage net extending to a depth of 5 feet.



250-volt electric, 3,700 rpm, geared down to 750 rpm.

One external hand switch; one mercury switch on battery, and one in tail which is operated when spring-loaded rod inside propeller shaft ejects parachute lug from propeller boss after soluble plug dissolves.

Vertical rudders driven by motor through worm gearing and eccentric cam working on rudder lever, giving gradual reduction of starboard helm. Torpedo would move in series of increasing circles to starboard.

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2. FOCKE-WULF 190 COMPARED WITH SPITFIRE IX AND P-38F

On the basis of incomplete tests of a captured Focke-Wulf 190, Germany's newest and best fighter plane, the following comparison may be made between the FW-190 on the one hand, and the Spitfire IX and the P-38F on the other.

a. FW-190 Compared with Spitfire IX

Speed--the two planes are approximately equal at most altitudes.

Climb--up to 20,000 ft the two planes are approximately equal, but at higher altitudes the Spitfire is definitely superior.

Dive--the FW-190 excels.

Maneuverability--except in radius of turn the FW-190 is superior.

General conclusion--the Spitfire compares favorably with the FW-190, especially at high altitudes.

b. FW-190 Compared with P-38F

Speed--while the P-38 is slower at low altitudes, the two planes are approximately equal at 20,000 ft, and at higher altitudes the P-38 rapidly excels.

Climb--the FW-190 is superior up to 15,000 ft, but after 20,000 ft, the P-38 has the advantage.

Dive--the FW-190 is faster in a dive than the P-38, particularly in the initial stages.

Maneuverability--except at lower speed of around 140 mph the FW-190 is superior and will out-turn the P-38.

3. EXPLODING DEVICE FOR JETTISONING BOMB CARRIERS ON JU-88

It has been ascertained that the external bomb carriers on certain Ju-88 aircraft are now being fitted with a jettison device. This device, which jettisons the complete carrier and fairing and also the bomb, if it is still in place, consists of electrically fired explosive charges which cut the holding bolts. The carriers are held to the wings by four studs, each of which is drilled to contain a charge, which shears the studs at a "neck" on the bolt, allowing the bomb rack to drop off.

It is suggested that this device is used to:

- (a) Jettison unnecessary weight and reduce head resistance in the event of failure of one engine;
- (b) Enable bombs and carriers to be jettisoned quickly if the aircraft is intercepted;
- (c) Get rid of a bomb if it is hung up.

Reports have been received from British pilots from time to time stating that pieces have been seen to fall from enemy aircraft during an action. It is possible that these may sometimes have been bomb carriers.

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4. GERMAN FIGHTER TACTICS TO AVOID ANTI-AIRCRAFT FIRE

The following report, obtained from a German prisoner of war, describes certain German aerial tactics used to lessen the effect of anti-aircraft fire.

German fighter pilots have consistently used two forms of passive defense against anti-aircraft fire. They either continued flying at the same speed, turning and twisting the aircraft in flight, or they throttled down the engine with a view to giving the ground defenses the feeling that the airplane was at a lower altitude than it really was, with the result that most of the fire was short.

ANTI-AIRCRAFT

5. ANTI-AIRCRAFT DEFENSE OF TOBRUK

The following brief comments were made at Tobruk during the period when it was undergoing intense bombardment by Axis airplanes. The anti-aircraft defense of Tobruk was outstanding up to the time of its surrender.

a. Rate of Fire

The rate of fire with the 37-mm anti-aircraft gun of 15 rounds per minute was consistently maintained, each round being set with the appropriate fuze setting. This rate of fire was continued for periods of well over a minute, and does not represent the maximum result of any single instance. This performance was due to the considerable practice obtained, and was substantially the same whether the loading tray was used or not.

b. Cover

The gun emplacements had often been the object of attack, and many of them were surrounded by numerous bomb craters. Close attention was therefore given to the parapets which, whenever possible, were themselves counter-sunk.

Stone parapets were as much as 6 to 8 feet thick at the base and about 5 feet at the top. Heavy construction such as this represented considerable labor, but after several attacks there was no question of skimping the work.

Stone parapets did not splinter and were found to be highly satisfactory against blast.

The size of the emplacements was reduced to a minimum compatible with freedom of action for the gun crew. This proved to be a diameter of 21 feet.

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c. Camouflage

Close attention was paid to camouflage which, because of the broken terrain, presented very little difficulty. A number of alternate and supplemental gun sites were prepared, partly for decoy purposes and partly to enable guns to be shifted on short notice.

d. Offensive Spirit

The offensive spirit shown by the gun crews at Tobruk was particularly noticeable, and it is not too much to say that during the siege the AA defense dominated the morale of the enemy flyers. This was reflected in the relatively little damage done in the harbor despite the heavy scale of the attacks, and the amount of air effort directed against the gun positions themselves.

6. GERMAN ANTIAIRCRAFT DEFENSE

The article translated below is a chapter from General von Cochenhausen's "Tactical Handbook for the Troop Commander" (1940 Edition). This text is extensively used by German army personnel, especially officer candidates and junior officers, and is believed to embody the current German thought on the subjects treated. For previous excerpts from the handbook, see Tactical and Technical Trends, Nos. 7 and 8.

It should be borne in mind that most German antiaircraft units are a part of the Luftwaffe organization (see Tactical and Technical Trends No. 5, p. 5 and No. 7, p. 7).

a. General

The missions of ground antiaircraft defense are:

- Defense against hostile aerial reconnaissance,
- Defense against hostile artillery observation,
- Defense against hostile air attacks on personnel and important defense installations,
- Support of friendly air combat strength.

This defense is provided by light and heavy antiaircraft battalions, antiaircraft searchlight battalions, and air barrage balloon battalions.

b. Weapons

(1) Antiaircraft Guns

Light and heavy antiaircraft weapons supplement each other in their effect. In addition, troops fire their own machine guns and rifles against planes |

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flying within a range of 800 yards. The antiaircraft gun, however, is the backbone of the entire antiaircraft defense. The battery is the fire unit, and the suballotment of its elements is not considered practical.

The heavy battery bears the brunt of the antiaircraft defense in the combat zone and combines a great range with rapid fire and mobility.

The mission of these heavy antiaircraft guns is to protect the ground troops against air reconnaissance and high-altitude attacks while on the march, at rest, or in actual combat. Moved by tractor or truck, the average marching speed of these heavy AA guns is from 5 to 20 miles per hour. Horse-drawn antiaircraft cannon are employed only by units contending with fuel shortages and very unsuitable road nets. Antiaircraft units moved by tractor or truck can be prepared for action rapidly, have great mobility, and can be employed within the effective range of hostile artillery.

These weapons are employed against hostile airplanes, especially attack units, flying at altitudes up to approximately 25,000 feet. Heavy antiaircraft artillery cannot be used against planes flying at altitudes under 3,000 feet. Because of the requirements for special fire-control equipment and special ammunition, these weapons are only to be used against ground targets in the case of close-in tank attacks.

(2) Light Antiaircraft Cannon

These lighter weapons are especially suitable for defense against planes flying at short ranges and at low altitudes, such as those attacking by ground-strafting and dive-bombing.

They are moved by mechanical transport, either on trucks or on self-propelled mounts, and are characterized by great mobility and, using tracer, by their ability to track air targets having a high angular rate of travel and change of ranges. The average marching speed of units equipped with these weapons is from 16 to 25 miles per hour.

(3) Antiaircraft Searchlight (60 and 150 cm)

By means of searchlights, alone or in cooperation with pursuit aviation, it is possible to discover hostile airplanes at night and deliver aimed fire at them as well as to blind the airplane crews, thus increasing their difficulties in orientation and preventing them from dropping bombs accurately. Searchlights do not attempt to illuminate the entire sky continuously. The general area of their targets is determined with sound-locator apparatus, and searchlights then illuminate the planes. Searchlights are moved by motor vehicles.

The 60-cm antiaircraft searchlight is organic within light antiaircraft artillery battalions, each of which is provided with 12 searchlights. With good visibility conditions, the maximum range of this searchlight is approximately 116,000 feet.

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The 150-cm antiaircraft searchlights are organized into special searchlight battalions, each provided with 27 searchlights. With good visibility conditions, their maximum range is approximately 25,000 feet.

(4) Air Obstacles

Barrage balloons supplement the defense provided by antiaircraft artillery, especially around important objectives. They are installed within, as well as around, the defended objective.

The mission of air obstacles, depending on their method of employment and altitudes, is to defend against high-level, low-level, or dive-bomber attacks.

c. Self-Defense of the Troops against Air Attacks

Troops of all arms, as well as the services, use their own light and heavy machine guns against low-altitude attacks at ranges of less than 850 yards. All light and heavy machine guns are provided with supplementary equipment for firing at air targets. All troops use small arms against low-altitude attacks up to ranges of 550 yards.

d. Employment

Several antiaircraft battalions may be assigned to a regimental commander, who, as far as the antiaircraft artillery is concerned, is placed directly under army command. The antiaircraft artillery attached to a corps is placed under the senior antiaircraft officer, who is then designated as the "corps antiaircraft artillery commander." The corps regulates the employment of the corps air units and corps antiaircraft artillery, as well as their cooperation with the aircraft warning service, in accordance with the orders of the army commander. One or more antiaircraft battalions may be placed under a corps, or, in exceptional cases, a division. Then, if no higher staff is available, the "antiaircraft artillery commander" has the mission of advising the ground force commander on all questions concerning: antiaircraft defenses, the employment of subordinate air and antiaircraft forces in accordance with the plan of action, and the execution of the pertinent orders of the ground force commander.

Normally, the antiaircraft artillery strength is concentrated around and on the most important and most critical points. Accordingly, the ground and air situations determine definite antiaircraft main efforts, which must usually be made at the expense of exposing a few less important points. March movements, for example, can generally be defended only at a few specially dangerous places, such as bridges and defiles, assembly points, and rest areas. On the battlefield, antiaircraft defense is usually most urgently needed to protect the artillery main effort.

The antiaircraft artillery battalion commander is essentially a tactical commander. Because of the widely separated battery positions and the characteristics of the targets, unity of fire control within the battalion is impossible.

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The changing of positions interrupts the fire effect, and therefore it must be given careful attention, and generally should be carried out by echelons.

Pursuit aviation cooperates with antiaircraft artillery. By the concentration of pursuit aviation strength and antiaircraft artillery at decisive points, and by air attacks against hostile airfields, hostile air reconnaissance can be suppressed for a limited time over a limited area. Nevertheless, individual hostile reconnaissance planes may be expected to get through; consequently, even in case of temporary air superiority, camouflage measures should always be effected. In case only weak pursuit forces are available, it is more important than ever that their employment be coordinated with the antiaircraft artillery, so that they may at least impede the normal hostile reconnaissance. Blockading an air area by means of pursuit aviation promises only limited success and results in the excessive use of air strength.

e. Air Signal Troops

A part of the air signal troops (ground force liaison battalions) are placed under the army, and operate actually under the air arm commander at army headquarters. The missions of these units are:

(1) To install and operate communications between the air arm commander and reconnaissance aviation and antiaircraft artillery that are directly under him.

(2) To maintain connection with the communications net of the operating air arm, which includes bombardment, dive-bombing, pursuit, and low-flying combat planes.

The establishment of communications with reconnaissance and antiaircraft units in support of corps and division commands is a responsibility of ground force signal units.

Separate air signal units of the operating air arm are employed well forward to carry out the air security and warning service in the zone of operations.

f. Aircraft Warning Service

This service depends on the airplane recognition service and is carried out by the liaison troops.

There is a fixed "German territorial aircraft-warning service" and a "mobile aircraft-warning service" which is carried out by aircraft-warning service companies. This warning service is operated through the air district headquarters commanders, under whom the aircraft-warning service is subordinated.

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The fixed "aircraft-warning service net" is mesh-like in character. The distance of individual air guard lines from one another varies between 20 and 45 miles. These distances and lines are established in accordance with tactical considerations. "Air guard stations" comprising observation and reporting stations (6 to 8 miles apart) and "air guard headquarters," comprising plotting and relaying stations, are agencies of the aircraft-warning service.

The motorized aircraft-warning companies supplement and increase the density of the fixed aircraft-warning net. Although usually employed well forward, they may be employed on open flanks and in rear areas.

The reports of the German territorial aircraft-warning service are made by wire, whereas the reports of the motorized aircraft-warning companies are made by radio.

The aircraft-warning service is supplemented by the troop-warning service of the antiaircraft artillery (similar to the German antiaircraft artillery information service). Every active antiaircraft artillery unit observes the air in the area under its jurisdiction with specially trained personnel. Thus, these units as air guards, and their staffs as air guard headquarters, execute, or in some cases supplement, the aircraft-warning service. The reports, after being checked by the antiaircraft artillery battalion, are transmitted to the air arm commander at army headquarters. These reports must contain the following: name or location of observation position; hour the planes were seen or heard; the number, type, nationality, and flight direction of the hostile planes; the altitude of the planes and their range from the air guards (only if this altitude and range are unusually great).

In addition, all troop units must use their own air guards to avoid surprise. These guards give warning by means of calls, horns, sirens, or blinker lamps. If antiaircraft artillery is present, its fire is the most effective warning.

CHEMICAL WARFARE

7. THE EMPLOYMENT OF SMOKE IN COOPERATION WITH COMBAT TROOPS

The article translated below is another chapter from the latest edition of General von Coothenhausen's Tactical Handbook for the Troop Commander (1940 edition).

As far as is known, the German Army does not have a chemical warfare service as such. When smoke is required in limited areas, it is furnished generally by smoke-producing ammunition fired by the combat units' organic weapons, such as artillery and mortars. In operations involving the use of smoke in large quantities, motorized units specially trained and equipped are allotted by GHQ for this purpose. These units are commonly called "smoke-throwing battalions" (Nebelwerferabteilungen). Each battalion is organized, in

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general, into a staff, communication platoon, and three batteries, each composed of two platoons of four mortars each.

The translation follows.

* * *

a. Purpose and Characteristics of Smoke

Smoke is used to conceal friendly troops and installations, and also to blind or deceive the enemy or hinder the effect of his fire. It is preferable to smoke the enemy, if the smoke mission in the given situation can be accomplished with the existing material. The enemy's fire effect is decreased if the smoke covers his riflemen and observation posts rather than his targets. Also, to smoke friendly troops restricts their action and draws the enemy's attention toward them.

Favorable conditions for the employment of smoke are: a steady moderate wind, humid atmosphere, clouded sky, falling temperature, early morning or late evening hours, and bare, even terrain.

Unfavorable conditions for the employment of smoke are: a very weak wind or a calm, a very strong gusty wind constantly changing its direction, dry atmosphere, sunshine, heat, and hilly or covered terrain.

b. Materiel

(1) Smoke Ammunition

Smoke may be produced by special ammunition for artillery and mortars, as well as by ammunition for special weapons. Smoke ammunition is most applicable for use against hostile troops and is least dependent upon the weather. A smoke cloud which is to blind the enemy should be built up as rapidly as possible and maintained with moderate fire.

Ordinary mortars and special gas mortars normally consume less ammunition than cannon or artillery of equal caliber.

(2) Smoke Sprayers and Smoke-Releasing Apparatus

Devices which release a smoke-producing fluid may be used to establish a smoke curtain or a smoke cloud.

The sprayers most commonly used are the small type carried on the back of the individual soldier, and the large type which is moved into position on a hand cart. The small sprayers produce smoke for a period lasting about 10 minutes, and the large ones, for periods lasting from 30 to 40 minutes. The small sprayers can be used by troops either while they are moving or in position.

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These sprayers are suitable for rapid use within the combat area of infantry troops. The installation of the large sprayers in the forward parts of the combat zone is time-consuming, and possible only when the terrain is hidden from hostile observation.

Sprayers can release smoke effectively whatever the direction and speed of the wind, and any vehicles equipped with sprayers can release smoke effectively even in a calm atmosphere, providing the vehicles are moving at high speeds. However, if the wind is blowing away from the enemy, such a method should not be used to smoke friendly front-line troops. This method is applicable for smoking the enemy only at short distances (seldom more than 800 to 1,000 yards), and if there is a steady wind toward the enemy.

(3) Hand and Rifle Smoke Grenades

These weapons have a limited effect both as to time and space.

(4) Smoke Candles and Smoldering Material

These develop smoke which resembles fog. The material most commonly used includes small candles that are thrown, or placed, a few paces apart on the ground. They produce smoke for periods lasting about 2 minutes, and are used mostly in such small-scale operations as combat in the interior of a hostile position.

(5) Airplane Smoke Material

Airplanes may drop smoke bombs to screen the enemy for a short time and in limited areas.

Airplanes may also be equipped with smoke sprayers, which, depending upon the type and size of the apparatus, can either lay a flat smoke screen about 300 yards wide and several miles long, or establish a vertical curtain about 200 yards high. Planes so equipped may be used to produce smoke in air combat, or they may release smoke to blind AA weapons or deprive the enemy of ground observation over friendly troops. Because of their rapid employment, and great extension but short duration, such smoke screens are principally suitable for concealing the movement of mobile units.

c. Issuance of Orders for the Employment of Smoke

The influence of weather conditions and the usually short duration of the smoke effect require quick decisions in its employment. Disadvantages are the restriction of observation and the interference with neighboring troops. Artillery and other troops that will be affected by the smoke should be informed of its contemplated use. Independent employment is permitted only in case the effect of the smoke is limited to the area of the command using it. In other cases, the use of smoke is regulated by the higher commander.

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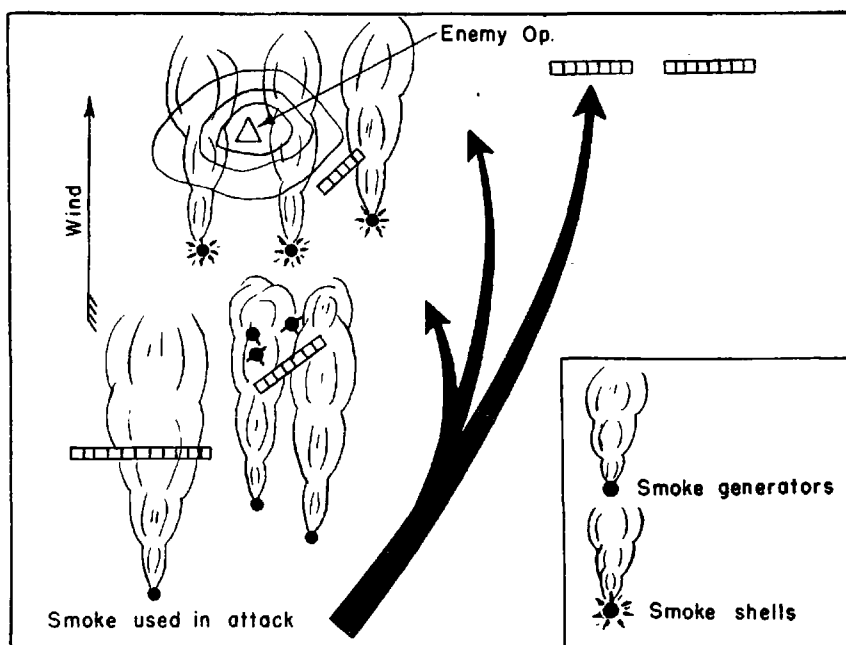
The commander can normally withhold from his subordinate units the permission to use smoke; only armored vehicles may use smoke for self-protection without restriction.

For large-scale smoke operations, army and corps commanders allot to their subordinate units smoke troops with projectors or sprayers, the necessary ammunition for artillery and mortars, and airplanes equipped with smoke-producing apparatus. In general, the division commander regulates the use of smoke and coordinates it with the fire and movement of his subordinate units. Recommendations are made by the smoke-troop commander. The combat order should prescribe what the smoke is to conceal and why. When used to restrict hostile observation, the direction and duration of the screen should also be stated. To insure close cooperation, smoke troops are usually attached to the units to be protected.

d. Use of Smoke in Large-Scale Operations

(1) Attack

Smoke conceals the movements made in preparation for attack and facilitates surprise. Smoke reduces losses, and its use is especially valuable in crossing open terrain and during the initial crossing of a river. Concealed hostile positions, suspected observation posts, and defensive weapons, such as machine guns, can be prevented from operating efficiently. When smoke is used for this purpose, it saves fire power and facilitates the establishment of the artillery main effort. Smoke serves to support the attack in the zone of the main

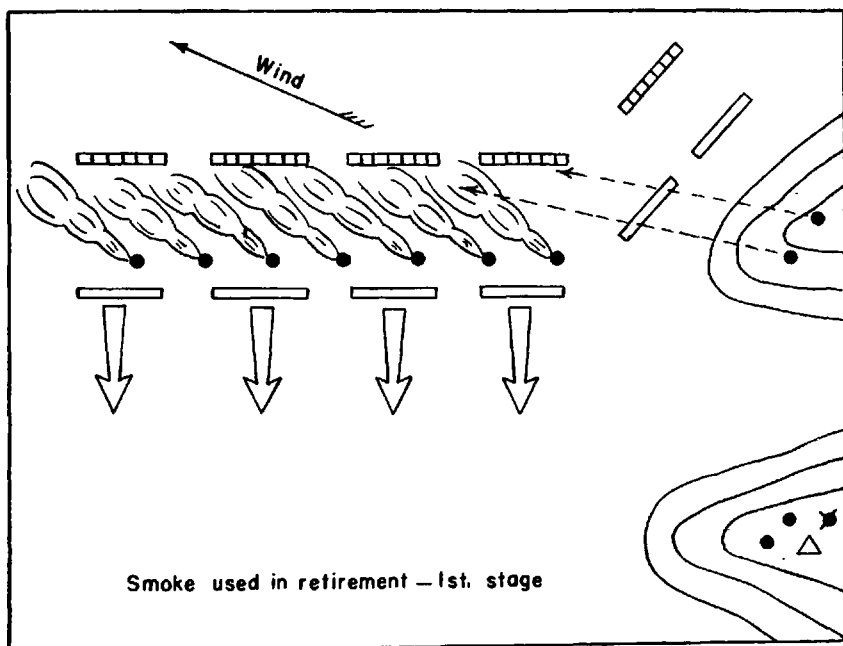


effort, to veil weakness in adjacent zones, and to conceal gaps in the lines.

Most frequently, the attacker uses smoke shells to blind the enemy. Smoke sprayers are seldom used for this purpose, and then only as a temporary expedient, providing the wind is blowing toward the enemy. Sprayers are mainly used to conceal the movements of attacking troops.

(2) Defense

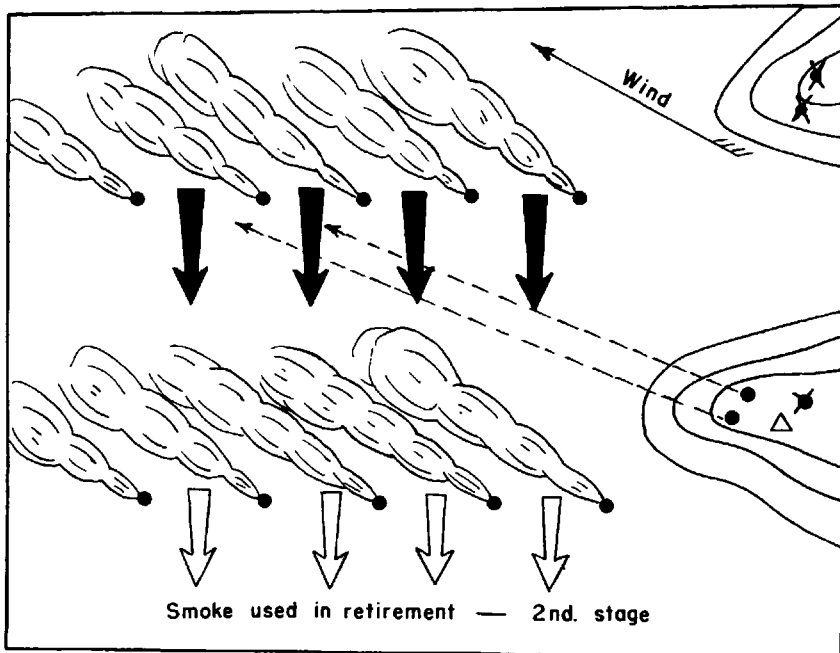
In defense, the use of smoke in front of the friendly artillery observation posts is seldom advisable, because such use blinds their observation. The defender's use of smoke on critical parts of his own position in the event of a tank attack is generally not recommended.



Fire from smoke-producing ammunition is a suitable expedient for blinding hostile observation positions. When using smoke in the forward zone to conceal working parties or movements, previous arrangements should be made for observation, from the flank, of the terrain beyond the smoke cloud, and for fire protection against surprise attack by the enemy.

Smoke may be used in the rear of the defender's artillery observation posts, except when the wind is blowing in the direction of the enemy. Such use serves to conceal the shifting of strength, the movement of reserves, or changes in artillery positions; but it will fulfill its purpose only if it completely excludes all observation.

(3) In breaking contact during combat, smoke gives valuable assistance. By providing concealment, it facilitates disengagement from the enemy by day. Whenever possible, the enemy should be blinded by use of smoke-producing ammunition. Ordinarily, the withdrawing troops can also be covered by sprayed smoke, even if the wind is blowing in the direction of the withdrawal. In general, however, the timely employment of smoke sprayers is possible only in case of previously planned preparations for retirement. Naturally, the smoke apparatus will fall into the enemy's hands. The advancing enemy should be held up by observed or planned fire as soon as the smoking or retrograde movement begins, in order to prevent him from using the occasion to launch an attack on the withdrawing troops.



(4) Concealment from air observation requires a great expenditure of smoke ammunition, and therefore is possible only for short periods of time. The establishment of a complete and effective smoke screen can be accomplished only under especially favorable weather and terrain conditions. Combat bridge construction and large ferries cannot be concealed from the air by smoke for long periods of time. Likewise, troop movements can be concealed only during short marches: for example, troops moving from a dispersed or camouflaged formation into natural cover. Smoke makes low-level air attacks more difficult.

(5) Smoke may be used deceptively to divert hostile attention and fire from important positions. For example, in river crossings, it may be used at several places in order to deceive the enemy as to the location of the contemplated crossing. The size of the deceptive smoke cloud must be such as to make it appear to serve an important purpose in the combat situation.

e. Use of Smoke in Small-Scale Operations

In local operations, smoke should be produced by the combat troops' organic facilities, which include smoke candles, hand and rifle smoke grenades, artillery and mortar smoke shells, and smoke sprayers on armored vehicles.

f. Combat in Smoke

Smoke hinders the defense more than the attack.

Troops moving across country in smoke maintain their direction by compass. In order to maintain control, it is often practical to move troops by bounds. In smoke, troops should advance silently and attack resolutely. The decision is secured in close combat. Upon contact with the enemy, attack him immediately with the bayonet, hand grenades, and battle cries.

In defense, the direction of fire should be definitely established and a fire plan prepared in advance, thereby guaranteeing effective fire even in case of a surprise attack supported by smoke. In case of hostile smoke, gas masks are used until it is definitely determined that the smoke is not mixed with toxic agents.

Front-line troops should open fire individually against hostile smoke only if it is directly in front of their own position; the enemy may be displaying smoke to divert fire from his own important positions. Combined fire will be ordered by higher authority. Friendly air reconnaissance should determine definitely what the hostile smoke conceals.

* * *

Comments: In order to disperse the hostile fire that smoke attracts, it should cover the maximum area. However, the possible hindrance to friendly artillery observation, fire, and troop movements should always be taken into consideration in decisions to use smoke. Even if handicapped by smoke, artillery can continue to execute its prepared fires, but it cannot recognize or fire effectively upon new targets. In view of the above considerations, the Germans have not emphasized the development of smoke-spraying vehicles for use in support of front-line units, but prefer to use weapons firing smoke-producing ammunition.

The Germans believe that it is generally unnecessary for the defender to leave his cover and move into view of an attacking enemy. Therefore, the use of smoke by the defense is usually undesirable, since the strength of the defense depends mainly on the effectiveness of aimed and observed fires.

It must be assumed that the purpose of smoke during a daylight withdrawal will be immediately recognized by the enemy, who will increase his efforts to push after the retiring troops. Smoke alone will not hold the enemy away. Therefore, in such situations, German artillery and other heavy weapons

supporting a withdrawal will increase their fires against favorable targets, previously selected and registered. These weapons will also be prepared to place aimed and observed fire upon the advancing enemy as he emerges from the smoke.

It has been noted in this and other texts, as well as in accounts of combat experiences, that the Germans frequently use smoke as follows: to conceal movements of armored and foot troops, especially from the flanks; to deceive the enemy, by placing smoke at seemingly logical and important points; and to reduce the ammunition expenditures required to neutralize hostile weapons, especially those which cannot be effectively engaged by armored vehicles, infantry weapons, or artillery.

Whether the use of smoke brings the intended results depends upon the ability of the commanders to achieve a skillful cooperation between the effect of the smoke and the fire and movement of the combat troops.

8. MUSTARD GAS AND INCENDIARY BOMBS

A British report on chemical warfare stresses the fact that it is technically possible and tactically valuable to use mustard gas bombs with incendiary bombs in such a way that the areas covered by the two types overlap, or at least are adjacent.

The tactical value of this combination lies in the hampering of the fire-fighting services by the presence of contamination in the area where they must work, and in the threat of casualties among personnel.

The report emphasizes that the mustard gas will cause confusion and delay among the fire-fighting troops, especially at night, thus allowing the fire to spread. No important proportion of the mustard gas will be destroyed by fire.

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INFANTRY

9. NOTES FROM A SECOND GERMAN ARMY TRAINING DIRECTIVE

The following notes were translated from a captured German document. They are the commanding general's views on various phases of German Army training. The section given here concerns tactics.

* * *

When expecting contact with an enemy reported to be in approach march formation, the troops should advance, depending upon the situation, either in small columns or completely deployed. Whenever possible, supporting weapons should be in position to render assistance. The approach march formation develops into the attack formation when enemy fire demands such action.

Generally, division orders will assign one or more objectives for the division as a whole, as well as final objectives for the infantry regiments. Only in exceptional cases will intermediate objectives for the infantry regiments be assigned by the division order.

In spite of my directives, almost without exception, a triangular formation has been adopted for the purpose of constituting a "point of attack," although it is clear to every one that an attack carried out by an infantry regiment whose units advance in a triangular formation is, as a matter of fact, led merely by the light machine gun of a single combat group, and, as a result, is subjected to heavy enemy fire and doomed to failure. I invite your attention again to the fact that the triangular formation must not become a fixed rule.

It is a rule that an infantry regiment should constitute several "points of attack," particularly against a well-organized enemy defense.

Narrow and deep formations make it easier for the subordinates, and especially for the battalion commander, to make use of his heavy infantry weapons. The organization of the fire of these arms and the synchronizing of their fire with the advance of the troops are the supreme test of the battalion commander.

The lessons of the World War, confirmed by those of the campaign in Poland and in the West, that widely deployed formations avoid severe infantry losses, must always be borne in mind. They must be resorted to even on a terrain that is not under the direct observation of the enemy (depressions, wooded areas, etc.) but which can be brought under his fire.

The junior officers and noncommissioned officers of the infantry must realize that the combat formation of their respective units will be subjected to continual changes because of the terrain and enemy fire. The shaping of the formation to meet the new situation rests with every subordinate commander.

Staffs forced to move on foot during an advance should avoid bare ridges or open spaces. Should it be absolutely necessary to cross them, widely deployed formations should be used.

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The advantage fog affords to the attacker will be lost if the commander does not require that it be fully utilized in moving against the enemy position.

In darkness, fog, or large wooded areas, a compass is the most simple means for maintaining the direction of attack. It is frequently the case that the direction of march is fixed by the battalion rather than higher headquarters.

To have the reserves follow at a prescribed distance is wrong; and to leave them at a fixed point during the development of the action is frequently in advisable.

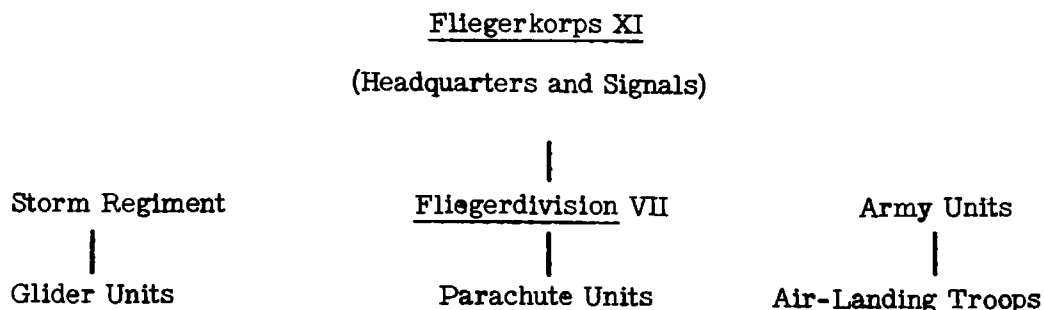
The reserves should be moved from one point of the terrain to another only when so ordered and, until the moment they are engaged, their commander or the second-in-command should be with the commander at whose disposal they have been placed.

10. ORGANIZATION, TRAINING, AND EMPLOYMENT OF GERMAN PARACHUTISTS

a. Organization

German parachute units are a part of the German Air Force and come under the immediate control of Flieger Division VII. They consist of parachute rifle regiments together with parachute antitank, antiaircraft, signal, engineer, medical, supply, and other auxiliary units. Four parachute rifle regiments have been definitely identified, and there are possibly six in existence. Including the auxiliary units, there is thus a total of 18,000 to 20,000 fully trained and equipped parachutists.

Air-landing operations come under the control of Fliegerkorps XI. In a large-scale air-landing operation, the corps would command not only the parachute units but also glider troops, air-landing troops, and transport aircraft as shown below.



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Parachute rifle regiments are organized like infantry regiments. This fits in well with the organization and tactical use of the transport squadrons. The basic organization is a section of 12 men armed with 2 light or heavy machine guns, rifles, and revolvers; or 8 men with a heavy mortar. Either load is suitable for one Ju-52 airplane. Three sections form one platoon which is carried in a flight, or Kette, of three Ju-52's. A rifle company consists of 12 sections, which are conveniently carried by a German squadron, or Staffel. A battalion comprises 3 rifle companies and 1 weapons company, with a total of about 600 parachutists and 200 non-parachutists. This is the load, including battalion headquarters, of a GAF Gruppe of 53 Ju-52 transport aircraft. Battalion organization is shown in the accompanying diagram.

b. Parachute Jumping Course

Originally this course lasted 6 weeks, was then reduced to 4, and is now compressed into 16 days. During bad weather it is not possible to complete the courses in the prescribed period, as initial jumps are carried out only under ideal conditions. During the winter 1941-1942, the weather was so bad that one school was closed for several weeks.

The instruction given has not altered from that of the longer course but is necessarily much more intensive. Previously, more time was spent on ground exercises before jumping was attempted.

For the first 10 days of the course, instruction includes the following:

(1) Lectures on parachute packing, theory of parachute control during descent, etc.

(2) Practice in parachute packing as much as 3 hours a day.

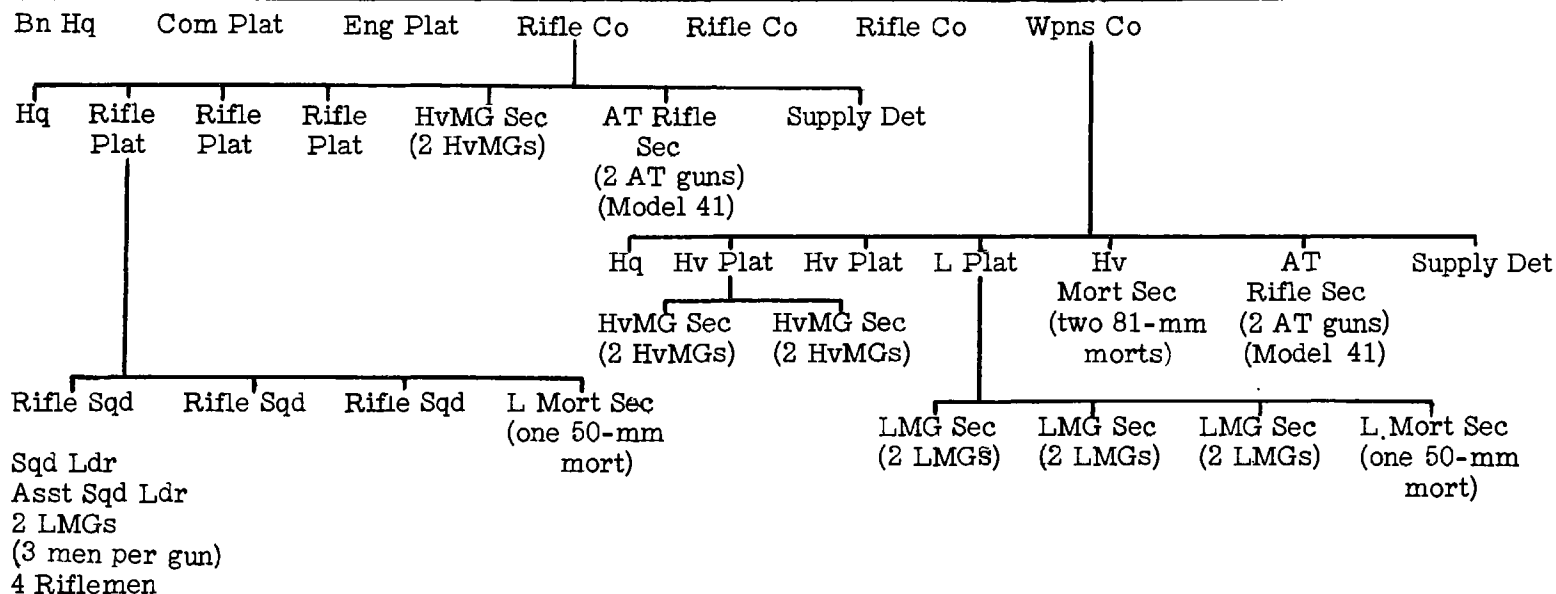
(3) Instruction in movement and jumping out of a skeleton Ju-52.

(4) Jumping from a platform approximately 9 feet high on to matting about 4 inches thick. Full jumping uniform and equipment (minus parachute) are worn. The height of the platform is not varied. Men are taught the correct method of falling, this being practiced for about 1 hour a day.

(5) Practice on a suspension device. This includes instruction in control of a parachute during descent, how to counteract drift, how to maintain a normal hanging position, and control of a parachute on landing. This is practiced for 2 hours daily. The suspension device is moved by artificial currents which produce conditions experienced during an actual descent.

On each of the last 6 days of the course jumps are made from altitudes starting at 900 feet and gradually reduced to 350 feet. The number of training jumps is six. For the first five jumps, only parachute clothing is worn; for the sixth, full equipment and rifles are carried, and a light machine gun is dropped with the section.

ORGANIZATION OF A PARACHUTE RIFLE BATTALION



NOTES:

- (1) PWs state that in Africa each Rifle Co was to have 2 HvMGs attached from the Wpns Co. This would seem to be in conformity with present practice in German Inf Bns in Africa. This would make the total of 4 HvMGs in a Rifle Co.
- (2) Prisoners are at variance concerning the number of LMGs per Rifle Sec but from previous evidence the figure is believed to be 2.
- (3) The number of AT guns in an AT Sec of the Wpns Co is uncertain. As it seems to be only a section however it would be most unlikely to have more than 2. This would conform with the AT Rifle Secs in the Rifle Cos.

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The following jumping drill is taught. Besides the pilot and gunner, there is an Absetzer (controller) who issues the orders to jump as follows:

- (1) "Get ready."
- (2) "Get ready to jump."
- (3) Whistle---blown by the controller.

The men jump in the following order:

- (1) Section leader or assistant leader.
- (2) Three light machine-gunners.
- (3) Four riflemen.
- (4) Three light machine-gunners.
- (5) Assistant section leader or section leader.

c. Employment

In full-scale air landings such as in the Crete campaign, parachutists and gliders with air-borne troops have their place in the operations. The glider troops are used in the initial phase to attack batteries and anti-aircraft gun positions and silence them in preparation for the arrival of the parachutists. (In Crete the parachutists arrived 15 minutes after the gliders.) On landing, the parachutist discards his parachute, collects his equipment, and assembles with his section as quickly as possible. In the first few minutes after landing, while under the shock of the jump and before they have regrouped, parachutists are highly vulnerable. In many cases where they have been attacked immediately after landing, whole units have been wiped out. If not attacked, however, the parachutists rapidly collect together and proceed to the attack. In this they frequently have the advantage of surprise, while their very heavy fire power, particularly at short range, makes them formidable opponents. One of their first objectives is frequently an airdrome or landing area suitable for Ju-52's carrying troops. These troops usually consist of infantry or mountain regiments. These reinforcements join the parachutists and continue operations against the opposing forces. Further supplies and reinforcements continue to be landed by air as required.

Smaller-scale parachute operations may be undertaken with the object of seizing key points, such as roads, bridges, strongpoints, etc. in the rear of the enemy. These attacks are carried out particularly in conjunction with land offensives when the parachutists may expect to have to hold their position only for a few hours, or at the most, a day or two, before being relieved by their advancing forces. The number employed in such operations may vary from a platoon to a battalion in strength, according to the objective.

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A common use of parachutists in connection with an attack is to drop individuals or small groups behind the enemy lines. The object is to cause the maximum amount of disruption and panic by sabotage of communications (cutting telephone wires, blowing up railways, etc.), issuing false orders, spreading rumors, misdirecting traffic, etc. These agents may be disguised and have a perfect knowledge of the enemy's language.

11. FURTHER NOTES ON THE BURMA CAMPAIGN

The following are some further items from British sources on the experiences gained in the Burma Campaign. Other material on this subject was included in Tactical and Technical Trends, No. 9, p. 15.

a. Pace of Fighting

The British reports stress the "absolute necessity" for an adequate flow of reinforcements, permitting the interchange of units in the front line so that troops will have a rest every 3 or 4 days. The Japanese Army (it is stated), will sacrifice manpower and use fresh troops in repeated assaults to gain an objective.

b. Arming of Service Troops

In the fighting in Burma, lines of communication were very long and exposed, and the Japanese made dangerous attacks on rear areas by flanking or infiltration groups. Under these conditions, it was regarded as absolutely necessary that all types of troops--engineer, signal corps, ordnance, etc.--should be provided with, and trained in the use of, rifle, bayonet, grenades, machine guns, and Tommy guns.

c. Equipment for Jungle Fighting

The following recommendations were made:

(1) Troops should be armed at all times. Every man should be issued a bandolier, which he can carry about with his rifle wherever he goes. Full equipment need not be worn at all times; in an emergency the important thing is to have a rifle and 50 rounds.

(2) Every man should carry at least one light machine-gun magazine, in addition to his own ammunition.

(3) Some form of knife should be issued to troops in jungle country.

(4) Individual intrenching tools should be carried by every one, but should be modified to exclude the pick end and to make the digging end slightly stronger (Note: this refers to British types of tools). These would be supplied.

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mented in the battalion by ordinary picks and shovels.

d. Infantry Patrols

(1) Length of Patrols

Throughout the Burma Campaign, infantry were at all times called upon for heavy patrol duties. The number and length of patrols were increased by the enclosed nature of the country (restricting observation), by lack of reconnaissance aircraft, shortage of mobile troops, and the Japanese aptitude for using little known and even unmarked trails. The arrival of an armored brigade did little to help reduce the burden put on the infantry; in the early stages, this brigade operated as a separate mobile force ahead of the infantry, and later was employed for shock action or distant patrolling.

These factors not only made patrol duties heavy, but increased beyond ordinary requirements the depth to which patrols were required to operate. Bren-carrier patrols to a distance of 13 miles were commonplace, and sometimes infantry on foot were called upon to patrol as far as 15 miles ahead of forward units. The necessity for frequent carrier patrols, at long distances, led to the carrier vehicles being treated as armored cars--an unsuitable role. Many were lost on roads and trails in close country through grenade or mortar attacks, or through destruction of the crew by snipers armed with automatic weapons and concealed in trees.

(2) Functioning of Patrols

When infantry patrols are sent on foot for such long distances from their nearest support, very high morale is required, as well as leadership above the average. If a patrol returns prematurely or fails to carry out its mission, this may vitally affect the security of the main forces.

In a country where Fifth Columnists are numerous, British sources recommend special precautions, such as moving only at night and avoiding villages.

(3) Forms of Patrols

In some cases, infantry in trucks accompanied armored carriers on long-distance patrols. It is doubted whether this was good practice, since the infantry was vulnerable to attack and the trucks had limited capacities for cross-country patrol work.

On one occasion, a 3-inch mortar was man-handled forward by a patrol and achieved a notable success, the enemy being completely unprepared for fire of this type forward of the British positions.

(4) Sending Back Information

Lack of equipment for communications added to the difficulties of patrol work in close country. Information was often slow in getting back from the patrols. Retirements of the main forces often had to be made on short notice, and patrols could not always be notified of the movement. Sound signals (prearranged fires, etc.) were not always a practical method of overcoming this difficulty.

(5) Possible Use of Cavalry

Neither side employed cavalry for patrols. The British report suggests that cavalry using small native ponies would have been invaluable in this campaign. For patrol work, it is suggested that the mounted infantry should have a high proportion of light machine guns and submachine guns carried with the troops. Mounted patrols could use pack wireless and Jeeps to communicate information and receive orders. Specifically, the report suggests that three companies of mounted infantry, plus a company of armored scout cars (U.S. type) having some heavy mortars, would make the ideal reconnaissance unit or light covering force for a division.

(6) Maps

Without adequate maps, long distance patrols found great trouble in carrying out assignments in difficult country.

e. Village Fighting

Village fighting was involved in a majority of the actions in this campaign.

(1) Character of Burmese Villages

They consist of bamboo houses, with the living quarters raised off the ground and entered by a ladder. Cattle and equipment are kept on the ground underneath. The roofs are thatched with leaves, and holes can be easily made in them. Houses are generally separated from each other by bamboo stockades, often with sharpened ends, and the whole village is usually surrounded by a stockade. Cactus hedges are common. Villages, if lacking in bamboo or other cover, are usually built in squares. Where cover is abundant, the village is irregular. There is plenty of cover for concealment in the ordinary village.

Village sanitation is deplorable. The best water supply (wells) was usually in the villages; this led to troop concentrations in or near villages, and so to village fighting. The best water is found at the village temple.

(2) Japanese Tactics

The Japanese shock-troops were adept at infiltrating into villages and concealing themselves. They used trees extensively; also green camouflage nets. They were skillful in taking cover in houses and frequently used the roof as a sniping position, after knocking out a small hole, by supporting themselves on rafters. Culverts, bridges, sunken roads, bamboo clumps, wicker baskets, rice dumps, trenches under houses--all were likely hiding places.

(3) British Tactics

To clear a village occupied by the Japanese required bold and resolute leadership. The roads were to be avoided. Unless the village ran into the jungle, a straightforward advance through the houses on both sides of the road paid best. Attack, in two waves, should include a firing party with automatic weapons followed by a mopping-up party--both with plenty of bombs.

If snipers were not caught by the first wave, they could be dealt with by setting fire to houses and other cover--in such a way as not to interfere with the main operation. Mopping-up had to be thorough, and the houses searched from ground to roof; otherwise, the Jap merely "fades out" and "fades in" again at will. When the village is flanked with jungle, it is suicidal for attacking troops to advance across the more open spaces of the village with the flanks not cleared. An encircling movement through the jungle into the village will bring fewer casualties. In such a maneuver, objectives must be strictly limited. As each successive objective is gained, there must be a pause for reorganization, selection of the best objective (to be clearly stated to all troops), and replenishment of ammunition. These encircling movements can be supported by frontal covering fire with automatic weapons.

Tanks can be effectively used in support of infantry in clearing a village. They advance down roads echeloned back from each wave of infantry. They are thus comparatively safe from antitank grenades, and the infantry ahead of the tanks can deal with antitank weapons covering the road. Tanks often obtained a favorable target by moving along the flanks of villages.

Armored carriers can be used in a similar way, if tanks are not available. Both tanks and carriers can easily make breaches in stockades by charging them.

(4) Miscellaneous

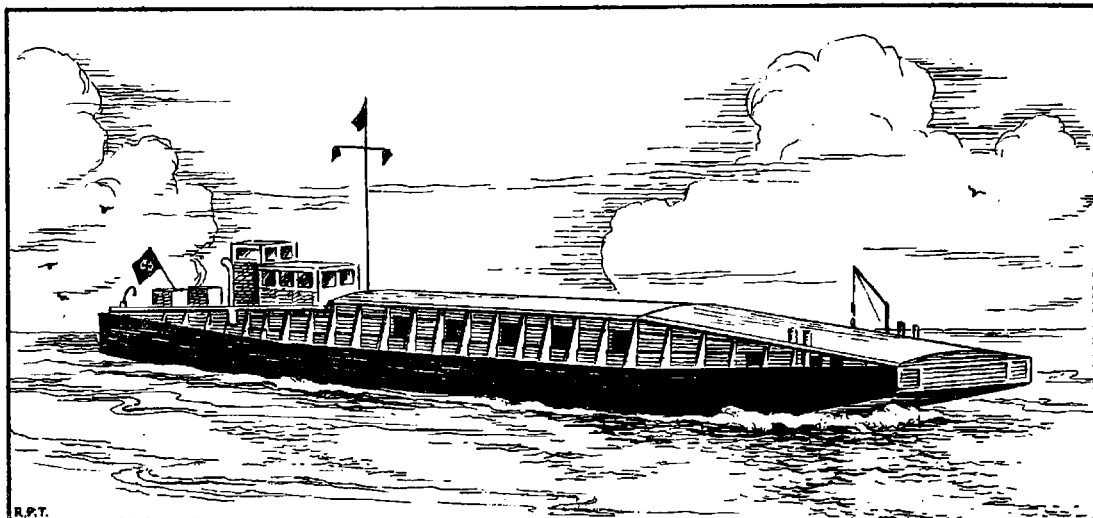
The searching fire of mortars, well in front of advancing infantry, is effective in making the Japanese give ground.

In firing a village (to improve fields of fire), it should be remembered that dumps of rice will take 2 to 3 days to burn out. A dry bamboo house will burn out in 20 to 30 minutes. The "plop" of burning bamboo shoots has often been mistaken for enemy small-arms fire.

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12. GERMAN TANK-LANDING CRAFT

This information concerning tank-landing craft, called "F" boats, is based on the examination of a vessel wrecked in Salum, and on observation of others passing through the Dardanelles.

a. Detail(1) Construction

Width of hold is 13 feet, but the width of the ramp is 11 1/2 feet and immediately forward of this, the passage is only 10 1/2 feet wide. This will permit a free passage of tanks up to at least the Pz Kw IV (22 to 24 tons). The superstructure is about 8 feet above the deck. The bows rise clear of the water about 17 feet.

The front opening is covered with thick corrugated iron sheeting on strongbacks and held down by fore and aft securing strips on each side.

The bridge is of 1/2-inch plating about 5 feet high in front and on both sides; the aft side is of wood, possibly enclosing about 4 inches of concrete. There is no top to the bridge.

The top and sides of the hold are not armored; the plating is about 1/8 inch thick.

(2) Equipment

There is no navigational or communication equipment on the bridge. The wheel is on the bridge and works the tiller through gears and chains. There is no steering engine. Two hauling-off kedges worked by hand winches are fitted

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on each quarter.

There are no watertight doors in the hold.

Provision is made for the carrying of troops; there are five large doors on each side from the upper deck to the hold, and there are folding benches in the hold along the side.

(3) Armament

No armament was found in the wrecked craft; however, there was some evidence suggesting that the craft was probably armed with one 75-mm gun forward of the bridge, and two machine guns, one forward and one aft.

(4) Performance

The craft displaces possibly 320 tons and has a carrying capacity of about 120 tons. It is able to carry from four to seven tanks, according to size.

Power is believed to be furnished by three Diesels developing 130 hp each. Estimates of speed range from 7 to 12 knots. It is known that passage through the Dardanelles was made at roughly 8 knots. The range is unknown.

(5) Seaworthiness

Four of these craft are reported to have traveled under their own power from Sicily to Benghazi by easy stages, stopping at Tropani, Pantellaria, Lampedusa, and Tripoli. One was reported to have been wrecked by rough weather. They have also gone through the Dardanelles, probably from Varna to the Aegean.

(6) Building Yards

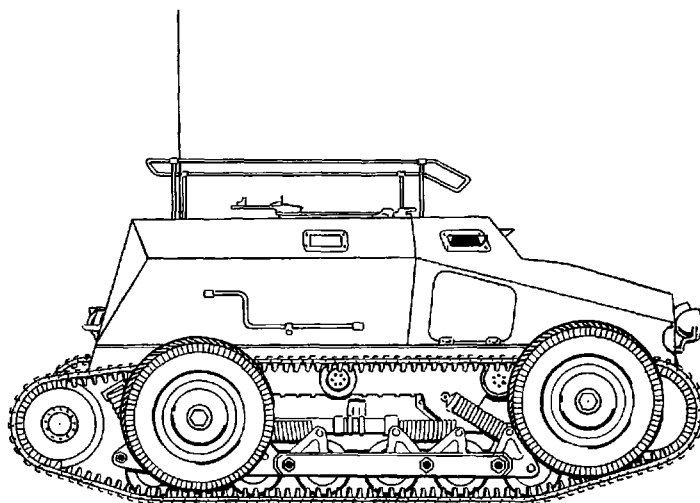
Most of these craft are being built in the Low Countries from standard parts, and it is believed that sections can be transported by rail and assembled anywhere.

13. GERMAN LIGHT ARMORED OP VEHICLE

A description has been received of a light armored OP vehicle (Sd Kfz 259) mounted on a wheel-and-track suspension. (See accompanying sketch.)

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LIGHT ARMoured O.P. VEHICLE

The four wheels can be raised or lowered by means of arms, so that the vehicle may run on its tracks over rough ground, or on its wheels along roads. Front, side, and rear plates are sloped to the vertical, while the top is horizontal. An observation hatch is fitted in the roof; slit openings, together with slit opening flaps, are located in the sides and front. A door is fitted in the back for the crew, while a small door, probably for the driver, is to be found on the right side.

Radio is fitted for communication with the gun positions, but there is no evidence of armament or optical instruments, although it has been reported that a BC scope is fitted. This instrument has an azimuth scale.

There is a crew of five, believed to consist of a battery commander, radio operator, observer, chauffeur, and one NCO.

14. VULNERABILITY OF GERMAN TANKS

When enemy armored force vehicles are attacked at close quarters with incendiary grenades, the air louvres are very vulnerable. It is therefore important that differentiation be made between "inlet" and "outlet" ducts, since obviously a grenade thrown against an exhaust opening will be less effective than one aimed at an inlet, which will draw the inflammable liquid into the vehicle. If the engine is not running, all openings are equally vulnerable.

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In general, it may be said that in the Pz Kw II and III tanks the best targets are the flat top-plates of the rear superstructures, since the air intakes are located there. The side louvres in these tanks are invariably protected by a vertical baffle. On the Pz Kw IV, the left side ports are intake and thus more vulnerable than the right-hand exhaust ports.

MEDICAL

15. MEMORANDUM ON THE USE OF BENZEDRINE AND METHEDRINE IN WAR

Benzedrine (also called Amphetamine) and Methedrine (German equivalent Pervitin) are substances belonging to the group called analeptics (restoratives). For practical purposes the actions of these drugs are the same, but 1 dose of Methedrine is as potent as 1 1/2 doses of Benzedrine, weight for weight. Their chief action is to stimulate the higher activities of the brain, showing itself especially in decreased sensations of tiredness and fatigue, and in a disinclination and inability to sleep. The administration of Benzedrine does not increase the mental or physical efficiency of a man who is not tired, and Benzedrine should not be taken with this object.

Mention may be made here of the trend of German reports on the use of analeptics. In the latter half of 1941, these reports were enthusiastic, but toward the end of the year warnings commenced to appear, and in the early months of 1942 reports tended to be definitely against their use except under rigid control. The substance in use was Pervitin. (See Tactical and Technical Trends, No. 5, p. 32.)

The effect of these substances on troops has now been studied in the laboratory and in the field, and the following conclusions have been drawn by British medical authorities.

(a) The valuable effect of Benzedrine* to individuals engaged in war operations is to reduce the desire for sleep, and the fatigue which results in loss of efficiency and makes difficult the continuation of essential duties.

(b) Circumstances may thus arise in which the administration of Benzedrine may be advantageous for skilled personnel when they are severely fatigued and unable to continue at a reasonable level of efficiency without an additional stimulus.

*Where "Benzedrine" is written, "Methedrine in equivalent dosage" may be substituted except where this is obviously inappropriate.

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The use of Benzedrine should be confined to emergencies or crises, and it should not be taken regularly.

The decision to give Benzedrine must only be made in circumstances when there is reasonable expectation that the emergency will be at an end within 12 hours.

(c) No person whose duties involve the making of difficult decisions, should be permitted to take Benzedrine in a crisis unless he has tested his reactions to it previously.

(d) Benzedrine must not be given indiscriminately to large bodies of troops.

(e) A single dose should not exceed 10 milligrams. A dose of 5 mg may be repeated once or even twice at intervals of 4 to 6 hours.

If an individual is of the opinion that a dose of 10 mg does not produce appreciable effects upon him, the use of the drug should be given up.

(f) The administration of Benzedrine should be under the control of a medical officer.

16. FOOT BANDAGES FOR MARCHING

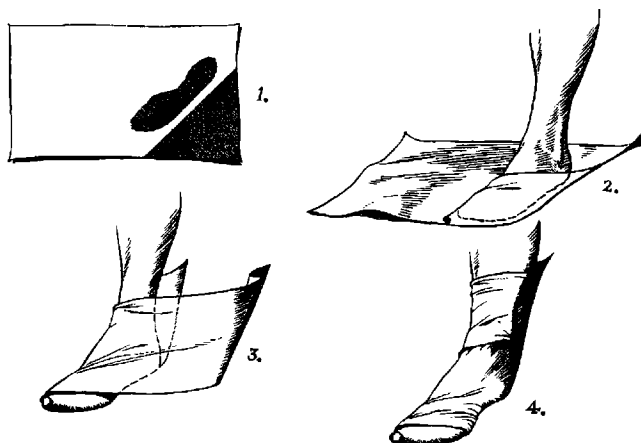
Despite the increasing importance of motor movement in war today, in the final analysis a soldier depends on his own two feet to reach his objective; hence attention to the care of his feet can not be too greatly emphasized.

The Germans take special measures to protect the feet of their troops by the use of bandages. They march long distances in heavy and rather roughly made boots with little foot trouble.

The following method of bandaging prescribed for the Hungarian Army and Labor Corps is also used in the German Army. The Hungarian does not wear the German boot but instead a high shoe with a flap at the top, which straps around the leg well above the ankle outside the breeches and holds them in place. Ordinary light socks are worn beneath the bandages.

The bandage is a rectangular piece of light flannel (probably cotton) some 24 x 14 inches in size. Its winding is illustrated for the left foot, which is placed on the rectangular cloth as shown in figure 1 of the accompanying sketch.

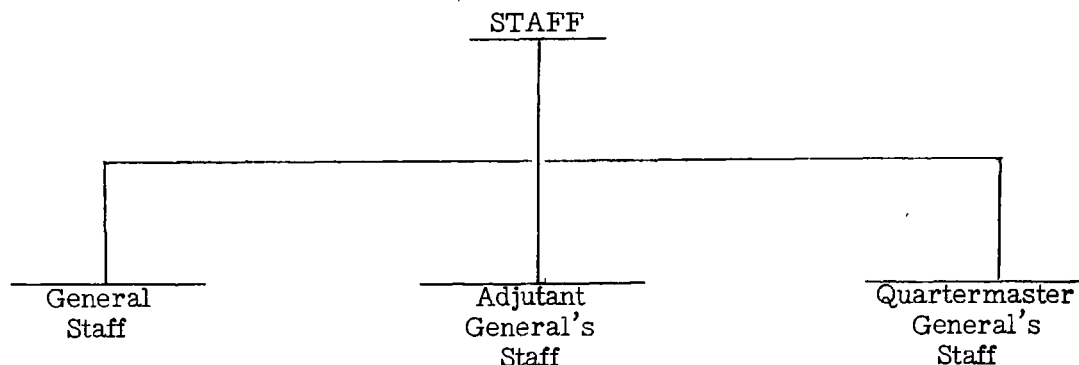
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Then the shaded corner area is folded over the foot and the corner itself is held under the ball of the foot, as in figure 2. As the remainder of the cloth is wrapped around the arch and instep (figure 3), the foot is moved forward a bit as in thrusting into a shoe, until the big toe is flush with the edge of the hole formed by the forward edge of the cloth in figure 3. Thereafter, the winding about the ankle is completed as shown in figure 4, and the end may be fastened at the top with a small safety pin, or left to hold by friction if the entire winding has been tight enough. The winding is in general not very tight, although this varies to suit the individual. Too tight a winding means interference with blood circulation, and too loose means no support of the arch and ankle.

17. NOTES ON THE BRITISH GENERAL STAFF, UNCLASSIFIED ARMS AND SERVICES

a. The Staff is divided into three main parts as shown below:



(1) The General Staff, also known as the "G" Staff or "G.S.," is responsible for operations, intelligence, training, and coordination. At the War Office and other large headquarters, separate branches are established. At headquarters other than the War Office, branches are designated as follows:

G. (S.D.) -- Staff Duties	(War Office designation -- S.D.)
G. (Ops) -- Operations	(" " " -- M.O.)
G. (I) -- Intelligence	(" " " -- M.I.)
G. (C.W.) -- Chemical Warfare	(" " " -- S.D.9.)
G. (Trg) -- Training	(" " " -- M.T.)

(a) G. (S.D.) Branch is the coordinating General Staff Branch. It is responsible for organization of troops for battle, allotment of priorities of weapons and equipment, policy concerned with organization and armament for battle, etc.

(b) G. (Ops) Branch is responsible for all operation planning, issue of operation orders, etc.

(c) G. (I) Branch is subdivided into three sections -- I (a), I (b), and I (c).

I (a) is responsible for intelligence about the enemy.

I (b) is responsible for all security matters, i.e., preventing the enemy from obtaining information about our troops and other military matters.

I (c) concerns itself with censorship.

(d) G. (C.W.) Branch is responsible for all questions concerning chemical warfare.

(e) G. (Trg) Branch deals with all training (other than administrative subjects), and prepares and writes exercises.

Note: At headquarters below the GHQ of a force, the "G" branches are progressively combined, e.g., S.D. and Trg are combined at Corps Hqs.

(2) The Adjutant General's Staff, also known as the "A" Staff, may be described as the foster father of the individual soldier. It enlists, pays, promotes, looks after his discipline and welfare, supervises his medical care, and eventually discharges or buries him.

The responsibilities of the "A" Staff in no way interfere with or minimize the responsibility of unit commanders for the discipline and promotion of their men.

"A" Branch considers questions of manpower and statistics, and in connection with those subjects it follows that "A" Branch is concerned with the organization of units and manpower generally. There is a very close link with G. (S.D.).

The senior Medical Officer at any headquarters is the adviser to the Headquarters Commander concerning all matters bearing on hospitalization, medical care, hygiene, and sanitation. His approach to the Commander, however, is through the "A" Branch, which coordinates all medical matters from a general staff point of view.

(3) The Quartermaster General's Staff ("Q") outfits the soldier and is responsible for the provision, through its services, of every article (clothing, equipment, weapons, ammunition, food, vehicles, gas, and oil) which is required. It is also responsible for movement, except when troops are actively engaged in operations. Operational movement is controlled by the General Staff.

The subdivision of "Q" duties varies at different headquarters. It is normal, however, to find at large headquarters at least three subdivisions.

- (a) Q (Ops) or Q (Maint) provide all that the soldier requires.
- (b) Q (ACC) deals with accommodations.
- (c) Q (M) deals with movement.

At every British Hqs there is an officer who coordinates "A" and "Q" duties. He is the nearest approach to our Commanding General, Services of Supply.

b. Grades of Staff Officers

Staff officers of the rank of Colonel and above are ungraded and, in general, exercise a coordinating function over a number of branches.

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First grade staff officers hold the rank of Lieutenant Colonel and are in charge of branches at the War Office and larger headquarters.

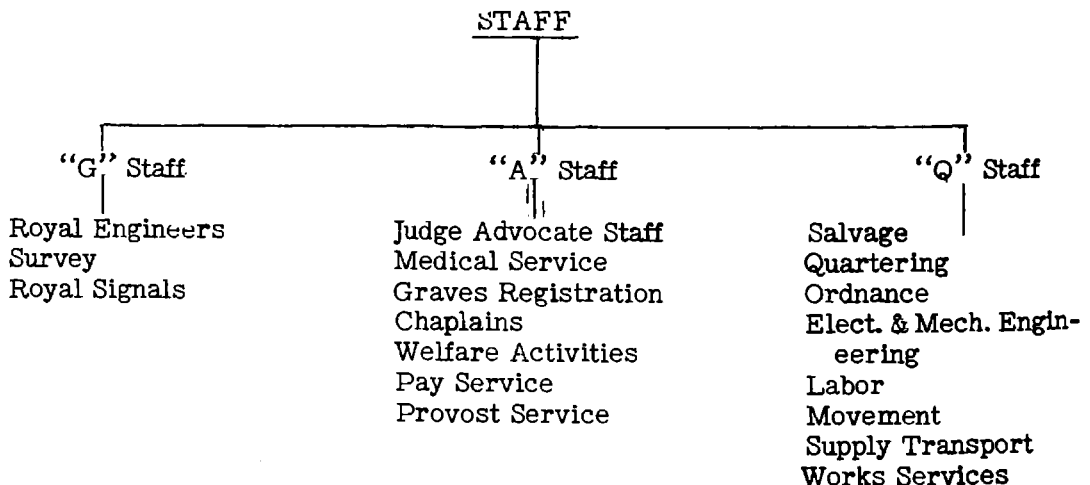
Second grade staff officers are Majors and third grade are Captains. Their titles are as shown below.

	<u>"G" Staff</u>	<u>"A" Staff</u>	<u>"Q" Staff</u>
First Grade	General Staff Officer 1 "G.S.O.1" or "G.1."	Assistant Adjutant General "A.A.G."	Assistant Quartermaster General "A.Q.M.G."
Second Grade	"G.S.O.2."	Deputy Assistant Adjutant General "D.A.A.G."	Deputy Assistant Quartermaster General "D.A.Q.M.G."
Third Grade	"G.S.O.3"	Staff Captain (A) "S.C.(A)"	Staff Captain (Q) "S.C.(Q)"

The titles "G1," "G2," and "G3" when used in the British Service relate to the gradings and not to the branch of the staff as is the case in the United States Army.

c. Arms and Services

Arms and Services in the British Army concerned with administration are as shown. Control by the Staff is as shown below:



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18. GERMAN INSTRUCTIONS TO TROOPS WHO MAY BE TAKEN PRISONERS

U.S. Intelligence Officers will be faced many times during the present conflict with the problem of extracting information from captured German prisoners. The Germans have, in general, issued to their troops security instructions similar to our own. In the past, however, the British have on innumerable occasions found German prisoners of war to be a rich source of vital intelligence of all sorts (see Tactical and Technical Trends, No. 9, p. 31). Evidence that German military authorities are taking measures to correct the undue loquacity of their troops subsequent to capture is afforded by the following order issued by Marshal Rommel to his troops in North Africa.

"H.Q. of Armored Group,
Africa.

Subject: Behavior of soldiers taken prisoner of war.

"From the attached translation of three enemy news sheets of the 2nd South African Division, it regrettably appears that German prisoners of war have talked inexcusably.

"On receipt of these examples the troops will be instructed in detail how a soldier who is unfortunately taken prisoner of war is to behave. The chief principle at interrogation is, that apart from the personalia (name, date of birth, birth-place, rank) no further information may be given. As response to further questioning, the following will be the reply:

""I cannot answer any further questions."

"In conversation with other German prisoners of war who are not known, the greatest reserve will be exercised, as the English use agents in German uniform to listen to prisoners.

"Furthermore, under no circumstances may soldiers who are taken prisoners of war - after the usual destruction of all service papers - allow diaries or letters from home (from which, for example, conclusions may be drawn as to food worries, air-raid damage and the like) to fall into enemy hands.

"The German soldier who is taken prisoner must prove that even in this disagreeable situation he does not lose his proud, superior bearing."

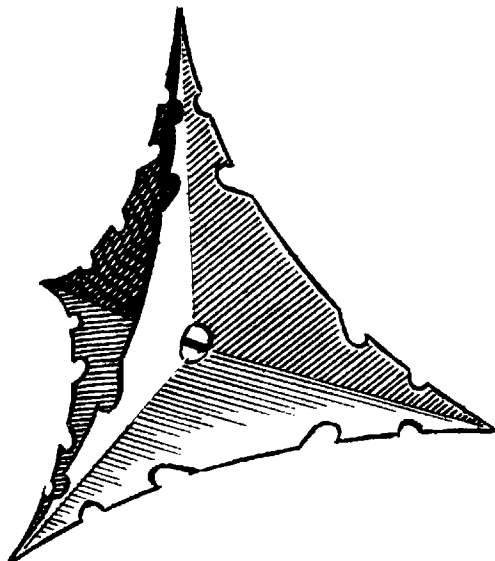
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19. GERMAN METAL SPIKES (CROWSFOOT)

German metal spikes of the kind known as "Crowsfoot" (German name, "hedgehog") are reported to have been dropped on motor transport roads, landing fields, and airdromes.

The particular object is made in the shape of a pyramid, each side in the shape of an equilateral triangle recessed in the center. Each side is 3 inches long, and the apex of each triangle is sharply pointed giving 4 spikes in all. The triangle edges are serrated, giving a "fish-hook" effect, so that once the spike has penetrated a tire it would be difficult to remove without tearing the cover.

a. Construction

The spike is made from two pieces of thin-gauge steel (1 mm) welded together, the whole being camouflaged light brown, with olive green stripes. The letters "R" and "L" are stamped on two of the sides, and may refer to the method of packing. There is a hole in the center of the pyramid, which presumably takes a holding rod for packing. (See accompanying sketch.)

A further type has been found of exactly similar construction, but with a base of only 2 1/2 inches instead of 3 inches.

b. Method of Use

The spike is so designed that, theoretically, whichever way it falls, it should rest firmly on its base with one point up. It would appear in practice, however, that when dropped on the ground, there is a good chance of a point penetrating, thus presenting a flattish surface.

c. Container

The container in which the spikes are dropped is a thin-gauge, sheet-metal "bomb" painted dark green and marked with two thin red stripes. The container is 5 feet 6 inches long, including the fins, has a circumference of 4 feet 10 inches, and is fitted with lugs which indicate it can be carried externally by the Ju-87, Ju-88, He-111, and Me-110. Apparently 1,000 to 1,500 spikes can be carried in the container.

A time fuze is fitted so that the spikes are scattered from the air over the road or airfield.

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20. MAINTENANCE AND REPAIR SERVICE IN GERMAN ARMORED DIVISIONS

The organization of maintenance and recovery units in tank regiments was summarized in Tactical and Technical Trends, No. 10, p. 24. In addition, the German armored division has repair units and workshops which are assigned primarily to the service of the elements in the division other than the tank regiments. However, it is worth noting that some of the divisional repair subsections (see below a. (2)) may include tank mechanics; this suggests that such units may be called upon to assist those assigned to the tank regiments.

The repair services for units other than tank regiments* are performed by:

a. Repair Subsections

(1) Repair subsection "a"

1 motor transport corporal (in sidecar), leader,

1 motorcycle driver (engine mechanic),

1 engine mechanic,

1 chauffeur (engine mechanic).

Vehicles: Motorcycle with sidecar,

1 small repair automobile (Kfz. 2/40).

This subsection is allotted** to units that have not more than 25 motor vehicles (not counting trailers, or sidecars: 4 motorcycles count as 1 vehicle), except for those units (such as battalion headquarters) which are given repair detachments (see below, b.) The companies in the armored infantry regiment, the motorcycle battalion, and the antitank battalion have subsections of this type, as have artillery batteries of all types.

(2) Repair Subsection "b"

1 motor transport corporal (in sidecar), leader,

* These repair units are also found in German motorized divisions, and the scheme of allotment which governs their services applies equally to the motorized division

** The sources give the theoretical principles of allotment of repair units; however, it would be dangerous to assume that the scheme is rigorously applied. There is very little difference in size between some types of repair units (especially the repair detachments); furthermore, the Germans make flexible application of any theoretical organization, and these organizations themselves are subject to frequent modification.

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- 1 motorcycle driver (engine mechanic),
- 6 engine mechanics (or tank mechanics),
- 1 electrician (spare chauffeur),
- 2 chauffeurs (engine mechanics).

Vehicles: 1 motorcycle with sidecar,

1 small repair automobile (Kfz.2/40),

1 medium truck (3 tons), open, for spare parts and personnel.

The principle of allocation of this subsection is not clear from the sources. It is definitely found in the armored engineer company, and may be assigned to the armored radio company of the divisional communications battalion.

(3) Repair Subsection "c"

- 1 motor transport corporal (in sidecar), leader,
- 1 corporal (tank mechanic),
- 1 motorcycle driver,
- 12 tank mechanics (6 are engine mechanics),
- 1 electrician,
- 2 communication equipment mechanics,
- 1 chauffeur (engine mechanic),
- 2 truck chauffeurs.

Vehicles: 2 motorcycles with sidecars,

1 small repair automobile (Kfz. 2/40),

1 medium truck, for tires and spare parts,

1 medium crosscountry truck, for personnel.

This subsection is allotted to armored car companies in the divisional reconnaissance battalion.

b. Repair Detachments(1) Detachment "A"

- 1 workshop foreman (official, middle grade),
- 1 corporal (master mechanic and engine mechanic),
- 2 engine mechanics (assistant chauffeurs),
- 1 engine mechanic for motorcycles,
- 1 blacksmith and welder,
- 1 motorcycle driver (clerk),
- 4 chauffeurs (1 is an electrician, 1 an engine mechanic).

Vehicles: 1 motorcycle with sidecar,

- 1 light automobile,
- 1 small repair automobile (Kfz. 2/40),
- 1 medium crosscountry truck, open, for motor transport repair equipment,
- 1 medium crosscountry truck, open, for spare parts, tools, and towing equipment.

This detachment is allotted to headquarters of battalions which contain not more than 125 motor vehicles; also, to headquarters of all motorized infantry regiments.

(2) Detachment "B"

As for Detachment "A", except that there are 3 engine mechanics (assistant chauffeurs) instead of 2.

This detachment is allotted to headquarters of battalions (including artillery) which contain more than 125 motor vehicles (examples: motorcycle battalion, armored infantry battalion, antitank battalion, engineer battalion, reconnaissance battalion).

(3) Detachment "C"

As for Detachment "A", except that

- (a) There are 5 engine mechanics (or tank mechanics) instead of 2. 1

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- (b) There are 5 chauffeurs (of whom 1 is an electrician, 1 a welder's assistant, and 1 an engine mechanic) instead of 4.
- (c) The vehicles include an additional open medium crosscountry truck for tires.

This detachment is allotted to headquarters of battalions (including artillery) where the main vehicles of the subordinate units are special vehicles (armored, half track, etc.) and where all the subordinate companies are armored (The only certain example is the case of the medium artillery battalion.)

c. Special Allotments

One subsection "a" is assigned to each of the following:

Each company of a troop-carrying motor transport battalion (and to the battalion headquarters), motorized bakery companies, and motorized medical companies.

One detachment "A" and two subsections "a" are allotted to the headquarters of the motorized divisional supply services.

d. Workshop Companies

Each armored division* has three workshop companies (not including the much larger workshop company of the tank regiment). Each company includes a headquarters, two workshop platoons, an armory section, and a supply section. The personnel totals 102 officers and men (1 officer, 7 officials, 6 NCO's, 88 EM). The equipment in vehicles is 4 automobiles, 16 trucks, 1 half-track vehicle for towing (and personnel), 4 trailers, and 6 motorcycles.

These workshops carry out all motor transport repairs on vehicles sent back by the unit repair subsections and detachments, excepting jobs which require more than 12 hours work. The latter go to base workshops.

21. STANDARD ITALIAN WEAPONS

The following list of standard Italian weapons does not include arms belonging to other Axis countries but used by the Italian arm as well. The oblique line and number written after the caliber of a gun indicates the length of the bore in calibers, e.g., 75/18-mm howitzer would indicate a howitzer with a bore 18 calibers long. Where "feet" is given after a number in the maximum range column it indicates the maximum vertical range when the weapon is used for antiaircraft. In Tactical and Technical Trends Nos. 9 and 10 the standard German and Japanese weapons have been given.

* A motorized division has two workshop companies, organized as those in the armored division.

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Name	Caliber	Muzzle Velocity (foot-seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theoretical	Practical	
6.5-mm rifle (Model 91) Mannlicher-Carcano	.256	2,300	3,270	—	—	Weight 8 1/2 lbs without bayonet; 6-rd clip.
6.5-mm Carbine (Model 91) Moschetto	.256	—	1,650	—	—	Weight 7 lbs; 3 ft long with bayonet.
6.5-mm automatic rifle Revelli	.256	2,300	2,180	120	40	—
6.5-mm LMG Breda (Model 30)	.256	2,080	3,270	450 to 500	150	Bipod mount; 20-rd box magazine, one model has tripod mount.
6.5-mm MG Fiat (Model 14)	.256	—	3,270	500	—	Water-cooled; 50-rd box magazine, tripod mount.
7.35-mm rifle (Model 38)	.289	2,490	4,400	—	—	Weight 7 1/2 lbs without bayonet; 3 ft 4 in long; folding bayonet which can be removed and used as a dagger.
7.35-mm Carbine (Model 38) Moschetto	.289	—	—	—	—	Similar to Model 38 rifle.
7.35-mm LMG Breda (Model 38)	.289	2,080	3,270	450 to 500	150	Similar to Model 30 except in caliber.
7.7-mm LMG Breda	.303	—	—	800	—	British .303 ammunition will work in this gun; weight, 27 lbs; often mounted on aircraft.
8-mm MG Fiat (Model 35)	.315	—	5,700	600	—	Tripod mount; air-cooled; fed by 20-rd plate charger; wt, 42 3/4 lbs without mount; some are converted Model 14's.

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Name	Caliber	Muzzle Velocity (foot-seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theoretical	Practical	
8-mm MG Breda (Model 37)	.315	2,600	6,500	300 to 400	—	Tripod mount; air-cooled; life of barrel, 20,000 rds; ball, tracer, incendiary tracer, and AP used.
9-mm pistol Beretta (Model 34)	.350	—	50 (effective)	—	—	7-rd magazine; weight 1 lb 7 1/2 ozs; length 6 in.
9-mm pistol Gelisenti (Model 1910)	—	—	50 (effective)	—	—	Weight 1 lb 12 ozs; length 8 1/2 in; 7-rd magazine. Effective range of this and other pistols is limited by the inaccuracy inherent in the use of such a weapon.
9-mm submachine gun Beretta (Model 38)	.350	—	250 (effective)	570	—	Weight without magazine 9 lbs 1 oz; magazine 10, 20, or 40 rds.
10.35-mm revolver Bodeo (Model 89)	.41	—	—	—	—	Cylinder capacity, 6 rds; cylinder does not swing out, empty cases removed one by one; weight 2 lbs; standard for certain MG and gun crews.
12.7-mm MG Breda	.500	—	—	650	—	Weight 67 1/2 lbs; modified version of 7.7-mm Breda MG; extensively used in aircraft.
20-mm Hv AA-AT MG Breda (Model 35)	.79	2,750	6,000	250	120	Fires HE, tracer, and AP; elevation -10° to +80°; similar AA gun manufactured by Scotti.
20-mm AT rifle Solothurn	.79	2,800	—	—	10 to 20	10-rd clip; weight 120 lbs; length 7 ft.

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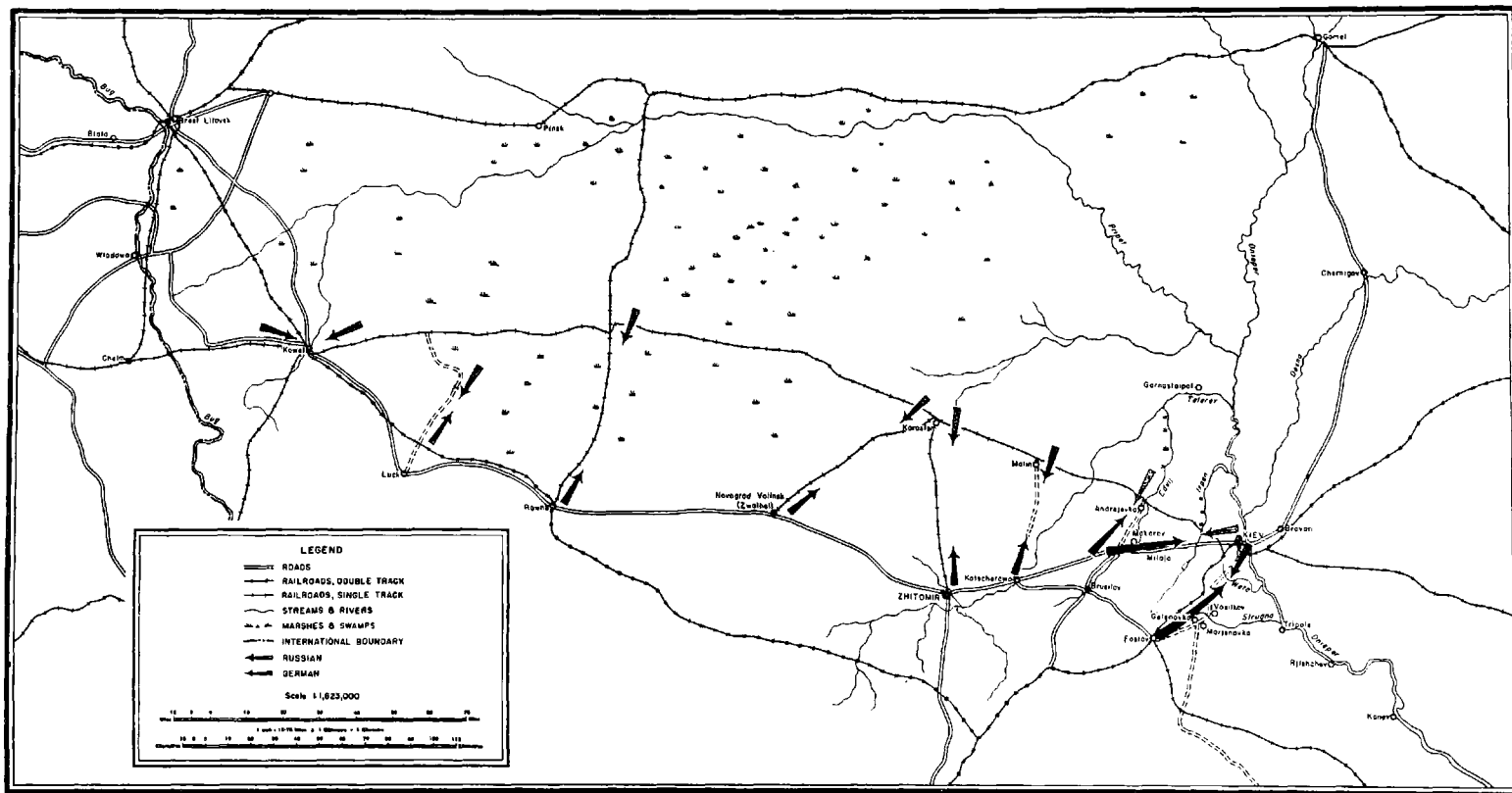
Name	Caliber	Muzzle Velocity (foot-seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theoretical	Practical	
37/54-mm AA gun Breda	1.46	2,620	7,700 13,500 ft	125	75	6-rd loading tray; twin-barreled model also in use; mobile platform; barrel, 54 cal; fires HE with time fuze and HE tracer with percussion fuze; a very effective gun.
45-mm mortar Brixia (Model 35)	1.77	272	587	—	30	Tripod mount; weight in action 34 lbs; 1-lb bomb; standard light mortar.
47/32-mm AT gun	1.85	2,050	7,800	—	12 to 14	Barrel, 32 cal; 60° traverse; penetrates 1 1/4-in armor at 90° at 800 yds; also used as infantry support gun.
65/17-mm infantry gun	2.58	1,130	7,100	—	—	—
70-mm infantry gun	2.76	1,160	7,100	—	—	Weight, 850 lbs.
75-mm infantry gun (1934)	2.97	1,180	—	—	—	—
75/13-mm mountain howitzer	2.97	1,240	9,000	—	—	On wheels or 7-load pack; weight, 1,350 lbs.
75/18-mm gun-howitzer (Models 34 and 35)	2.97	1,430	10,300	—	—	Model 34: 1,760 lbs; mountain artillery; Model 35: 2,420 lbs; towed or SR
75/27-mm gun-howitzer (Model 06)	2.97	1,730	11,200	8	4	Weight in action, 1 ton; elevation -10° to +16°; models 11 and 12 have smaller MV and range, greater elevation and traverse.

Name	Caliber	Muzzle Velocity (foot- seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theor- etical	Prac- tical	
75/34-mm field gun	2.97	1,650	13,500	—	—	Weight, 2,750 lbs; towed; expected to become standard in mobile division, replacing 75/27.
75/46-mm AA gun (Model 34)	2.97	2,350	14,100 27,200 ft	—	—	Mobile gun.
75/50-mm AA gun	2.97	3,200	17,000 27,500 ft	—	—	Tractor-drawn.
76/40-mm AA gun	2.99	2,620	9,000 15,750 ft	125	70	Water-cooled jacket; elevation -10° to $+90^{\circ}$
77/28-mm field gun	3.03	1,710	7,700	—	—	Weight, 2,200 lbs.
81-mm mortar (Model 35)	3.19	836	4,429 (light bomb) 1,640 (heavy bomb)	—	—	Weight, 129 lbs, bomb wt, 7 1/2. lbs; a new improved model has been introduced. A 15-lb bomb is sometimes used.
90/50-mm multipurpose gun	3.55	2,755	19,000 39,400 ft	—	—	Weight, 5 3/4 tons; tractor-drawn.
100/17-mm mountain howitzer (Models 16 and 34).	3.94	1,800	10,000	6	4	Carried in 3 loads.
102/35-mm AA gun	4.02	2,477	14,425 31,100 ft	—	10 to 12	—

Name	Caliber	Muzzle Velocity (foot seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theor- etical	Prac- tical	
105/28-mm field gun	4.14	1,850	14,800	—	—	—
105/32-mm field gun	4.14	—	17,500	—	—	—
105/40-mm field gun	4.14	—	18,500	—	—	Weight, 9,900 lbs.
149/12-mm howitzer	5.87	985	7,200	—	—	—
149/13-mm howitzer (Model 14)	5.87	1,130	9,560	—	—	—
149/35-mm gun	5.87	2,200	19,100	—	—	Weight, 15,400 lbs.
149/40-mm gun	5.87	—	24,000	—	—	—
152/13-mm howitzer	5.98	1,240	10,400	—	—	Weight, 7,920 lbs.
152/45-mm gun	5.98	2,730	21,200	—	—	Weight, 36,820 lbs.
210/8-mm mortar	8.27	1,130	9,200	—	—	Weight, 17,600 lbs.
210/22-mm howitzer (Model 35)	8.27	1,730	17,500	—	—	Weight, 34,320 lbs.
280/16-mm coast defense howitzer	11.03	—	12,760	—	—	—
305/17-mm howitzer (Model 17)	12.0	1,790	19,200	—	—	—
305/50-mm coast defense gun	12.0	—	23,650	—	—	—
381/40-mm railway gun	15.0	2,500	26,200	—	—	—

SECTION II

A GERMAN SPEARHEAD IN THE KIEV OPERATION



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A GERMAN SPEARHEAD IN THE KIEV OPERATION*

THE ADVANCE OF THE SIXTH ARMY

GENERAL VON REICHENAU'S ARMY. Among the German forces which crossed the Russian frontier on June 22, 1941, was the Sixth Army, under the command of Field Marshal General von Reichenau. It appears that this army, on the eve of the campaign, was concentrated in German-held Poland in the Biala-Chelm sector immediately west of the Bug River (the Russo-German boundary under the agreement of August 21, 1939). The Sixth Army held the northern flank of the German South Group of Armies under Field Marshal General von Rundstedt. The Sixth Army included motorized infantry and panzer divisions, the Adolph Hitler Regiment (an S.S. unit), and foot infantry divisions, with necessary auxiliary services of all types, and had the support of aviation. "Panzer and motorized infantry divisions, as well as an S.S. unit" are listed by a German source as forming a part of the narrow penetration wedge which was to follow a panzer division spearhead.

In front of Von Reichenau's army was the Russian Fifth Army, which was a part of the Russian South Group of Armies under Marshal Budenny. The order of battle of the Russian Fifth Army is not known.

The German Sixth Army had on its right (southern) flank, the First Panzer Army of General von Kleist, while south of von Kleist was the Seventeenth Army of General von Stuelpnagel. These two armies later became the southern arm of the great Kiev encirclement. Further south, von Rundstedt's forces included Hungarian and Rumanian as well as German troops.

North of von Reichenau was the Center Group of Armies under General von Bock. No army of the Center Group maintained ground contact with von Reichenau after the jump-off from concentration areas; ground liaison between the two armies was prevented by the impassable Pripet marshes. East of the marshes, in the Dnieper Valley, the Second Army under von Weichs and the Second Panzer Army of Guderian later established contact with von Reichenau and became the northern arm in the Kiev encirclement.

THE PRIPET OR PINSK MARSHES AND THE ROUTES TO KIEV. The great marshes of Western Russia are variously called Pripet, after the river which runs through but does not effectively drain them, and Pinsk, for the largest city included in their vast expanse. The term "vast" is not an exaggeration, for the marshes extend from Brest-Litovsk on the German-Russian border eastward to and beyond the Dnieper, a distance of more than 300 miles, and stretch from north to south more than 150 miles.

* This paper is based chiefly on five articles published in the October 16, 23, 30, November 6 and 13, 1941, issues of the Illustrierte Beobachter. The source is believed to be reliable, but details in regard to the order of battle of the various task forces and in regard to the chronology of operations are unfortunately lacking.

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The marshes had a marked influence on German strategy. Such roads and railroads as existed in them were not first-class. Moreover, a demolition which would be merely a nuisance on dry land would be disastrous in a region where any detour from a road-bed meant hopeless bogging down. Consequently, the marshes could not be effectively penetrated, and were thus a natural boundary between the two groups of armies.

From his concentration area, von Reichenau had to advance toward Kiev along the southern edge of the marshes. The axis of his advance was determined by the disposition of highways and railroads.

At Kowel, the railroad line from Biala and Brest-Litovsk joined the line from Chelm and Luboml. East of Kowel, the single line led to Kiev through the southern part of the marshes, across numerous tributaries of the Pripiet River. From three of the villages on this railroad, branch lines ran north or northwest toward the Pripiet River or the Dnieper (see map). This road and its branches were single-track, and the gauge was different from that of German railroads.

As with the railroads, a highway from Brest-Litovsk and a highway from Luboml met at Kowel, east of which a great highway led to Kiev. This highway was of asphalt and had four traffic lanes from the old Polish-Russian border to Kiev (according to some accounts, all the way from the new German-Russian border to Kiev). This road, which was south of and approximately parallel to the Kowel-Kiev railroad, led through well-drained country and cut across the Pripiet tributaries in their upper courses.

VON REICHENAU ADVANCES AND BUDENNY RETREATS. Because of the difficulties inherent in the use of the Russian railroads, the Germans generally chose the highways for their spearheads in Russia -- in this instance, the excellent Kiev highway.

The men and materiel of von Reichenau's Sixth Army had apparently been concentrated as close as possible to the border, along all-weather roads. Some of the first units to enter Russia crossed the frontier near Brest-Litovsk and advanced along the highway from Brest-Litovsk to Kowel. Others, entering further south, advanced along the highway from Luboml toward Kowel. Like the other leading units, which literally rolled into Russia on the morning of June 22, 1941, the forward units of von Reichenau's army again used the spearhead tactics which had been so successfully employed in France and moved forward with great speed, protected by superior air strength. As the Germans advanced, the Russians retreated at an average rate of some 15 miles a day.

To the German commanders, as to observers outside the battle area, the parallel with the campaign in France must have appeared striking. In each case large areas of important territory were promptly occupied by the Germans.

The Russian withdrawal, however, was not due entirely to weakness. Beyond question, the Russians knew that the Germans had massed great quantities of men and materiel along good highways, just across the Bug. Uncertain

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exactly when and exactly where these massed Nazi resources would be used, the Russians apparently held their forward positions with delaying forces only and elected to make their main defensive stand many miles to the east. In this way, the Russian commanders were able to learn the direction and strength of the German thrusts before committing the Russian reserves. Even in retreating, they could learn something of German tactics. Finally, when the main engagement would take place, German lines of communication would be long and Russian lines short. These considerations, as well as the strength of the Nazi military machine, probably played a part in the rapid Russian retreat before the German armies in the 1941 campaign. Nor was the German advance made without cost. Battered vehicles abandoned by the road, dead horses, and destroyed villages told of the fury of the Russian rearguard action.

FIGHTING BETWEEN A HIGHWAY AND A RAILROAD. Since von Kleist was on his right, von Reichenau appears to have had no difficulty on that flank as his spearhead advanced.

On the left (northern) flank, the situation was different. There was no ground contact with the nearest army of the Center Group; this army, in fact, was miles away, north of the Pripet marshes. Moreover, the Russians were in these marshes in considerable force and at once began to harass von Reichenau's left flank. Accurate and heavy Russian artillery barrages came down unexpectedly on German transport.

In spite of this harassment by Russian artillery, von Reichenau's forward troops continued to move ahead. The area taken by the spearhead troops extended not more than 2 or 3 miles on each side of the highway.

The situation on the marsh flank could not, however, be ignored. Resistance to the Russians was left to foot-infantry troops armed with the necessary heavy weapons and artillery. At every crossroad or junction, a task force had to be constituted to cope with a Russian attack which, if neglected, might threaten the flank. A German commentator, irked by the cost of the operations, stated that a full-scale battle had to be fought for each miserable village, which was worthless in the first instance and rubble when taken.

In the battles between the troops on the highway and those on the railroad, the Germans had the advantage. They were able to move forward more troops and material on the four-lane highway than the Russians could bring up on the single-track railroad, and a Russian retreat was forced. In no case, however, was the bulk of the Russians cut off. When outgunned by superior German artillery and in danger of being flanked by the advance on the highway, the Russian troops retreated along their railroad line to the next vantage-point and again harassed the German advance.

Shortly after the campaign began, the Germans were at Kowel, the junction of the railroad line which the Russians had determined to hold and the highway on which the Germans had determined to advance. After overcoming strong Russian resistance at Kowel, the Germans again moved forward, and took in

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turn Luck, Rowne, and Zwaihel. Soon they were at Zhitomir, an important junction some 75 miles from Kiev.

After crossing several minor streams, their forward elements reached the heights west of the Irpen River. From the summit of this high ground they could see the spires of Kiev. They were 5 miles from the outskirts and 12 miles from the heart of the city. In 20 days they had come 312 miles. With Kiev in sight, an armored division hurried down the four-lane highway toward a wooden bridge over the Irpen.

CHECK OF THE SPEARHEAD AT THE IRPEN RIVER

THE GERMAN SPEARHEAD IS HALTED. Despite the unexpected and strong Russian assaults which had harassed their advance and were still continuing against their left flank well to the rear, the Germans claim they were confident on July 12 as they started down the western (left) bank of the north-flowing Irpen. Suddenly, in front of them, the wooden bridge of the great four-lane highway was blown out by Soviet troops. Germans often make light of Russian demolitions, but this one they conceded to be perfect. There was nothing left of the bridge, and the steep west banks were under Russian fire. The armored spearheads could not cross the Irpen, and had to retreat up the hill. The delay was annoying, but (according to German sources) it did not shake the confidence of men who had advanced 312 miles in 20 days.

For 20 days they had averaged 15 miles a day; in the next 2 months, however, they were not to move a yard!

The first difficulty was the terrain. Directly in front of the Germans was the Irpen River, a natural bastion of Kiev. Here in its middle course the Irpen had dry banks but the channel was unfordable. There were many wooded areas on the slopes, particularly on the Russian-held eastern slope, and Russian troops in these woods commanded every yard of open space between the heights on the western bank and the river. Most of the cultivated land was in tall grain, under cover of which the Germans apparently constructed field fortifications. Suburban houses, which offered many opportunities for concealment, dotted both slopes, particularly the Russian-held eastern slope. The four-lane highway cut across the Irpen and ran straight up the hill through a wood toward Kiev, but the bridge was destroyed and every foot of the roadway was under Russian fire.

The Irpen position, moreover, could not be flanked by the German advance units which were halted there. To the north near the mouth of the Irpen, the terrain was swampy, and the Russians held the rail-line in menacing strength. To the south, the upper Irpen, which widened at places into lakes, was an obstacle; and across the divide between the Irpen and the Dnieper, the Weta and the Strugna Creeks were as well defended as the Irpen.

After von Reichenau's leading elements had been halted on the west bank of the Irpen, he immediately devoted himself to a three-fold task: the consolidation of the Irpen position; the elimination of the Russian artillery which was still

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pounding his supply line and interfering with the bulk of the Sixth Army's movements to its new concentration area east of Zhitomir; and the protection of the Irpen position by operations on the Weta and the Strugna. The accomplishment of these tasks would have the dual result of preventing a successful Russian counterthrust and of establishing the Sixth Army in positions from which, under more favorable circumstances, a further advance might be made.

THE HALTED GERMANS DIG IN AND RECONNOITER. Von Reichenau's forward units were much over-extended. According to German claims, these units were some 125 miles ahead of the foot-infantry divisions of their army and now had to devote themselves to holding on until the infantry divisions could come forward.

A headquarters for the defending German troops was apparently established in the little village of Milaja, just west of the Irpen, and the main body of the forward troops occupied two shallow ravines more or less parallel with the river. Fox holes were dug at once to give shelter to the troops, who were tired by their rapid advance. Construction was carried out under extreme difficulties. Any movement beyond cover brought a storm of Russian artillery fire. Russian aviators flew over the German-held houses on the west bank every 2 hours at a height stated by the Germans to be only 35 to 50 feet, dropping 5-pound bombs and machine-gunning the German positions.

There is no reference in available sources to German air reconnaissance over the Irpen position, but such reconnaissance was routine in similar situations and doubtless took place here. Ground reconnaissance was constant. From hidden positions just east of the village of Milaja, officers with camouflaged BC scopes searched the eastern banks of the Irpen. Soon a bunker was discovered. Some hours later a second bunker was detected, and finally the general course of a line of bunkers. Further observation with field glasses led to the discovery of field positions and to the conjecture that there was a tank-trap ditch behind a stockade-type fence. Numerous trucks full of men and materiel were seen to turn off into the woods on both sides of the main highway from Kiev. The Russians were evidently strengthening their already well-defended position.

THE RUSSIANS COUNTERATTACK. In a few days the Adolph Hitler Regiment took over the position from the spearhead troops, and was later relieved by infantry at dawn on a date unknown but shortly after July 20.

But the Russian reconnaissance and intelligence had been effective. The Russians had learned precisely what was happening on the German side of the river and during the relief of units launched a strong artillery attack. During the afternoon, Russian combat patrols crossed the river on footbridges. Even though the slope on the German side of the river was level and open in comparison with the slope on the other side, Soviet advanced units, under cover of their artillery, succeeded in hiding themselves in small hollows and depressions.

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At nightfall, a German battalion was ordered to regain the lost ground. On a front which extended about a mile and a half north and 2 miles south of the highway, the Germans attacked along a line about 500 yards west of and parallel to the Irpen. Under the cover afforded by fields of tall grain, they used machine guns, rifles, and hand grenades against the newly-won Russian positions under fire, however, from Russian mortars.

After a conflict which lasted about an hour and was especially violent along the highway near the blown-up bridge, the Russians were pushed back across the Irpen. The large searchlights, which the Soviets had camouflaged in the tree-tops, began to flare across the German-held west bank, sweeping the grain fields, and the Germans did not attempt to pursue the retreating Russians across the river. The infantrymen sought out their old fox holes east of Milaja, and an hour before dawn set up their machine guns again in the positions they had occupied before the Russians crossed the river.

THE SIXTH ARMY CONCENTRATES BEFORE KIEV. Meanwhile, screened by the troops who had repulsed the Russian counterattack on the Irpen, the rearward combat units of von Reichenau's Army continued to move forward rapidly to positions east of Zhitomir.

The one road to Kiev had to be used by almost the entire Sixth Army; it was therefore imperative that any possible jamming and confusion be avoided. Rather than depend entirely upon guides and messengers, the Germans made great use of directional signs. At each junction there were many road markers bearing unit insignia. The signs were especially elaborate at Kotscherowo, where units turned off to protect the southern flank of the Irpen position, and at the junction south of Makarov, where units turned off to secure the northern flank. With these route markers as guides, motor vehicles left the highways without a halt for task missions against the Russian railroad positions or to move into concentration areas. Serials were formed, according to the speed of vehicles or the time a small unit was ready for moving, and the markers with division insignia were relied on to bring the subordinate units together again.

Provision had to be made for servicing and supplying advanced units, and one lane (at least between Zhitomir and Kiev) was designated for west-bound traffic, with three lanes for eastward movement of men and materiel. Over the west-bound traffic lane, transport elements of the forward units went to Zhitomir each night on missions of servicing and supply.

To sum up, the Germans, in the days following July 13, made use of the great highway to strengthen their position on the Irpen, and bring forward troops in great quantities. Some of these relieved the soldiers on the Irpen. Some were thrown off on the left flank to continue the fight for the railroad. Some moved to the South to prevent the Irpen position from being outflanked. Most of them, however, were brought just east of Zhitomir into a staging area which was almost as large as the original concentration area between Biala and Chelm on the west bank of the Bug. Supplies were also brought forward in large quantities. From this new concentration area, troops and supplies were in a position to be

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moved at the commander's will as operations developed.

OPERATIONS ON THE LEFT FLANK OF THE SIXTH ARMY

THE RUSSIANS CONTINUE TO THREATEN THE GERMAN LEFT FLANK. While von Reichenau in the days following July 13 was strengthening his position on the Irpen and was bringing forward the bulk of the Sixth Army into its new concentration area east of Zhitomir, Russian artillery was still active on his north (left) flank. The Russians on the railroad had apparently not retreated further eastward than Korosten, and Russian artillery was now dangerously near to the new concentration area east of Zhitomir. Accordingly, von Reichenau determined to secure at any cost his exposed left flank, and launched a vigorous assault on the Russian position at Korosten. The railway junction here was defended by the Russians with bitter determination, and it fell into German hands only after hard fighting; again, the Russians retreated northwest and east along the railroad lines.

THE BATTLE FOR ANDREJEVKA. By July 23, the Germans had mopped up Korosten and other neighborhoods to the east, and now determined to take Andrejevka. Many details in regard to the struggle for this village are available and are believed to be typical.

For the Andrejevka engagement, German forward units apparently left the Zhitomir-Kiev highway at the junction near Makarov. During the night of July 22-23, several artillery battalions and a smoke battalion moved up under cover of darkness, and took their positions less than three-quarters of a mile from the infantry front line. At 0430, light and heavy field howitzers, 100-mm guns and 180-mm mortars opened fire against the Soviet field fortifications which German observers had detected on the southern edge of Andrejevka. At the same time, German smoke shells fell among the Russian field positions and spread a thick veil of smoke just in front of the village.

The heavy fire preparation, the laying of the smoke screen, and the beginning of the infantry advance had been coordinated. The Russians were blind; neither their forward infantrymen nor their observers in observation posts could see more than five or six yards through the thick smoke. Unobserved, the German infantrymen left their positions of readiness and rushed across the open terrain toward Andrejevka, whole infantry companies reaching the edge of the village with hardly the loss of a man. The Russians were unable to check the German advance with their heavy weapons, because their firing was based on data obtained before the laying of the smoke screen.

The smoke screen had been launched under ideal weather conditions and remained for a long time.

As soon as the Soviet observers could see through the gradually disappearing smoke, they directed fire against the German attacking infantry. However, the German forward artillery observers quickly informed their batteries of the location of the Soviet artillery and heavy weapons positions. These

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positions were at once shelled heavily, and soon became silent.

The German infantrymen then entered Andrejevka, which consisted of many field positions, all excellently camouflaged and all liberally provided with machine guns and mortars. Houses and barns had been equipped for defense. The Russian positions were in many cases connected by cleverly arranged trench systems.

THE THREAT TO THE LEFT FLANK IS REMOVED. The engagement at Andrejevka was basically a struggle for the Korosten-Kiev railway line, which passed a mile or two to the north. With the German capture of this village, following the capture of Korosten and Malin, this vital railroad, except for a short suburban portion near Kiev, was in German hands. The Russians who had threatened von Reichenau's left flank withdrew now to assist in the defense of Kiev. No information is available as to their line of retreat; but most of them probably fell back along the railroad to the strongly held position east of the Irpen. The new Russian front line north of the Zhitomir-Kiev highway became something like the top half of the letter "C".

Overcoming the Russian resistance along the railroad reduced the threat of a Russian flank attack from the north. Few roads and railways led through the Pripet marshes toward the new German positions, and the Germans instead of the Russians were now aided by the fact that a slight demolition could render a whole area impassable.

Von Reichenau had not only secured his left flank; he was also getting into position to make contact (previously denied him by the Pripet marshes) with von Bock, whose Second Army and Second Armored Army were soon to move down from the north.

OPERATIONS ON THE RIGHT OF THE SIXTH ARMY

A CORPS MOVES TO SUPPORT THE RIGHT FLANK. While elements on the northern flank of von Reichenau's army were attacking Russian positions on the railroad north of the Zhitomir-Kiev highway, one of his corps was assigned a mission to the south. The mission of this corps was not only to assist in securing the Irpen position but to put von Reichenau's army into areas from which an assault upon Kiev could be made when the situation permitted.

The German units destined to take part in the large-scale operations south of the Irpen position turned off the main Zhitomir-Kiev highway at Kotscherowo, and proceeded in a southeasterly direction by way of Brusilov to Fastov. German panzer and motorized infantry divisions went first along the paved road, which stopped at Fastov, some 40 miles southwest of Kiev. Beyond Fastov, the troops had to advance toward their new positions along ordinary roads, which had been turned into mud by a three-day rain.

On a front of some 12 miles running from southeast to northwest astride the Fastov-Vasilkov-Kiev road, five infantry divisions were moved up to

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establish prepared assembly areas from which an attack was to be made later against Kiev. Fastov was the center of combat for the entire sector, since it was on the only practical road to Vasilkov, the one city of any size between Fastov and Kiev. There were regimental assembly areas on each side of this road.

Two villages, Gelenovka on the left and Marjanovka on the right, flanked the roadway some distance in front of these assembly areas, and as the Germans approached these villages they encountered difficult terrain, for the Strugna had many tributary creeks with steep slopes. The two villages had, moreover, been very heavily fortified by the Russians, and here again, as north of the Zhitomir-Kiev highway, the Germans were compelled to use their heavy weapons and expend themselves in force against unimportant localities which the Russians had transformed into fortresses.

THE GERMANS USE DIVE BOMBERS AND TANKS IN CAPTURING THE VILLAGE OF GELENOVKA. The German heavy artillery had been moved into position, apparently south of Fastov, and by July 30 von Reichenau felt that his southern corps was ready to launch an attack toward Kiev. The attack was made at 0400 on a 12-mile front. Artillery concentrations fell on Gelenovka and Marjanovka--and at the same instant similarly heavy Russian artillery attacks were directed upon the German positions. The Germans learned later from prisoners that the Russians had, by an unusual coincidence, made their plans for an attack upon the German positions at this same hour.

Under the cover of fire by their artillery, German infantry troops moved into positions of readiness at the bottom of the small valley in front of Gelenovka. During this movement, they were under fire from Russian artillery.

Either by previous plan or because of the unexpectedly heavy Russian artillery fire, the Germans sent in eight dive bombers at 0530. The German and the Russian artillery fire ceased as the planes appeared. These dive bombers released their bombs at an altitude of about 450 feet. A decrease in Russian fire indicated that Soviet observation posts and guns had been hit by the bombs.

The advancing German infantry, however, had to cross broad fields of ripe grain before arriving at the edge of the village. In accordance with their customary tactics, the Soviets had taken advantage of the cover afforded by the grain and, digging deeply into the black soil, had constructed an elaborate system of field positions to protect the village. Russian machine-gun fire from flanking positions, as well as carelessly directed German infantry fire, increased the difficulties of the forward German units as they moved through the grain fields. There was heavy hand-to-hand fighting for the Soviet machine-gun and rifle nests. Finally, the leading German units reached the edge of Gelenovka. There again machine guns, rifles, and hand grenades were used on both sides in close combat in front of the village.

In spite of bitter and incessant fighting from 0400, Gelenovka was still held by the Russians shortly before sunset. At this time, German armored assault artillery advanced through lanes among the halted forward elements and

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charged into the village, firing in every direction from which resistance appeared. Riflemen followed closely and beat down any resistance not broken by the assault artillery. At sunset Gelenovka was finally captured. The exhausted infantry sat at the side of the road amid dead Soviet soldiers, crushed horses, and burned vehicles and watched a stream of Russian prisoners led to the rear.

According to German sources, an equally severe struggle was necessary to secure possession of other villages, including Marjanovka. When Marjanovka was taken, the Germans felt that they had entered the outer protective ring of the positions in front of Kiev.

THE GERMANS ARE STOPPED AT WETA CREEK BY RUSSIAN DEPLOYMENT IN DEPTH. On July 31, German troops worked forward from Marjanovka toward Vasilkov, the only city on the road to Kiev from the south. German observers with glasses sought for any possible show of hostile resistance in the tall grain. Infantrymen combed the grain fields and the steep slopes of the Strugna tributaries.

The Russians harassed the German advance by artillery fire; however, they evacuated the inhabitants of Vasilkov, and did not defend that city. The Germans entered the town, established headquarters, and dug in around the outskirts to protect the units and supplies which were brought up.

During the forenoon of August 1, the leading German elements continued beyond Vasilkov in close pursuit of the Russians. After passing through several villages and crossing several swamps, the Germans, encountering increased opposition, approached the Weta, which the Russians had determined to hold. Russian artillery and mortar shelling of the German forward positions was extremely heavy on August 1, 2, and 3.

In front of the Germans and across the Weta, the Russians had constructed a semicircular line of bunkers similar to those further north along the Irpen River. The Germans at once began efforts to force these positions. At dawn on August 3, a young lieutenant succeeded in leading his platoon into the valley through a ravine obscured from the enemy. The platoon crossed the Weta and surprised a hostile security group located behind wire obstructions and an antitank ditch. Although accurate Russian shellfire prevented this platoon from holding its position, the observations reported by the lieutenant formed the basis for his battalion commander's attack. During the evening of August 3, German heavy weapons units, varying from heavy mortars to light field howitzers, completed their movement into positions in front of the Weta bunkers. Fire began at once, and hits were registered on positions located by observers in advance posts.

On August 4 at 0400, German artillery opened a heavy concentration of fire against Russian fortifications in the woods across the Weta. Three Russian bunkers received direct hits. After 45 minutes of continuous firing, there was a lull of five minutes, and at 0450 the German shelling was renewed with increased intensity. Smoke mortars next went into action; their shells exploded in front

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of and between enemy bunkers, and covered the center of the valley with a smoke cloud. Artillery fire was continued. The commander of a German infantry battalion leaped out of his cover, led his companies down the slope, through the knee-deep Weta, and across a 70-yard open space to a lane cut through the wire entanglements by the bridgehead platoon. Fortunately for the Germans, the bunker which protected the antitank ditch just beyond the wire had been put out of action by a mortar.

After crossing the antitank ditch, the right flank rifle company encountered another band of wire entanglements. Pioneers rushed to the front and cut a lane, through which a second special group of pioneers moved against the bunker on the right, bursting it open with two concentrated explosive charges. Then the flame throwers squirted their liquid fire into the hatchways, and a black smoke cloud obscured the view for some minutes. The Germans pushed on into the forest and found numerous abandoned field positions dug deeply into the earth. Their artillery fire had destroyed Russian resistance in that particular area. In places, the forest was a jumble of giant craters, broken trees, and torn branches. The air was full of dust mingled with the smell of exploded shells. A rolling barrage of German artillery, directed by observers with the leading elements, lifted just ahead of the Germans advancing through the forest. Finally the Russians were pushed out of their last positions in this area, which was over 100 yards inside the forest and a little more than a mile from the creek.

Simultaneously, other Russian bunker positions were penetrated, not only here, but on the front of the entire corps attacking on the south. The Russian fortifications were arranged in great depth, however, and this corps, while it had scored minor gains, could not effect a break-through.

Under heavy Russian fire the German riflemen lay on either side of the road in deep trenches which protected them from hostile shell splinters. They were surrounded by ankle-deep mud, and stretched pieces of canvas over themselves for shelters. They did not shave or wash for days. The field kitchens were several miles in the rear, and by the time meals could be served the food was cold. But, in spite of difficulties, the Germans held their position in spite of strong Russian counterattacks. They thought, according to their own accounts, that they would reach Kiev in 2 or 3 days. However, they remained in their positions, 12 miles from the heart of the city, and for a number of weeks made no advance against the determined Soviet resistance.

In the meantime the Germans strengthened their positions, turned Vasilkov into a headquarters town, and brought up supplies and reinforcements again by an all-out attack, which made no appreciable headway.

VON REICHENAU'S HALTED ARMY BECOMES THE HOLDING ATTACK OF THE KIEV ENCIRCLEMENT OPERATION

The situation before Kiev was finally resolved in September by events many miles away, both south and north. In the south, von Stuelpnagel had thrown a bridge across the river below Kremenchug, (see Tactical and Technical Trends

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No. 7 p. 40), and still nearer German forces had established bridgeheads across the Dnieper at Kanev, Rjishchev, and Tripole. Thus the west bank of the lower Dnieper was in German hands.

In the north, von Kleist had crossed the Desna near Novgorod-Seversky. Also, on the northern flank, a German advance to the northeast had forced the Russians out of Garnostaipol and across the Dnieper. The more northern elements of von Reichenau's Army had also established connection with von Weichs's army which had advanced north of the Pripet marshes, and had turned southward and crossed the Desna.

If the Germans had planned to take Kiev by a frontal attack, they had failed. Von Reichenau's army in two months of effort made no appreciable headway on the Irpen and on the Weta. The Germans had, however, dug themselves in so that they could not be easily thrown back. Whether the Germans had planned to take Kiev and had failed, or whether they had planned merely to secure strong positions before that city, they were now ready to become the holding attack in the envelopment which followed.

On September 17 at 0630 von Reichenau, once more began his attack on the Russian positions. As usual, violent artillery bombardment, assisted by dive bombers, paved the way for assaults with mortars, machine guns, hand grenades, and other weapons. The Russians again defended villages so stubbornly that each village outside of Kiev was destroyed. Because of the closing of the trap by armored troops far to the east of Kiev, however, the Russians had to cease their resistance, and withdraw across the Dnieper River. The city was captured by the Germans on September 19. Despite their heroic 10 weeks of resistance to the Germans in front of Kiev, the outflanking operations of von Bock from the north and of von Rundstedt from the south had forced the Kiev defenders into a disastrous position. The Russian soldiers who had fought so valiantly were withdrawn across the Dnieper, but were not able to escape from the trap which closed around at least four and possibly five of Budenny's armies.

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