GERMAN ATTACK AT EL ALAMEIN
AUGUST 31-SEPTEMBER 5, 1942

INTRODUCTION

After the British attempt to penetrate Rommel's lines on July 27, 1942 had failed, the Egyptian front settled into a more or less stagnant period for a few weeks. During this period, outside of the constant artillery fire, night patrolling, and usual air activity, little in the nature of active military operations took place. Most of this time was utilized by both sides in preparing defensive positions and building up strength in personnel, equipment, and supplies.

During the month of August the British reached a new high in morale. This change in attitude was attributed by observers to three main factors. First, the complete turnover which had taken place in the supreme command. General Alexander, a World War I veteran, noted for his aggressiveness and the leader of two brilliant actions of World War II, had replaced General Auchinleck as High Commander in the Middle East. Now under Alexander and in direct command of the British Eighth Army, was Lieutenant General Montgomery, a veteran of the fighting in France in World War II, and a soldier's soldier. Second, the quantity and quality of rations, which in the past had left much to be desired, had increased to a point where the British Tommy was not the underfed and under-nourished soldier that Rommel's troops had previously faced. Third, the British had gained a much-needed and well-deserved rest.

The British, in particular, were very thorough in their plans for the anticipated battle with Rommel's forces. About the middle of August it became evident, from the nature of the position that the British were taking, that they did not intend to attack, but instead that their strategy was based on the fact that Rommel could and would. With this thought in mind, the British prepared their position for defensive action only. By restricting themselves in this fashion, the British hoped to be able to keep their armor from falling into antitank ambush, similar to that which had caused their defeat a few weeks earlier. Since they planned to remain on the defensive, the British were also able to site their guns so as to have immediate antitank and artillery support, which had been lacking in the earlier attack.

After the British command had committed themselves to the defensive, they spared neither time nor labor to make certain that no possible contingency could arise which would frustrate them. Every man had been instilled with the feeling that he, and he alone, might mean the difference between victory and defeat. The line that they would be defending was commonly known as "Egypt's Last Hope"; with its fall, Egypt was lost. During the period from the June 27 attack to the latter part of August, every conceivable defensive position had been tested all along the entire line. Terrain exercises and maneuvers were going on constantly, testing and improving the defenses. All tanks had been moved in and out of pre-selected battle positions, actually dug in, and placed in hull-down and gun-down positions. All drivers and all gun crews were thoroughly familiar with their duties and positions. Likely targets had been registered upon, and gun and tank crews had gone to their positions in darkness.

GERMAN PLANS

Of Rommel's general plan little is known. It is known that he was preparing a strong position and his armored strength increased in tanks, both German and Italian. German and Italian parachute troops made their appearance on this front, as well as elements of the German 164th Division. Despite continual bombings by British and American planes, the port facilities at Benghasi,

Tobruk, and Matruh were still open, and through them, some supplies still reached the forward elements. The railroad from Tobruk to Daba also remained open, although traffic was severely hindered by the continual bombing by Allied planes.

Allied air reconnaissance showed that Rommel was regrouping his forces, with a large part of the German and Italian infantry, and the Italian armor, identified on the southern flank of his line, and with the bulk of the German armor behind the center although in a position to join overnight a thrust on the south.

About August 25, the Axis air force began to build up its strength in serviceable planes.

BRITISH PLANS

The British general plan was to prepare several contiguous fortified areas along the coast and to hold them at all costs, and also to cover the high ground of Ruweisat Ridge and the ridge immediately south of it. They also planned to hold the New Zealand "box" covering the western edge of Deir El Hima. The armor was to take up defensive positions along the foot of Alam El Haifa escarpment and maintain this position, thereby intending to force the German armor to fight them on ground chosen by the British. The southern sector was to be defended by two parallel mined areas extending to Himeimat, which is along the edge of the Qattara Depression. The bulk of the British armor was to be held in the south-central sector and well behind the minefields. In support of the infantry defending the fortified areas was an armored brigade (British brigade approximates U.S. regiment). Portions of the light armor and elements of the motor brigade patrolled and guarded the minefields. The light armor on the south would harass any advance, and the armored reserve (another armored brigade) was to be held in readiness to the east.

In the absence of any specified missions, the Royal Air Force, combined with the American Air Force, was to bomb continually and strafe the Axis ports, supply lines, and troop concentrations day and night.

British Intelligence fully expected the Axis offensive to get underway during the full moon on the night of August 25/26. For some reason, said by some to be a lack of fuel, the attack did not materialize at this time. However, on the night of August 30/31, just prior to midnight, Rommel launched the long-expected attack which he hoped would bring him victory, and drive the British from North Africa.

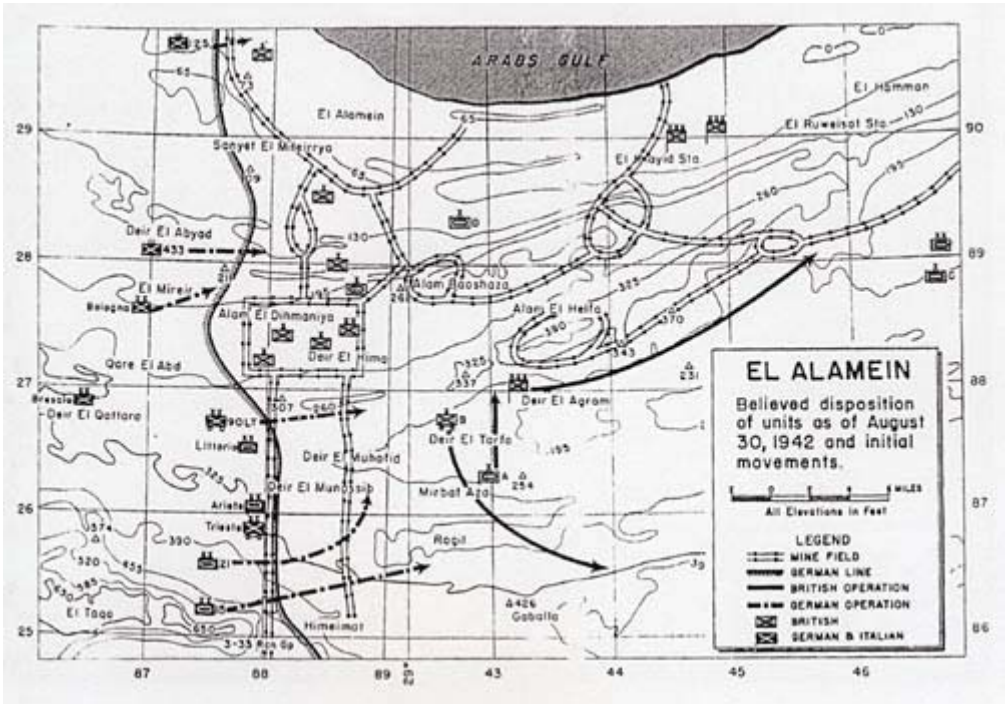
OPERATIONS: AUGUST 31

Rommel's attack on the strongly prepared British El Alamein line commenced at 2320, August 30. At that time German engineers and infantrymen commenced clearing a passage through the western section of the British minefield between the 25th and 26th east-west grid lines in the vicinity of Himeimat.

An interesting sidelight on this preliminary operation, and the subsequent tank penetration, was that the British fully intended to shell the Axis armor while they were confined and restricted in movement during passage through the minefield, but due to a misinterpretation of orders, this was only lightly done. As a result the Axis tanks managed to get through the minefields comparatively unharmed.

The German 15th Armored Division, with approximately 140 tanks, came through the minefield just north of Himeimat practically unharmed, then turned due east. Around noon they were in the vicinity of the 43rd north-south grid. At

this point, for some reason not fully understood, they halted their advance, and formed up as though they were expecting a counterattack. When the expected counterattack did not materialize, they formed up in the area east of Deir el Ragil, and proceeded in a northeasterly direction at about 1600. At the same time they detached about 40 tanks, which remained in the area of Deir el Ragil as security for the southern flank. It appeared that the German armor would bypass the principal British position, and, in order to prevent this, and to draw the Germans northward, the British commander sent a detachment composed of two tank battalions south to make contact, and, if possible, draw the Axis tanks north. This move was successful, as the British detachment returned to its previous position closely followed by the 15th Armored Division. A patrol of the 15th Armored Division closed in on the left flank of British Armored Brigade "A"* defending the main position on the southern side of Alam El Halfa, and a short engagement followed. After dark the 15th Armored withdrew to the south, leaving about 13 tanks behind in a wrecked or burning condition.



The German 21st Armored Division crossed the minefield with the 15th Armored, then turned in a northeasterly direction. It reached the area north of Deir el Tarfa at 1700. At this point it came under the fire of the right flank of British Armored Brigade "A" southwest of point 337. As the Axis tanks closed in, a brisk fight followed which lasted till dark. The 21st Armored then withdrew to the vicinity of point 254, leaving approximately 15 tanks burning or totally destroyed.

The German 90th Light Infantry Division which was on the north flank of Rommel's southern group, had difficulty in crossing the minefields, but by evening had succeeded in reaching the area north of Deir el Muhafid.

South of the 90th Light were the Italian divisions, Littorio, Ariete, and Trieste, in the area Deir El Munassib. Of these latter three outfits, only the Trieste completely crossed the minefields during the engagement.

German Reconnaissance Groups 3 and 33 advanced east, and then turned south towards the area Qua El Labin.

In the central sector a localized Axis thrust by the German 433rd Infantry Regiment and the Italian Bologna Division against the Indian outfits (aided by the South African and the New Zealand brigades) on Ruweisat Ridge, advanced as far as point 211, but was later driven back by counterattack.

In the northern sector, another localized Axis attack by the German 125th Infantry Regiment was momentarily successful near Tel el Eisa, but was later driven hack to its original position by the Australian brigade occupying that sector.

Patrols of British Motor Brigade "B" were active in the east and also in the Himeimat area. The remainder of the British Eighth Army held to their defensive positions, and only fought that part of the Axis forces that attacked them. Allied air support was continuous and intensive, as was the British artillery support, given from the area near Alam el Halfa where it was concentrated.

In a review of the day's fighting, two points stand out. First, the Axis attack did not come as a surprise to the British. Second, the British held rigidly to their preconceived defensive plan. They did not counterattack but waited, as planned, and met the Axis tanks on ground of the British choice.

During the night of August 31/September 1, British Armored Brigade "C", then in reserve, was ordered to advance and tie in with the left flank of Armored Brigade "A" to form a line along the foot of the Alam el Haifa escarpment.

OPERATIONS: SEPTEMBER 1

Just prior to daylight, the Axis tanks formed for the attack. The 21st Armored Division with approximately 50 tanks was along Deir el Agram facing the center of the main British position.

The 15th Armored Division, with about 100 tanks, formed southeast of the left flank of Armored Brigade "A".

At daylight, severe fighting broke out and continued until 1100. During the first hour of the fight, Armored Brigade "C" fought forward from its position in reserve, made contact with the left flank of Armored Brigade "A" on the main position, and formed as directed. This advance by the British armored reserve prevented the envelopment of the left flank of the principal British force.

It should be pointed out that the Armored Brigade "C" had been ordered to the position it eventually took during the previous night. However, the orders were not received until late at night, and execution was not as rapid as was expected.

The engagement was resumed in the late afternoon and continued until dark when the Axis withdrew to point 254 ridge, leaving behind 25 burning or totally destroyed tanks.

During the day a third Armored Brigade "D" went into position between the right flank of Armored Brigade "A" and the New Zealand box.

OPERATIONS: SEPTEMBER 2

During the night, the Axis formed up along the ridge at point 254, on the defensive behind a screen of antitank guns.

After daylight, small and isolated groups of Axis tanks felt out positions occupied by Armored Brigade "D" which had been moved up the previous day, but no attack developed.

The 90th Light Infantry Division commenced withdrawing from its position east of the minefield. It was replaced by the Trieste, supported by the Ariete and Littorio. The Italian Brescia Division moved forward from the area Deir El Munassib, and took up a position facing the southwest corner of the New Zealand box.

Allied bombing and artillery fire was continuous and heavy, both by day and night. Armored car patrols had gone around the Axis line and were harassing Axis supply lines far to the rear.

OPERATIONS SEPTEMBER 3

The day of September 3 was comparatively quiet. Axis motor transport commenced withdrawing westward along its axis of advance.

During the day British light armor, and patrols from Motor Brigade "B" intensified their harassing activities from the east and south as far west as Himeimat.

Artillery elements joined these patrols and shelled the Axis motor transport from comparatively close-up positions, then withdrew in face of enemy pressure.

The British heavy armor remained in place along Alam el Halfa.

It appeared at this time that Rommel was still undetermined as to his course of action. He had failed to draw the British armor away from its support, or into antitank ambush; in fact, the British failed to play the game the way he wanted them to play it.

OPERATIONS: SEPTEMBER 4

During the early morning hours, the New Zealand Division, composed of the two New Zealand brigades, which occupied the box, assisted by a brigade of another infantry division, laid down an artillery barrage and followed with an infantry attack. This attack advanced south and along the trails in square 88-27.

The attack advanced 3 miles, but with the coming of daylight the Trieste, Brescia, and the 90th Light Division, supported by the Ariete, and Littorio Divisions, in a series of three counterattacks, forced the attacking troops back nearly to their original positions.

This effort served one great purpose, however, in that it was evidently the deciding factor in causing Rommel's withdrawal. The force of this attack prevented him from using the 90th Light in a coordinated attack with the German armor.

The air and artillery attacks were continued on the same large scale as heretofore.

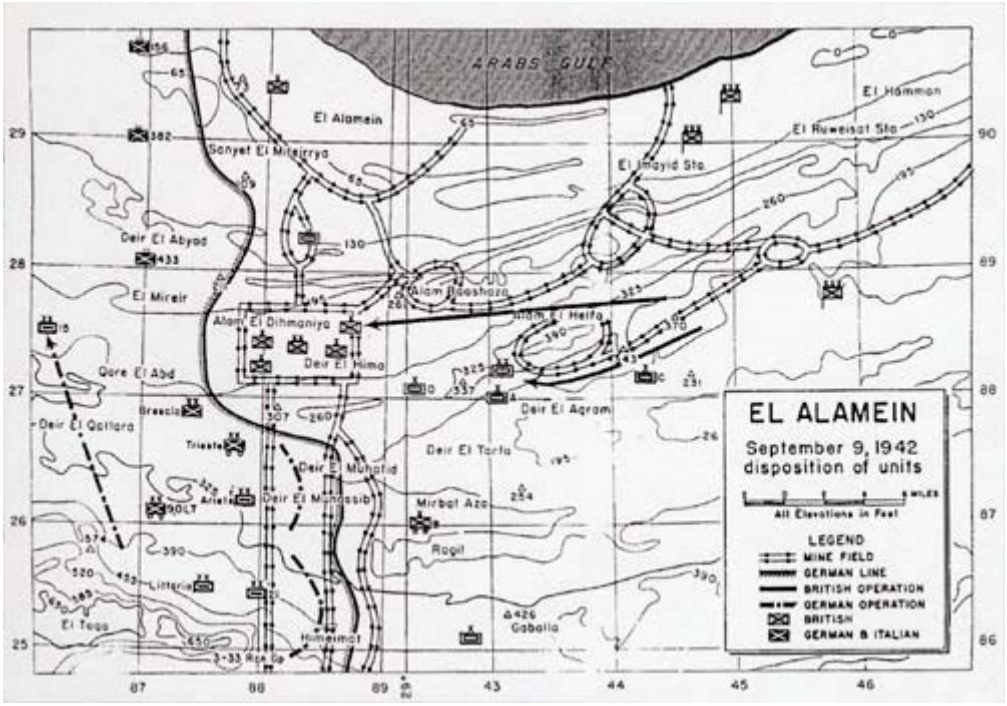
OPERATIONS: SEPTEMBER 5

The bulk of the Axis transport was withdrawn west of the minefields. The 90th Light withdrew off to the west. An antitank screen, supported by tanks, was set up between Himeimat and Deir el Munassib.

This was a slow withdrawal, with Rommel utilizing to the full extent his old scheme of leaving tanks visible as bait for British armor. These tanks were well protected by antitank guns. Formerly the British had always pursued them, and frequently had lost rather heavily. This time, all British armored forces remained in their battle positions, with their artillery continually firing on the retreating Axis forces.

Whenever the pursuing British infantry gun-carriers came within range, the Axis antitank guns picked them off. Rommel withdrew carefully, sustained only a minimum of losses, and eventually halted very close to his original position, retaining only about 2 miles of the ground he had won on the first day.

The Axis line in the southern sector was formed by the Italian Brescia and Trieste Divisions in the northeast part of square 87-26. The Ariete Division was at Deir el Munassib. The 90th Light Division was about 7 miles to the rear of the Ariete, as a mobile reserve. The German 21st Armored Division, the 3 and 33 Reconnaissance Groups, and the Italian Littorio Division covered the area around Himeimat and west to El Taqa.



While the Axis motor transport was retreating through the minefield area, the Axis air force managed to put up a fighter covering force which prevented Allied bombings. This protective covering "umbrella" was only local, however, and Allied bombing of the Axis rear areas continued on an undiminished scale.

When Rommel took up the position mentioned above, he immediately prepared strong defenses, and the El Alamein battle of August 1942 was at an end.

LOSSES

The Axis withdrawal was orderly, and since none of the previous engagements had been on a large scale, the loss of equipment throughout the entire battle was not unduly large.

Observers estimate that the Axis lost not more than 70 of their total of 440 tanks; of those lost, 55 were German.

Approximately 100 Axis motor transport vehicles, of which the majority were captured British vehicles, were destroyed and left on the field.

Judging from the empty cans lying about the areas that the Axis troops had occupied and then given up, the Axis forces appeared to be completely rationed with previously captured British supplies.

The British entered the battle with a grand total of 546 tanks of all types, and lost or had disabled a total of 67 tanks, which included British mediums and American medium and light M-3's. Of the total number of tanks lost, it was estimated that not more than 20 were completely destroyed and beyond repair.

British personnel losses were relatively light. A British corps commander estimated that the Axis losses were greater than the British in a proportion of 2 to 1.

SUMMARY

Rommel first advanced with his entire striking force, but there was no indication that a full-fledged, all-out assault had been launched. It is believed that he hoped to engage the British armor on grounds of his own choice, defeat it and then occupy Ruweisat Ridge which commands the coast road and the avenue to Alexandria.

When the British tanks refused to come out of their hull-down defensive positions, and away from their antitank and artillery support, Rommel was not quite sure of his ground and was afraid to risk his full strength. He spent 2 days feeling out the British position, losing rather heavily in tanks and motor transport while doing so. In view of later developments, it is also believed that he underestimated British tank strength.

Rommel was not able to bypass the principal British position along Alam El Haifa and then proceed eastwards to the Delta (El Hamman) because of the constant danger to his supply line by the British armor, plus the constant interference from Allied bombing and artillery.

On realizing the full extent of the British strength, Rommel withdrew to his previous line and occupied the strongest defensive position in the Western Desert.

The British success was due to: security; the well-planned defense which had been thoroughly tested by many tactical exercises; a thorough knowledge among troops and unit commanders of what was expected; proper execution and coordination among higher echelons; and the continual artillery and air bombardments. The effect of these bombardments, while not producing great material damage, must be accounted as a decisive factor.

In the employment of armament the most outstanding points were: the British static use of tanks; the effect of antitank guns; and complete utilization of field artillery mobility.

The only notable achievement of the German Luftwaffe was their ability to maintain a protective fighter-umbrella for several hours during the withdrawal of motor transport through the minefields, despite over-all Allied air superiority.

*For security reasons the British units cannot be referred to in the text by their exact designation. The armored brigades and the motorized brigade which played main roles in the action will therefore be designated by letters (A, B, etc.). By reference to the accompanying maps, the position and movements of these units can be easily followed.

GERMAN INTERROGATION OF PRISONERS OF WAR

The following report on interrogation of prisoners by the Germans is from a German document on that subject. It is believed that a knowledge of the type questions which might be asked of prisoners of war will be useful to unit commanders for instruction on safeguarding military information.

a. Printed Form

The printed form shown on the following page is required to be completed regarding each British prisoner of war. It is issued in pads.

b. Further Questions

Further questioning may include one or more of the following questions:

(1) Have there been any alterations in the Order of Battle as printed in the [German] handbook? Are alterations in progress, particularly with regard to armored formations?

(2) How far have infantry and other units been equipped with antitank and light antiaircraft units?

(3) With which units are there signal units which do not belong organically to the division?

(4) What is known about the Air Corps or the airborne divisions (parachute and airborne troops)? What is known about the strength, organization, training, equipment, and armament of Commandos and Special troops?

(5) What is the effect of our [German] weapons and tanks, technically and with respect to morale? What about losses in personnel, weapons, and equipment?

(6) What is known of the Amphibious Command, new weapons, new tanks, or new armament, and of armor on known types of tanks?

(7) What is known about active and passive chemical warfare preparations?

(8) What rumors are there about future operations?

(9) What is the situation at home concerning the formation of new units, movements overseas, supply and food situations, opinions as to the prospects in the war, and general morale?

No. 01061 FORM FOR INTERROGATION OF BRITISH PRISONERS

(Interrogating Unit) (Place) (Day)

To.
CHIEF OF THE GENERAL STAFF OF THE ARMY.
Dept. Foreign Armies. - West
To be transmitted by the quickest means.

Name:	Taken	Unit	
Christian Name:	At	Name	Army Corps
Year of Birth:			Div
Rank:	On		Brig Bn
Number:			Type of Co

Regular Army or Territorial Army.			Mobilization and transport overseas.				
	Place	Command	Date	T.O. of Unit	Embar-kation Place Date	Dis-embark-ation. Place Date	Route taken (places & dates)

Unit arrived in the line.	What units in the same Div?	Other units known.
At From To		Name Div Place Date

Particulars of weapons, tanks, equipment, antigas equipment.

Morale: (Losses)	Other important items.

Remarks:

1. Important papers (diaries, orders) are to be attached to the copy sent direct to the Chief of the General Staff.
2. Items of only local interest are to be put on a special sheet for interested units.

GERMAN MEDICAL SERVICES

The efficiency of the medical services of an army is reflected in the morale and combat effectiveness of that army.

The following details concerning the organization, equipment, and supply system of the German army medical services are taken from an Allied source.

* * *

a. Organization

(1) Infantry Division

2 medical companies, motorized or partly motorized.
2 ambulance platoons, motorized.
1 field hospital, motorized or partly motorized.

(2) Mountain Division

2 medical companies, partly motorized.
2 ambulance platoons, motorized.
1 field hospital, partly motorized.

(3) Motorized Division

2 medical companies, motorized.
3 ambulance platoons, motorized.
1 field hospital, motorized.

(4) Armored Division.

2 medical companies, motorized and armored.
3 ambulance platoons, motorized and armored.

(5) Airborne Division.

3 paratroop medical companies.
1 field hospital (airlanding).

b. Equipment

(1) Of the Individual.

(a) The Combatant.

One large and one small packet first field dressing wrapped separately in black, rubberized fabric 1 box anti-vesicant tablets

(b) The Stretcher Bearer.

In the combatant units - 2 stretcher-bearer's haversacks containing:

1 pair of scissors
1 pair of dissecting forceps
6 packets dressing

3 triangular bandages
3 strips of gauze 16 ft x 2 3/4 in
6 squares of gauze
1 roll of adhesive tape
1 waterproof bandage 18 x 20 in
1 tourniquet
20 safety pins.

In the medical units - in this case, the stretcher bearers are not all equipped with the haversack as above, but each group of four has a haversack (Verbandtasche) containing:

1 pair of cloth-cutting scissors (Kleiderschere)
1 tourniquet
12 strips of gauze
10 squares of absorbent cotton
6 triangular bandages
2 "Brandbinden" (absorbent gauze treated with bismuth for burns)
1 waterproof bandage 36 x 40 in
4 rolls rubberized adhesive tape
35 safety pins
4 small splints with cradle
2 slings, 12 x 5 in
Each stretcher bearer also carries a mug and a bottle with about a pint of cordial.

(c) The Medical Service N.C.Os. and Medical Orderlies.

Each carries a bottle of cordial, a case of dressing material and two medical haversacks, the first containing medicines such as salicylic acid (2%), formaldehyde, ticture of iodine, cardiazol and opium; the second containing much the same dressing material as the stretcher bearers' haversack on a smaller scale.

(d) Officers of the Medical Services.

Each carries the officer's haversack, the contents of which are extensive, including a number of surgical instruments such as probes, lancets, ligature forceps, cannulae, vaccinostyles and the like; a certain quantity of dressings; a tin plate case for tablets containing among others, pyramidone, veronal, acetylsalicylic acid, codein phosphate, tannalbin, opium, cocain chloride, atropinemannite and calomel; and also a box containing ampoules of, for example, caffein sodium salicylate, superarenine chloride and morphin hydrochloride.

(2) Of a Combatant Unit.

The medical equipment of battalions and regiments is identical. It comprises:

(a) Box No. 1. This is the "Battlebox" (Gefechtskasten) and is marked with two white strokes the form of a cross. The contents are miscellaneous but include much dressing material, anti-tetanus serum, medicaments and two 6-in atomizers containing ethyl chloride.

(b) Box No. 2. Medicaments of all types (Arzneimittelkasten).

(c) Box No. 3. Dressing Equipment. (Verbandmittel).

(d) Box No. 4. Supplementary box. This is like No. 1, but on a smaller scale.

(e) Box No. 5. Contains 280 flasks of tetanus anti-toxin 3000 units per c.c.

(f) Two medical haversacks containing medicaments and dressings rather on the scale of the M.O's haversack. Two empty rucksacks are also included, with blocks of labels for wounded and for sick.

(g) One set of equipment for fractures, including cardboard splints, metal wire splints and aluminum splints.

(h) One unit medical outfit - like an M.O's haversack.

(i) One set of oxygen apparatus - the flask contains 275 quarts of oxygen.

(j) Four stretchers.

(k) Twelve woolen blankets.

(l) One filter apparatus.

(m) Anti-vesicant, and gas protection caps for those with head wounds.

c. The Evacuation of Casualties

(1) Units under Divisional control. There are no medical units allotted to corps normally.

(a) Battalion aid station (Verwundetennetz) as close to the fighting line as possible. The station may or may not be under cover. Treatment is restricted to first aid. Occasional blood transfusions may be done. Evacuation is by stretcher bearer section of medical company.

(b) Ambulance Station (Wagenhalteplatz). This is established only if the ambulances cannot go forward to the battalion aid station.

(c) Field Clearing Station (Hauptverbandplatz) is established by the Medical company. It is intended for serious casualties requiring resuscitation, adjustment of dressings, splints etc, arrest of hemorrhage or blood transfusion before further evacuation. Emergency operations may be done here.

(d) Lightly Wounded Collecting Station (Leichtverwundetensammelplatz) for walking wounded and sitting or reclining cases requiring only minor treatment before evacuation. There is a skeleton staff from medical company. The remainder of the medical company is normally in reserve -- available to assist in handling a sudden rush of cases or assist in bombed areas, etc.

(e) Division Field Hospital (Feldlazarett). Capacity 200 beds. It is intended for the reception and retention of casualties who require urgent operation or resuscitation and a few days rest before further evacuation. It has a surgical team and is fully equipped to handle any casualty.

(2) Hospitals at Home or in Occupied Countries. (Reservelazaretten)

(a) Casualty Collecting Station (Krankensammelstelle). It is established by an Army ambulance unit at a railhead or other traffic center, normally and is for the retention of casualties awaiting evacuation. Only minor treatment is possible.

(b) Army Field Hospital (Kriegslazarett). For more serious casualties. Capacity 500 beds. Fully equipped hospital with all specialist departments.

(c) Army Field Hospital for lightly wounded cases. (Leichtkrankenkriegslazarett) Takes casualties who will be fit for duty in 3 or 4 weeks. Capacity 1,000 beds; fully equipped. Normally located in back areas of Army zone and away from all large towns.

(3) Capacity and time of erecting or dismantling of various units.

(a) Army Field Hospital. Capacity 500 beds, 24 hours to set up or dismantle. Set up by Army medical detachments.

(b) Army Field Hospital for slightly wounded cases. Capacity 1,000 beds. 24 hours to set up or dismantle. Set up by Army Field Hospital detachments.

(c) Field Hospital. Capacity 200 beds. 3 hours to set up or dismantle. Set up by Army Medical detachments.

(d) Casualty Collecting Station medical railhead. Capacity limited only by the available accommodation. 3 hours to set up or dismantle. Set up by motor transport ambulance company.

(e) Field Dressing Station. Unlimited capacity. 1/2 to 1 hour to set up or dismantle. Set up by Divisional medical company.

(f) Slightly Wounded Collection Station. Unlimited capacity. A few minutes to set up or dismantle.

(g) Motor Ambulance. Capacity of 4 lying and 10 sitting. Has four driving wheels and double differential for cross country performance.

(h) Hospital Train. The 2- or 3-axled coach train with heating coach has 358 lying capacity, and 385 sitting capacity without heating coach. The 4-axled corridor coach train with or without heating coach has a 364 lying capacity. 2 to 6 hours to set up or dismantle.

(i) Hospital Train for Slightly Wounded. 920 sitting capacity. 1 to 2 hours to set up or dismantle.

GERMAN RATIONS IN LIBYA

The following German food and water situation in Libya has been reported as a result of PW interrogations. The information showed that until July 1, 1942, no food or water difficulties had been experienced in the unit concerned, and after the fall of Tobruk canned fruit and vegetables had been added to the normal rations.

The battalion rations officer was responsible for the collection of rations (requisitioned every 3 days by companies) from the supply dumps, and for the delivery to companies. For distribution to companies there were four 3-ton trucks, never loaded to more than half capacity. Thus for 3 days' supplies, a 6-ton truck capacity per battalion was necessary. Bread was collected separately from the field bakery. Apart from the regular 3 days' supply, companies carried 6 days' and each man 1 days' iron rations. Rations included one hot meal each day, always prepared in the field kitchen, which is brought as far forward as possible.

Rations per man per day actually issued were:

Coffee	Bread	Water*
1/2 oz real coffee	1/2 lb at rest	About 5 pints at rest
1/4 oz substitute	1/3 lb in battle	

GERMAN TACTICS IN NORTH AFRICA

A knowledge of German tactics and methods may serve the dual purpose of turning the lessons to good account both against the Germans and against the Japanese. It is already apparent that the latter have studied and applied German methods of warfare.

In the German offensive operations in North Africa which began on May 26, 1942, the main feature of the German tactical methods, as reported from British sources, were:

(1) Employment of practically the whole of the German forces on the same axis of attack and on a comparatively narrow front, followed by the Italian armored and mobile forces. Italian infantry divisions supported by a small number of tanks were used for diversionary operations. The principle of concentration of force at the decisive point was, as usual, given primary importance, and must always be expected of German commanders.

(2) A night approach march followed by a very rapid advance and direct attack by tanks, after short reconnaissance and preparation against any opposition encountered on the axis of advance.

(3) Forward deployment and offensive employment of all guns of all types, including 88-mm guns, in support of tank attacks and against British counterattacks. Reliable observers report that practically every vehicle, even staff cars, in the enemy's leading columns was towing a gun or a trailer. A senior British commander reports that the German column with which he spent 8 to 9 hours before escaping consisted of:

8 armored cars
6 tanks
two platoons of motorized infantry
4 105-mm guns
4 88-mm guns
12 50-mm antitank guns
12 37-mm antitank guns
4 assorted self-propelled guns.
All vehicles towed guns or trailers.

(4) The enemy was quick to cover his front with antitank guns when tanks were brought to a standstill or stopped to refuel, and to protect his flanks at all times with an antitank screen. A threat to the enemy's flanks by British tanks was immediately met by the deployment of antitank artillery, while the enemy tanks continued their movement. It was useless to expect that British tanks would not encounter strong antitank defense in any offensive movement. The enemy appeared to have a rapid "follow the leader" deployment drill, and a system of visual control by means of colored disk signals.

(5) The efficiency of the enemy's recovery, repair, and maintenance generally was evidenced by the speedy renewal of his offensive after his first effort had failed to achieve his object, and the maintenance of the offensive for so long and over such great distances. The tactical advantages derived from a highly efficient system of recovery, repair, and maintenance are obvious.

(6) Enemy control was quick and personal. When an objective had been captured, the next move followed without delay, and it was usually action by the whole available force, not by reconnaissance elements or detachments only. This was evidenced in the advance east after the capture of Bir Hacheim, and again after the capture of Tobruk.

(7) Defensive positions were reduced by concentrating against them in turn. This is obviously the way to deal with positions that are out of supporting distance of each other when the complementary armored formations, for which the defensive positions serve as pivots, have themselves been forced on the defensive. This is another example of the firm application of the principle of concentration.

(8) Every effort was invariably made to draw the fire of the defense, especially the fire of antitank weapons, by the deployment and advance of some tanks. The tanks which had advanced were then withdrawn, and the enemy concentrated his artillery and mortars on all the defenders' weapons that disclosed themselves. After a thorough preparation of this kind, the real tank attack was launched.

(9) A case has been reported of mine-lifting being carried out in the following way: detachments of tanks advanced to the edge of the minefield and engaged all of the defending weapons they could see. Engineers then debouched from the tanks and proceeded to clear mines on foot, covered by the fire of the tanks. Tanks that were hit were pulled out by other tanks and then replaced, or the whole detachment withdrew and renewed its activities at another point. (Offensive use of small arms is the obvious answer.)

(10) Officers who have been in enemy hands, and enemy prisoners, report that ground-strafing aircraft were always engaged with intensive fire from every available small-arms weapon, including rifles. No one who was armed "went to ground" on such occasions.

GERMAN WIRE COMMUNICATION IN NORTH AFRICA

The following report was made after observation and inspection of the system of wire nets used by the Germans in North Africa.

a. General

The German use of wire communication is very flexible, and the extent of use varies according to the time available, conditions, and the tactical situation.

At periods when the troops are not engaged in active operations, a complete wire net is laid, and radio is used only by forward patrols and as an emergency means in case of interruptions and excess traffic over the wires.

Wire is not used as a means of communication during periods of inactive operations when mounted messengers are available. In forward areas, the Germans take every precaution against interruption of messages sent over the wire nets.

It is definitely known that in at least one German battalion, the orders issued to it specified that operational traffic was to be sent by telephone or telegraph until the latest possible moment: i.e., until the lines were cut by enemy action, and only then was radio to be used.

The following notes concern the wire network of the German Afrika Korps from June to October 1941. During this period there were no important operations; hence, what follows probably shows the fullest extent to which wire has been used in Africa by the Germans.

b. Wire Nets

The wire nets for a large unit like the Afrika Korps may be divided into four classes.

(1) Local lines to the individual staff officers, corps headquarters, and communications personnel.

(2) Lines direct to lower units, corps troops, corps artillery etc., which are controlled directly by corps headquarters.

(3) Lines to the main units (divisions) under the command of the corps headquarters. These units themselves had large switchboards, through which corps headquarters could communicate directly with the regiments and battalions of the particular division.

(4) Lines to large centrals at fixed geographical points, such as Capuzzo, Gambut, and Gazala. These centrals were not in any unit headquarters, but provided a medium whereby corps headquarters could contact organizations not directly connected with it.

It must be noted, however, that there is no very clear distinction between (3) and (4) above. There are frequent instances of division switchboards acting as intermediaries between corps headquarters and non-corps divisions, or even of fixed centrals doing this, in addition to their normal function as the central exchange for their own regiments. Thus, in July and early August, the Trento Division switchboard carried the Afrika Korps communications to the Afrika Korps headquarters' switchboard at Gambut and Acroma, and to other Italian divisions such as the Brescia and Pavia (none of the Italian divisions belonged to the

Afrika Korps.) In June, the Afrika Korps actually had no direct wire to the German divisions under its command. These were contacted through the Trento switchboard. Similarly, in September, the Bologna Division had nearly all the German heavy artillery units as subscribers, while at the same time the Afrika Korps headquarters' switchboard provided wire to the XXI Italian Army Corps, the Brescia and Littorio Divisions, and fixed centrals at Acroma and Gazala.

Furthermore, no distinction is made in the circuit diagrams between unit switchboards and fixed centrals.

Another interesting fact about the function of unit switchboards is that comparatively minor units frequently had more important units as subscribers. In August, for example, in the 15th Armored Division's wire net, the 1st Battalion, 33d Flak Regiment was the central for both the 15th Motorcycle Battalion and the 104th Motorized Infantry Regiment.

c. Extent of Afrika Korps Wire Communications

The comprehensive wire net developed after a period of static warfare can be shown by taking each of the four categories separately.

(1) Local Switchboard

In July there were some 21 lines from the Afrika Korps staff switchboard. The subscribers were either individual staff officers, or the officers of the various sections of the staff. Five or six additional lines were used for communications personnel (wire maintenance sections, etc.).

(2) Lines Direct to Corps Switchboards

The number of these lines varied according to circumstances. At one period in December, the Afrika Korps seems to have been acting as a fixed exchange for the Italian division at Bardia, and this involved a number of extra lines to installations and detachments. Normally, however, there were about six of these lines, and the units served were AA batteries protecting the headquarters, corps signal battalion, the intercept company, the air cooperation headquarters, and at some periods a reconnaissance unit and an airfield.

(3) Lines to Unit Switchboards

These lines again varied considerably. In June, 1941 the Afrika Korps had no direct lines to its own divisions. Instead, these were contacted through the Italian Trento Division. In October, there were direct lines to switchboards of all three German divisions, and the corps headquarters, while all Italians units were contacted through fixed centrals.

(4) Lines to Fixed Centrals

Early in the period the Trento Division acted as the most important fixed central in the network, and the corps had direct lines also to central exchanges at Gazala and Acroma. During July and early August, the Trento Division and Capuzzo were the only centrals (apart from those of the German divisions) to which the Afrika Korps was directly linked. In mid-August the Bologna Division took over the complete role of the Trento Division. But in September and October, Afrika Korps had direct lines to two fixed centrals, Gambut and Capuzzo, which acted as intermediaries to all units not on the German division exchanges. These centrals correspond with the "North" and "South" sectors into which the Germans divided their main defensive area.

In the final stage of development of this network, after 3 months of position warfare, Afrika Korps had local lines for its various staff sections and staff officers, direct lines to six or seven corps troops units, lines to the switchboard of the corps headquarters, and of all three German divisions, whence lower echelons and units could be called, and finally lines to two large fixed centrals at Gambut and Capuzzo through which they could contact the main Italian units, smaller fixed exchanges, and other German units not covered by the corps wire net.

d. Divisional Wire System

A similar development is shown by the circuit diagram of the 15th Armored Division for the same period. There was a staff switchboard with up to 20 lines: direct lines to small units (AA, communication, medical companies, etc.); lines to main units, whence smaller organic units could be contacted; and lines to main exchanges like the Afrika Korps, or to Gambut for rear and lateral communications.

e. Subsequent Examples

Another circuit diagram showing the communications of the 155th Light Infantry Regiment from April 20, 1942 is interesting as an example of the German wire system.

The Afrika Korps had moved shortly before the date mentioned above, and from the new position had communications only with the 15th Armored Division, 109th Motorized Infantry Regiment, and an Italian division. The old switchboard had not been moved, and was connected to the new one through a fixed central. This central and the old corps switchboard together provided the new installation with a means of communicating to the 21st Armored Division and other units.

The 90th Light Division, the unit to which the 155th Light Infantry Regiment was attached, had communication to the rear only to the XXI Italian Army Corps, to which command it was at this time attached. No lines to the front were shown from the 90th Division, and a radio net including the 155th Light Infantry Regiment is shown on this circuit diagram.

The 155th Light Infantry Regiment was amply supplied with forward wire lines, but had none to the rear except indirectly via a battery of the 611th Antiaircraft Battalion to the 104th Motorized Infantry Regiment, and thence to the Afrika Korps. The 155th Light Infantry Regiment had the following wire circuits:

(1) A staff switchboard with lines for the regimental commander, adjutant, signal detachment, observation post, etc;

(2) Lines from the switchboard terminating at telephones to the supporting artillery troops and antitank units;

(3) Lines to switchboards running to the two battalions of the regiment simplexed for telegraph.

The battalions had their own local staff lines and lines direct to company headquarters.

f. Forward Wire Communications - Infantry Battalion

Two circuit diagrams of the 1st Battalion, 115th Motorized Infantry Regiment, dated May 27 and June 16, 1941, respectively, show the wire net of an infantry battalion in the front line in Libya.

The earlier diagram shows rear and lateral lines from battalion headquarters to regimental headquarters, a neighboring battalion, and an artillery battery. On the later diagram there is an additional line to the 2d Battalion, 115th Motorized Infantry Regiment. On both dates, the line to regimental headquarters was simplexed for telegraph.

Communications within the battalion were, at the earlier date, as follows: lines from battalion headquarters to 1 and 3 Companies, and radio communication to 2 Company. Both 1 and 3 Companies had lines to 2 Company, and each company had a line to an attached mortar Or machine-gun section. In addition, battalion headquarters had lines to two observation posts manned by elements of the heavy weapons company, and from one of these, there was a line to a platoon of the cannon company.

By June 16, the three companies had been compressed to two, a "Left" Company and a "Right" Company, each with one platoon in front. Lines to platoons and sections of the heavy weapons company no longer went back from company headquarters, but forward from rear observation posts, and an additional line was provided from battalion headquarters to an engineer platoon. The radio net from battalion headquarters to 2 Company was no longer shown.

The 33d Artillery Regiment's wire communications were shown in a circuit diagram to be as follows:

(1) A switchboard with a line back to division headquarters, and local lines to the staff officers;

(2) A second switchboard with lines to each of the three battalions and to the observation posts.

Radio was used for communication between command vehicles of the regiment, and the battalion commanders and observation officers in tank-supporting artillery units; wire cannot be used for these purposes

ENEMY MINEFIELDS AT EL ALAMEIN

Information concerning the type, layout, and marking of enemy minefields in the El Alamein area has become available from British sources. There is as yet no information as to whether this general method of mine laying was also followed in the Axis retreat from El Alamein.

a. Pattern and Spacing

The minefields were laid in belts, each belt consisting of two to eight rows of mines. Shallow minefields might have only a single belt of mines consisting of from two to four rows; deep fields might have several belts of mines with considerable distance between belts.

The belts themselves might be anything up to 200 yards deep, with an additional danger area consisting of widely scattered mines up to 250 yards in front of the belt. The back of the belt was usually marked with a fence; the distance from this fence to the front fence (if any existed) was anywhere from 100 to 800 yards.

No standard pattern for laying mines in the belts appeared to be used. However, from the mass of data that was available, it was found possible to classify the patterns broadly as follows:

(1) Regular Pattern

This is the most common. Mines in a given row are spaced at equal distances; there is an equal distance between rows; and the mines of one row are equally spaced between the mines of the previous row. A variation in this method is to vary the distances between rows. In no reported case, except for scattered mines, has the distance between mines in a row been unequal.

(2) Regular Pattern Offset

By a system of pacing, a certain variety is introduced into the regular pattern. The distance between mines in any one row is equal, but one row is slightly offset from the previous row, and the next row is again offset by a different distance. Once a few mines have been located, the pattern soon becomes apparent and mines will be found where expected.

(3) Random Mines

In front of most regular minefield belts, and particularly in front of gaps, there may be found mines scattered at random and unmarked. These are either continuous, with very wide and irregular spacing, or in clumps more closely spaced but laid to no pattern inside each clump.

The above patterns usually resulted in a density of a little less than 1 mine per yard of front. Densities up to 2 mines per yard were generally not found except when blocking roads, trails, or defiles.

The spacing between the mines in a given row is from 3 to 10 yards, with the average spacing being 6 yards. As noted in (1) above, in no reported case, except for scattered mines, has the distance between mines in a row been unequal.

The most common spacing between the rows themselves is reported to be usually about 5 yards or 10 yards.

b. Marking of Field

The front edge of forward minefields is often not marked. The rear edge normally is marked, usually with a trip wire on short stakes, though cattle-fence, concertina wire, and stone cairns are sometimes used. Cases have been reported of the rear edge being unmarked.

A common marking is a single row of concertina wire running along the center of a field parallel to the rows of mines. in a large minefield there may be several rows of mines in front unmarked, then a row of concertina wire, more mines, then concertina wire, and so on, finishing up with a row of concertina wire on the rear edge.

The marking of fields by furrows, commonly used at Tobruk, has only once been reported at El Alamein, and in that case the field was a dummy one.

Only one case has been reported of continuous wire running irregularly within a field. It is believed that skull and crossbones indicate the presence of antitank mines or booby traps.

In the rear areas, enemy minefields may be expected to be well marked with cattle-fences and warning notices in German and/or Italian.

c. Marking of Gaps

Little information is available about gaps through minefield; but the following data have been reported.

(1) Width

10 yards in one case, and in another.

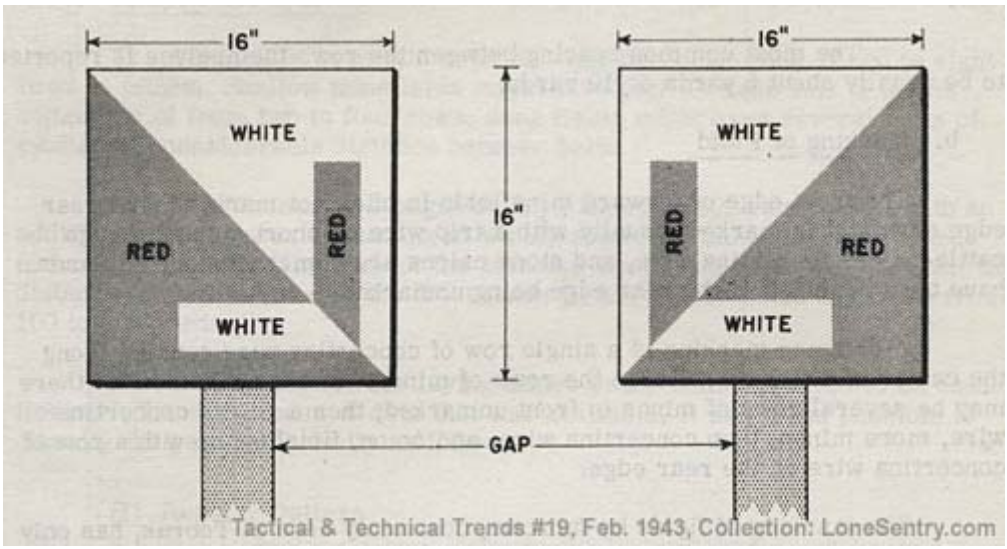
(2) Method of Closing

Usually two or three rows of Tellermines (antitank) with boards placed on one or all of the rows to insure detonation of mines if a vehicle attempts to pass through the gap over the boards, which are normally concealed by a shallow cover of soil.

(3) Marking

In the northern sector, two types of gap markers have been found:

(a) Painted signs, as in sketch, on either side of the gap.



(b) Luminous tubes 1 inch long placed on the tops of mines to mark a route for patrols. These tubes are visible 3 yards away.

(4) General

It is reported that gaps are a favorite place for laying Tellermines without any marking wire or signs. Gaps are sometimes covered by groups of scattered mines laid up to 2,000 yards in front of the gap, and unmarked.

d. Types of Mines

German, Italian, French, and British mines were all used by the enemy at El Alamein. Relatively few booby traps were found in the minefields, and the traps found were almost invariably attached to German Tellermines. Antipersonnel mines (usually Italian B4's) were found at times, generally as a single row laid in front of the outer wire of a minefield. The antipersonnel mines were spaced from 7 to 10 yards apart, with wooden pegs driven between the mines, these pegs being used to attach the trip wiring from the mines on each side of the pegs.

e. Tactical Siting

One report states that the minefield is usually 200 to 300 yards in front of the MLR, and covered by fire and listening posts. In another report the distance from the MLR to the main minefield is given as varying from 200 to 1,000 yards. A listening post was also located by a patrol 100 to 150 yards behind a minefield. It can be definitely stated that it is the enemy's practice by day to cover all main minefields with small-arms fire from close range, and by night to maintain antilifting patrols, as well as listening posts often located within the minefield itself.

Comment: It should be realized that the above information applies to the enemy mine tactics at El Alamein. It is to be expected that his tactics will change from time to time as a result of experience, expediency, change in terrain, or change in command personnel.

ITALIAN PARACHUTE SIGNAL FLARE

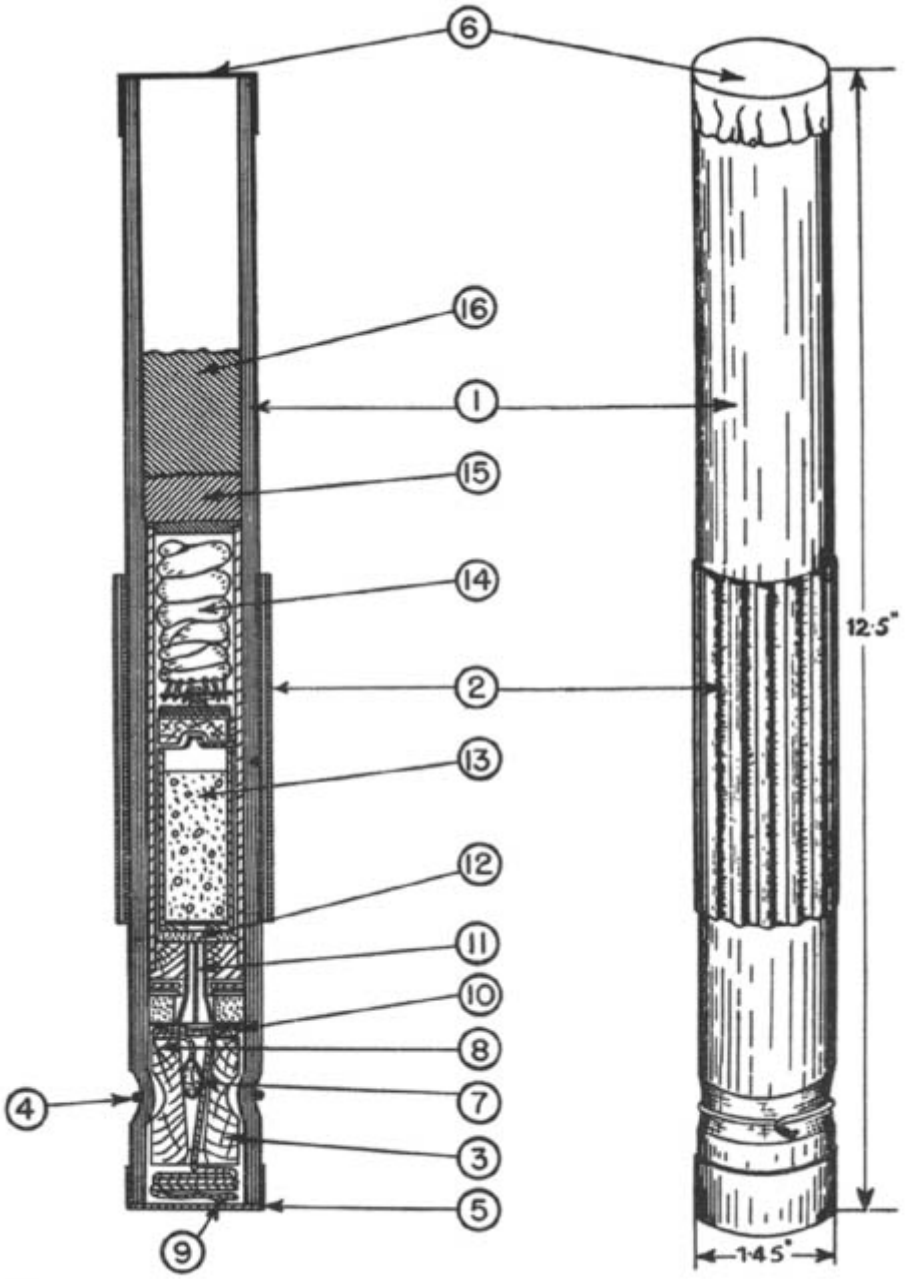
A specimen of an Italian parachute signal flare has been captured by the British in North Africa.

a. Description

The flare is contained in a cardboard tube (1) (see accompanying sketch) 0.19 inch thick, which, in the specimen examined, was colored bright red. The tube is provided with a corrugated cardboard grip (2), 3.9 inches long. Below this grip the tube is pinched in to fit into the groove in the wooden plug (3), and is secured by a wire (4). The open ends of the tube are sealed by paper, gummed over the ends at (5) and (6). The plug (3) has a central hole which contains a friction igniter (7), consisting of a match composition pellet attached to the end of a short length of cord and secured by a tack (8). The free end of this cord string (9) is protected by the seal (5). A part of the cord (10) near the igniter pellet (7) is impregnated with phosphorus. At (11) is a short length of safety fuse which forms a 2-second delay and leads to the powder charge (12). Above this is the candle (13) and its parachute (14), which are secured in place by a felt washer (15) and a length of waste packing (16).

b. Method of Functioning

When the seal (5) is broken, and the free end of the string (9) pulled, the part of the cord at (10) is drawn through the hole in the plug (3), where friction between it and the pellet (7) ignites the latter, which fires the safety fuse (11). After 2 seconds delay, this ignites the powder charge (12) which expels the candle (13) and parachute (14).



ITALIAN PARACHUTE SIGNAL FLARE

Tactical & Technical Trends #18, Feb. 1943, Collection: LoneSentry.com

c. Handling

If the ends of the tube are sealed, the flare has not functioned and is safe to handle. If the lower seal is broken, the cord should be secured within the end of the tube so that it cannot be pulled accidentally. The flare should be destroyed by burning.

SUMMARY AND EVALUATION OF OPERATIONS IN EGYPT

October 23 to November 7, 1942

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a. Summary of Operations

On October 23, Axis armored divisions were disposed in two groups as follows: the 21st Panzer and the Italian Ariete in rear of the south end of the line; the 15th Panzer, the Italian Littorio, and the German 90th Light (less certain reconnaissance elements), in rear of the north end of the line.

Beginning October 27, the Axis armored forces which had been concentrated in the north counterattacked vigorously, particularly against the north end of the British line. This was unsuccessful due to prior Axis losses and stiff British resistance.

On October 30, the 21st Panzer Division moved north and joined the 90th Light Division and the two armored divisions in that area; the Trieste Division (motorized), the only available reserve on the entire front, was committed in the north.

By the morning of November 1, the British completed regrouping the X Armored Corps, and in the evening the Corps attacked due west. The main effort of this attack was directed frontally against the 15th Panzer Division and the Italian Littorio (Armored) Division. Both of these Axis divisions suffered heavy casualties. The British attack penetrated, into the Axis rear areas and isolated one regiment of the German 164th Division along the coast. The 21st Panzer Division at this time was also along the coast, west of the 164th Division. The Axis forces counterattacked desperately and lost heavily in tanks and antitank guns in combat between armored units. Although suffering heavy losses, the 90th Light and the two German Panzer divisions with their depleted forces succeeded in withdrawing to the west.

A large proportion of the Italian forces in the south, lacking transportation, ceased resistance and they, together with miscellaneous German troops, were captured by the British XIII Corps.

b. Change in German Commanders

It is interesting to note that a change in German commanders during this period probably had a marked influence on the Axis conduct of the operation. At the beginning of the period, General Stumme was in command of the Afrika Korps in Marshal Rommel's absence. It was during his command that the Axis armor was split into two groups. On October 26, Stumme was killed in action and General Thoma took command. He initiated the concentration of his armored units for employment as a striking force.

c. Evaluation of Axis Tactics

Concentration of effort has always been a basic German tactical principle. It is almost axiomatic with German commanders to employ their armored units, specifically tanks, in mass to deliver hammer blows.

Hence it is difficult to understand why General Stumme divided his armored force into two parts, one south and the other north, without keeping an armored force in general reserve to deal with a British breakthrough. Perhaps terrain and lack of adequate facilities dictated his choice. Nevertheless, his reported disposition against an alert and well-equipped enemy possessing superior air power invited the Axis defeat that followed.

General Thoma's concentration of his armored forces apparently came too late. The British not only were prepared to take on the Axis counterattacks but they were able to renew the offensive at the proper moment, when the Axis forces were disorganized and expended as a result of these counterattacks.

d. Evaluation of British Tactics

Improvements in British tactics have been noted in the following respects:

(1) Intense and effective use of artillery against tanks and antitank guns.

(2) Judicious use of armored units concentrated for mass employment.

(3) Coordination between tanks and infantry movements.

The conduct of this campaign by the British was at marked variance with that of other desert operations. Previously, armored regiments, reinforced, were used independently as striking forces, but in this action the British X Corps, composed of two armored divisions and one motorized division, was used as a unit. This change in tactics was without doubt due in part to the recent sweeping changes in British High Command in the Middle East; but lessons learned in previous desert operations probably played a more important part.

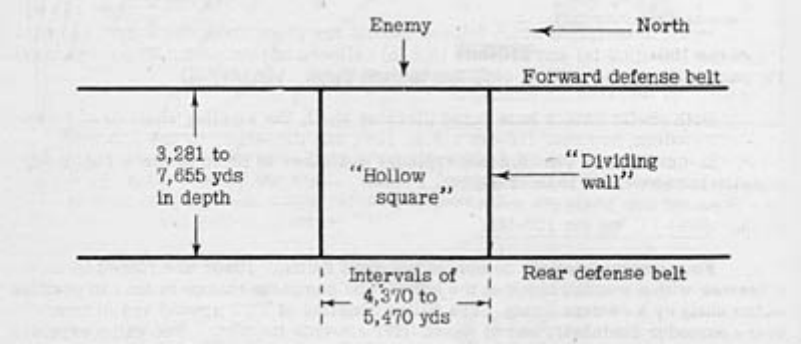
ROMMEL'S DEFENSES OF STABILIZED POSITION AT EL ALAMEIN

A well-organized defense capable of quickly and effectively reverting to the attack, with cunning and deception concealing movements and dispositions, can sometimes offset numerical superiority.

Due to the great length of front and shortage of troops at El Alamein, Rommel modified the traditional German system of defense in depth to a defensive square pattern as revealed in a recent report from Allied sources. Use of such a system is a possibility in fortifying the Mediterranean coast line.

(1) The usual German defense in depth may be diagrammed as follows:

(2) At El Alamein, Rommel used two main defensive belts (forward and rear) from 3,281 to 7,655 yards in depth connected by dividing belts at intervals of 4,370 to 5,470 yards, thus forming a series of hollow areas, which may be diagrammed as follows:



(3) The "hollow squares" formed by such a defensive pattern are characterized as follows:

(a) Designed on topographical basis with artillery placed so as to cover entire area:

(b) Act as traps for troops who succeed in penetrating forward defenses;

(c) Permit enfilade fire from either or both of "dividing walls" and rear position;

(d) Artillery disposed for defensive fire throughout front with particular concentration on the "hollow squares."

(e) Minefields give additional protection in these "hollows", which were called "devils gardens" by Rommel.

(4) The forward defense belt, thinly manned, was protected by minefields and listening posts. These were for prevention of surprise and deception rather than defense.

(5) Main advantages of such a defense are:

(a) Permits covering of wide front with a minimum number of men;

(b) Protects troops from hostile artillery fire which is usually concentrated on forward defense belt.

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.

Name	Caliber (inches)	Muzzle Velocity (foot-seconds)	Max Range (yards)	Rate of Fire (RPM)		Remarks
				Theor-etical	Prac-tical	
6.5-mm rifle (Model 91) Mannilicher-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.
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.
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 cals; 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	7,600	--	12 to 14	Barrel, 32 cals; 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 SP.
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.
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°.
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	--
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)	22.0	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	--	--	--