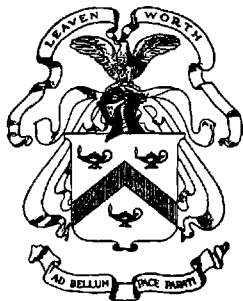


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TACTICAL AND TECHNICAL TRENDS

No. 1

JUNE 18, 1942

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by

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Prepared for

HEADQUARTERS ARMY GROUND FORCES AND SERVICES OF SUPPLY

By

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TACTICAL AND TECHNICAL TRENDS AND DEVELOPMENTS

This bulletin, which will be issued bi-weekly, consists of recent information of tactical and technical developments and trends affecting the operations of the Arms and Services. It is derived from official sources (except where specifically noted), and consists principally of extracts from reports by American Military Attaches and Observers in the field. Comments and evaluations are included where they are pertinent. Information relative to air and naval operations is not included, except where directly related to ground operations.

The material is arranged according to Arms and Services. The sources of information are indicated at the end of each topic discussed. Officers who wish to obtain further information on any subject herein may do so by citing the respective references, the title of article, and the number of the bulletin.

Divisional and higher commanders are invited to submit material for this bulletin, covering the experiences which they have had with the technical problems which have been encountered in connection with materiel issued to their organizations.

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SECTION I

TACTICAL AND TECHNICAL TRENDS

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PART I

AIR

JAPANESE BOMBING METHODS

A Japanese method in bombing operations is to send a fleet of bombers over the objective and drop no bombs at all. However, these are followed within a short period, from ten to fifteen minutes, by another fleet of bombers which do all the damage.

The Japanese also employ a method known as the "hidden fighter." This consists of an attack by a group of bombers which brings the British planes into the air. Then all but one of the Japanese bombers leave. The remaining bomber lurks in the vicinity behind hills until sufficient time has passed to allow the British fighters to land at their airfield, at which time the Japanese bomber comes out of the shadows and destroys the British planes on the ground. This deceptive method was used very effectively in Singapore, not only in the destruction of buildings but in causing great casualties among the people.

In a recent raid on Port Moresby, five Japanese fighters arrived 90 seconds prior to the appearance of bombers and traced a cross of white smoke. When the bombers appeared, they flew through the center of the smoke pattern and released their bombs approximately 12 seconds afterward.

(No. 363, M. I. S., Headquarters, U. S. F., S. W. Pacific.)

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PART II

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ANTI-AIRCRAFT

PROBLEMS IN BRITISH ANTI-AIRCRAFT MOUNTINGS

The British anti-aircraft mounting spring support, known as the Lakeman, has been commented on very unfavorably in the British Middle East Command and G.H.Q. The Middle East have stated that they would prefer to do without this support both on tanks and armored cars. British Royal Armoured Corps Headquarters have also been consulted in this matter and a certain divergence of opinion was noted. However, after consideration, it was decided that the Lakeman anti-aircraft mounting is not suitable in the United Kingdom either. The chief complaint, which appears general both in the Middle East and the United Kingdom is the lack of protection for the anti-aircraft gunner.

Note: While these discussions were being carried out, the 8th Armoured Division produced a Valentine Tank with an anti-aircraft mounting designed by a British Officer. This was viewed by the General Staff and British Royal Armoured Corps Headquarters and was found to have very definite possibilities. In consequence of this, the Director of Tank Designs has been requested by the General Staff to investigate the possibility of incorporating this mounting in all tanks and armored cars where possible. It is feared that it may not be possible to use this mounting with vehicles fitted with a cupola. Meanwhile, the Commander of the Royal Armoured Corps has requested that he may retain the present Lakeman anti-aircraft support pending the design and production of the improved mounting.

(M/A Report, London, No. 47672.)

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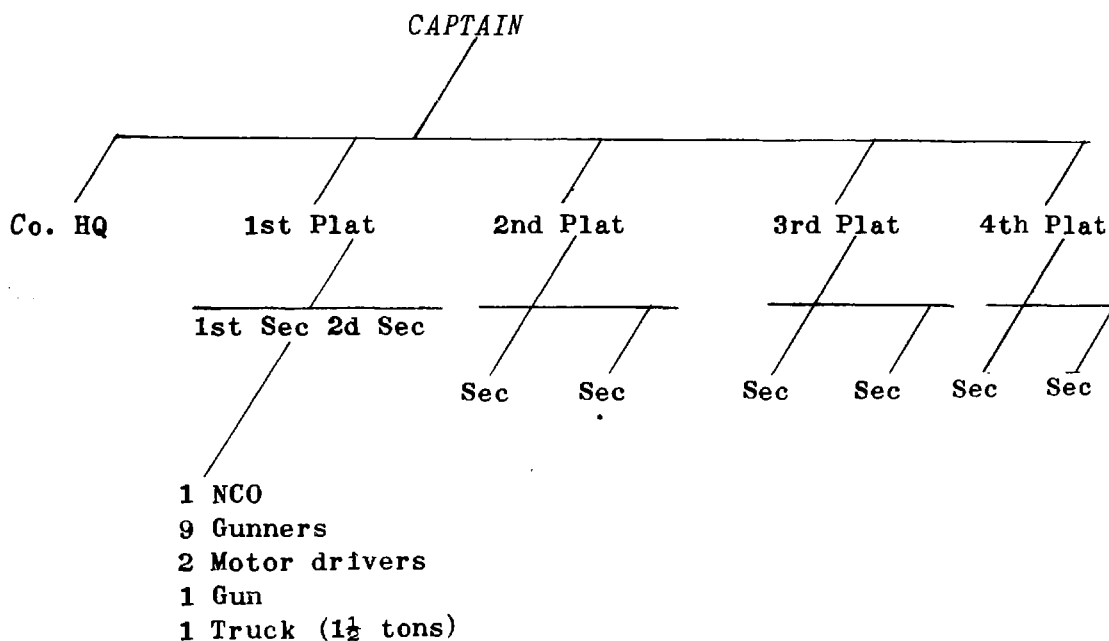
PART III

ANTI-TANK

ORGANIZATION OF JAP ANTI-TANK COMPANY

Following is the composition of a Japanese Independent Anti-Tank Company operating in Burma:

ORGANIZATION.



The total strength of the company is approximately 150.

EQUIPMENT

Eight 37 mm Anti-tank guns. Each gun is carried on a 1½ ton truck. 150 rounds of ammunition are carried in each truck. No motor transport is provided for the men.

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TACTICAL EMPLOYMENT

The unit was subdivided in the advance on Rangoon. Two platoons were with the 33rd Division and two with the 55th Division. The two platoons with the 55th Division were to operate with Japanese tanks, but failed to do so because the tanks could not cross the Sittang River in time.

(M/A Report, Burma, No. 173, U.S.M.O.)

GERMAN MINE FIELDS IN LIBYA

German Mine Fields encountered in the Tobruk area are reported to have been, with very few exceptions, combinations of anti-tank and anti-personnel mines.

A row of "Sperrmine" anti-personnel mines, called "S" mines, with push igniters was frequently laid in front of the Teller mines (platter shaped anti-tank mine, weighing about 10 lbs.). This apparently was intended to make the work of taking up the minefield more dangerous.

Trip wires intended to give warning of the approach of hostile troops were also utilized. It is reported that "T" mines are usually laid with the top of the igniter flush with the ground and the earth smoothed back into place. No elaborate concealment has been encountered and the disturbed earth usually makes the mines easy to locate. No pull-igniters have been found in the cavities provided for them in the side and base, of "T" mines although the Germans are known to have used this type of igniter in the area.

In one case a field of "T" mines was found to have been arranged for deliberate firing, and engineer reconnaissance discovered electric leads connected to the arming points in the sides of the mines. They were wired in parallel to enable the mines to be fired singly or in groups.

"S" mines are usually laid with only an inch of the antennae visible, and the disturbed earth carefully smoothed back into place. Nevertheless, the disturbed earth usually makes their location easy, as no elaborate attempt at concealment has been encountered.

Push, pull, and pedal-types of this mine have been encountered, the two former predominating.

(B.M.I., No. 43)

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ARGENTINE MOUNTAIN ARTILLERY TRAINING

A demonstration was given by a 75 mm mountain artillery battery; all the men taking part were of the class of 1920 and therefore had been in the service a little over one year. The exercise was held in the foot hills about two miles west of Mendoza. The terrain in this region is very rough and rocky with no vegetation except cactus and small bushes. There are many steep slopes, slides, and chasms. All pack mules were led by men dismounted. One gun was taken in pack to the top of a hill over a narrow, knife-edge ridge which was so steep that dismounted men assisted the mules by hauling on ropes tied to each side of the packs. This gun was eventually placed in position on top of the hill. Another crew hoisted its loads to the top of a cliff by hand, first using rope ladders for the personnel. The loads were then taken across a deep arroyo on a rope cable with pulleys. The personnel was also crossed in this manner and the gun set up on the other side. It was explained that the rope ladders and cables had previously been placed in order to save time. Nearly every pack carried a coil of heavy rope, and several rope cables were also carried. The battery detachment scaled a nearly vertical cliff on foot in the Alpine style to establish an observation post on a high hill. Communication equipment consists of telephone and radio. All these activities were conducted simultaneously.

Comments by observer: This demonstration is the best I have seen of Argentine army activities. Although rehearsed many times, as could be seen by the appearance of the ground, it presented a true phase of peace-time garrison training. The troops were in their every-day work uniforms and there was a total lack of parade ground atmosphere. The equipment was well worn but kept in serviceable condition. The guns were clean and working parts oiled. All in all, I was very favorably impressed with the efficiency by all ranks.

(M/A Report, Argentina, No. 7809.)

LIQUID AIR IN GERMAN SHELLS

The Germans at Kerch are reported to have used bombs, mortar and artillery shells containing a powerful explosive involving liquid air with evidences of magnesium. The resultant air pressure is reported to cause death by lung collapse, a reaction similar to that of death by gas or asphyxiation. The usual protective measures are said to be worthless due to the large effective radius.

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G-2 Comment:

Due to lack of United Nations observers on the Russian front, no first hand information is available on this subject.

(M/A Ankara, J-33)

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CHEMICAL WARFARE

NERVE GAS

Unconfirmed reports from various sources describe the effects of a so-called "Nerve Gas" said to have been used by the Germans in Russia.

(C.W.S. COMMENT: American chemists do not know of any agent which it is practicable to make having the characteristics ascribed to "Nerve Gas." However, because of the persistent rumors that a gas of this type exists, investigations along this line are being continued.)

NEW TYPE OF GERMAN VESICANT REPORTED

Evidence is accumulating that the enemy is manufacturing a vesicant other than mustard (HS) and lewisite (MI). It is almost certain that this substance is of the same type as one which is known to have been the subject of enemy experiments for some time. It appears that one center for the manufacture of this new vesicant is in Poland. At least one new projection device has been captured by the Russians.

Unusual interest in civilian anti-gas defense is also to some extent a seasonal manifestation. The Spring of 1941 saw great activity in Western Germany. It now appears that there is considerable activity in this direction in Berlin, eastern Germany and in Poland.

(M/A Report, London, No. 47531.)

NOTES ON GERMAN CHEMICAL WARFARE

A charred diary taken from the wreckage of an Heinkel III airplane brought down in May, 1941 in the Middle East was found to contain rough notes of a lecture on chemical warfare.

Although for the most part these notes confirmed our previous knowledge of German Chemical Warfare the following entries are worthy of comment:-

(I) Mention is made of toxic smoke and lachrymatory generators - "80% Blue Cross or White Cross." This is the first definite reference to German toxic smoke generators, although their existence has been suspected and samples from the private firm of Stoltzenberg have been examined. They are presumably intimate mixture types in which the toxic charging represents 80% of the total weight of the device.

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(II) Under the heading "Gas projectors and gas mines" it is stated that the filling used in "Green Cross and exceptionally, Blue Cross; range 3,500 metres." This range is too high for a projector of the Livens type and may possibly refer to the new German 10 cm. Stokes-brandt type mortar. "Green cross" is the German marking for the lung irritant group of war gasses (i.e. chlorine, phosgene, etc.), while "Blue Cross" is used to denote the arsenical toxic smokes.

(III) Describing gas shell for field artillery, the gas content is given as 10%.

This figure is high and may indicate that high capacity designs for gas shells have been introduced.

(IV) Under the heading of ground contamination methods, a Yellow Cross (mustard) spray mine is mentioned. This may be based on the Czechoslovak "Chema" chemical mine, in which an outer cylinder was used to project the mine into the air where it burst at a predetermined height.

(C.W.S. COMMENT: Permeable protective clothing issued to American soldiers gives all the protection practicable against mustard gas vapor and a large measure of protection against liquid lewisite. It gives protection against the vapor of lewisite but only limited protection against liquid lewisite. Against the so-called nitrogen mustard, American clothing provides rather limited protection against both vapor and liquid. At present, tests and development work now going on indicate that a greater measure of protection can be provided by further chemical treatment of the clothing. Tests have not proceeded far enough at this time to justify definite conclusions. Development is underway, the purpose of which is to provide an impermeable protective cape which will not be penetrated by liquid agents of either of the lewisite mustard or the nitrogen mustard types of agents.

A protective ointment is being issued to American troops which gives protection against Lewisite M1 and Mustard. The results of tests of the protection against nitrogen mustard are not yet available.

Detector papers and paints are being issued to troops which will indicate the presence of liquid mustard, lewisite or nitrogen mustard. A detector kit has been standardized, but not yet issued, which will also detect the presence of the three above described agents.

Rockets - Although the British have issued a rocket type weapon to their chemical warfare troops as a part of their armament, American

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chemical warfare troops are not so equipped. Development work is now underway which promises to provide an improved rocket type chemical projector.

Chemical mortar - Tests are now being conducted on the 4.2-inch chemical mortar, the standard for American chemical warfare troops, to increase the maximum range up to approximately 3200 yards as contrasted to the present maximum of 2400 yards. From results so far obtained this seems practicable.

High-explosive shells - A military requirement has been established for a high explosive shell of the 4.2-inch chemical mortar. It is expected that this development will be completed at an early date and production of several hundred thousand of these shells initiated.

Gas mask - The American gas mask will protect against all known gases in the field.)

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PART VI

ENGINEERS

GERMAN STEEL INVASION BARGES

The following is a description, received from Finland, of German steel invasion barges. They are 20 feet wide and 90 feet long, with a flat sloping bow to enable them to run up on the beach. Compartments for personnel and tanks are completely housed and on either side of steel deckhouse there are two exit ports. Guns and vehicles are taken on and off by means of a ramp in the bow.

(M/A, Helsinki.)

NOTES ON BRITISH BRIDGE CONSTRUCTION

The British Engineer-in-Chief, Middle East, reports that as far as he is aware no anti-tank obstacles were met other than anti-tank mines and ditches outside Tobruk. With regard to the latter, during recent operations a Field Company constructed eight class 24 tank bridges (capacity about 25 tons) in one night over an anti-tank ditch 18 feet wide by 8 feet deep. They were constructed of eight reinforced steel joist beams for spanning. 12" x 5" and 4" decking was used. The bank seats were 10" x 10" timber and had been laid a few days previous. The reinforced steel joists were wrapped in hessian (a heavy fabric) to deaden the noise. The first four bridges were completed by 0100 hours and the remainder by 0400 hours.

The officer commanding an Italian infantry regiment, who was taken prisoner, said under interrogation, "The sapper work in putting 8 tank bridges across the anti-tank ditch on the eastern sector was carried out in an impeccable manner. We did not know nor did we hear anything while they were being put across. The first thing we heard or saw were British tanks."

From an operational point of view the bridges were entirely satisfactory.

G-2 COMMENT:

It is believed that this description of British bridging of anti-tank ditches gives an unduly optimistic picture of the ease of the operation. The reference seems to be to the original capture of Tobruk from the Italians. If so, the explanation lies in (a) the fact that the ditch was outside the obstacle (wire and mines) system; and (b) the fact that the Italians, in that campaign, were push-overs.

(M/A Report, London, No. 47672.)

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PART VII

INFANTRY

ORGANIZATION AND TRAINING OF BRITISH COMMANDOS

Origin.

During the winter of 1939-1940, and prior to the Norway campaign twelve independent volunteer companies, one from each of twelve British divisions were formed. These companies were trained to perform especially hazardous tasks in support of divisional operations. Upon conclusion of the Norway campaign, and in June 1940, these twelve companies were formed into six independent battalions. In February 1941, these were regrouped into eleven commandos which now comprise the Special Service Brigade. Conversation with several officers, indicated that while it was believed that this S.S. Brigade originally should have been comprised of Marines, this was not possible at the time as the Royal Marines were unable to furnish the required personnel.

Missions.

The primary mission of the S.S. Brigade is to carry out raids. Raiding parties may vary in size from a small reconnaissance group to a complete commando or even a larger force. Secondary missions are:

- (1) To act as an elite or shock assault brigade to seize and hold a bridgehead to cover a landing in force.
- (2) To provide especially trained covering forces for any operation.

Organization.

The S.S. Brigade functions under the Advisor for Combined Operations (A.C.O.). The A.C.O. acts in an advisory capacity to, and executes the orders of, the Chiefs of Staff Committee of the Imperial Defence Council. The staff of the A.C.O. consists of officers of the Army, Navy, Air Force, and Royal Marines. The S. S. Brigade is commanded by a Brigadier who has both an operational and an administrative staff. The Brigade, however, does not train, nor does it function normally as a Brigade, but as separate commandos which are stationed in various parts of the British Isles and abroad. The S.S. Brigade is entirely serviced by the Army.

The commando consists of approximately 25 officers and 450 enlisted men, all of whom are volunteers. The unit is organized into a commando headquarters and six troops. The former consists of seven officers and 77 enlisted men organized into Administrative, Intelligence, Signal, and Transport Sections. In addition there are attached: one

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surgeon, seven Royal Army Medical Corps personnel and two Royal Army Ordnance Corps men.

Each troop consists of three officers and 62 enlisted men, organized into a Troop HQS. and two sections. Troop HQS. consists of a Captain (C.O.), a troop sergeant major and an orderly (runner and batman). Each section (1 officer and 30 enlisted men) is commanded by a Lieutenant. The section is composed of two or more subsections (squads) of six to eight men each. Subsections are commanded by sergeants. It will be noted that the section is exactly suitable for boating in one Assault Landing Craft (A.L.L.).

Weapons.

Although the establishment (Tables of Organization) provides a definite allowance and allocation of weapons, neither the numbers of weapons nor their distribution is rigidly adhered to. In every case the distribution of weapons is made according to the tactical requirements of the particular mission to be performed. Each commando HQS. has a separate store of extra weapons and thus extreme flexibility in armament is assured. A typical store contains:

Bren guns; TSMG's; cal. .55 anti-tank rifles; 2" and 3" mortars and a supply of both smoke and HE shell for each; defensive (fragmentation) Mills hand grenades; offensive (plastic body, concussion type) hand grenades, smoke pots; Very pistols; fighting knives; knuckle dusters; limpets (magnetic attaching, acid, H.E.) one type suitable for use against ships and another for use against tanks; demolitions of all types.

The establishment provides the following weapons in addition to rifles and Colt automatic pistols, cal. .45 for each troop:

- 4 Bren guns
- 4 TSMG
- 1 AT rifle, cal. .55
- 1 2" Mortar

Normally each subsection (squad) is allocated one Bren gun and one TSMG. The allocation of the anti-tank rifle and the 2" mortar is left entirely to the troop commander who employs them according to the requirements of the situation. As indicated above, additional weapons are available in Commando stores and may be assigned. The important point to note is the extreme flexibility in armament and the degree of initiative permitted troop leaders in its distribution.

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Clothing and Equipment.

Clothing and equipment furnished commandos includes a variety of types thus permitting flexibility in dress and battle equipment.

Normal clothing is "battle dress," a two piece woolen garment, stout shoes and anklets (short leggings). In colder weather a sleeveless buttonup leather jacket which reaches the hips is worn over or under battle dress. A two piece denim dungaree is also provided for wear over battle dress in damp or rainy weather. In addition to the ordinary hob-nailed shoes, a rubber soled shoe and a rope soled shoe are provided for missions that require stealthy movements over paved roads, through village streets, for cliff climbing, and so forth. A heavy ribbed wool cardigan with long sleeves and turtle neck and a wool undervest are also available for cold weather wear. No overcoats are worn at any time during training or operations even in severe weather. All clothing is designed and worn with the sole purpose in view of comfort and utility under actual operating conditions. No leather belts are worn either by officers or enlisted men. A fabric waist belt is provided for wear when deemed appropriate.

Basically, every officer and man is provided with standard army field equipment similar to our own. In addition, certain special equipment is available in Commando stores and is issued to individuals or troops as the occasion requires. Principal items are listed below:

Fighting knife; Tommy (individual) cooker; Lensatic compass; Field ration; skis and poles; Individual waist life belt (Mae West); Primus stoves; one gallon Thermal food containers; gas cape; wristlets; 2 man rubber boat; plywood (sectionalized) canoe; collapsible canvas canoe; bamboo and canvas stretchers; 2" scaling ropes; 1" mesh heavy wire (6' x 24") in rolls for crossing entanglements (see under "Training"); Toggle ropes (see under "Training"); Transportation equipment (administrative) consisting of: 6-Hillman pick-ups (4 seats), 3-1500 lb. trucks, 1-3 ton truck, 10-motorcycles;

Communication equipment: 10 Radio sets (#18 portable voice and key type, weight 36 lbs, voice range 5 miles), Semaphore flags, Blinker guns, Very pistols and flares.

Training.

Commando training is conducted along the following lines:

It seeks the development of a high degree of stamina and endurance under any operating conditions and in all types of climate.

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It seeks to perfect all individuals in every basic military requirement as well as in special work likely to be encountered in operations, viz: wall climbing, skiing and so forth.

It aims to develop a high percentage of men with particular qualifications, viz: motorcyclists, truck drivers, small boat operators, locomotive engineers, etc.

It aims to develop self confidence, initiative and ingenuity in the individual and in the group.

It seeks to develop perfect team work in operating and combat.

An officer or enlisted man volunteering for commando duty is personally interviewed by an officer.

In its training the S.S. Brigade is prepared to accept casualties rather than to suffer 50% or higher battle casualties because of inexperienced personnel. All training is conducted with the utmost realism and to the end that the offensive spirit is highly developed. Wide latitude is accorded commanders in the training methods employed, and thus the development of initiative, enterprise, and ingenuity in the solution of battle problems, and the development of new techniques is encouraged. A corresponding latitude is accorded troop commanders. Only the highest standards are acceptable and if officers and men are unable to attain them, they are returned to their units immediately. Leaves are accorded commando personnel during prolonged training periods and after actual operations in order to prevent men "going stale."

An appreciation of the type of training conducted by commandos may be arrived at by brief descriptions of observed routine training executed by five different commandos over a period of five days.

Assault Course.

All obstacle assault courses are not the same but vary in accordance with terrain.

Cliff Climbing.

Commandos receive special training in cliff climbing and troops are sent from time to time to appropriate regions for practice.

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Demolitions.

A general course is given to all members of commando troops in demolitions and more detailed instructions are given to a demolition group within each troop. These specially trained groups are taught demolition as affecting bridges, rail installations, machinery, oil tanks, etc. They are taught how to crater and to blow buildings to provide temporary road blocks. At Troun on December 3, during the course of a night problem (attack on a village), in which three troops participated, the following demolitions were employed: Bangalore torpedoes for gapping wire, booby traps installed in likely avenues of approach, and well camouflaged and piano trip wires set to explode land mines. The Bangalore torpedoes were real enough but booby traps and land mines were represented by detonators. Very few booby traps were exploded as men kept their wits about them and their eyes open. Sufficient training allowance of all types of high explosives, fuzes, and detonators is made available so that this important training is continuous. A plastic type of HE is used extensively. Neither TNT nor Nitro-starch is employed.

Street Fighting.

House to house street fighting is extensively practiced.

Field Combat Firings.

Both day and night field firings were observed. In one night firing exercise, a troop fired on low silhouette targets at a range of about 150 yards. The terrain was rolling countryside. A light rain was falling. Illumination was provided by Very lights fired from the flank. It was attempted to keep the flares 50 yards in front of the targets. Bren gunners posted on the flanks of each subsection fired with the subsection. Approximately 50% hits were scored out of an average 170 rounds fired per section.

Much time is devoted to tactical problems ("schemes") in which live ammunition is fired by all weapons. The strikingly effective use of smoke in assault at night was shown.

Marches.

On December 5, 1941, one troop of commandos executed a forced march of seven miles in one hour. Equipment: combat packs and rifles, uniform: battledress and steel helmets. This march took place along a macadam road through rolling countryside. The weather was chilly.

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Obstacles:

On December 3, and December 5, different troops were observed crossing barbed wire obstacles. Training and overcoming obstacles include:

1. Action against triple concertina.
2. Action against double-apron fence.

(In attacking any type of wire fastened securely to screw pickets, the pickets themselves on each side of the bay of wire to be crossed are seized by the leading men and bent to the ground, thus materially aiding in the wire-crossing.)

3. Use of Bangalore Torpedoes

Wall-Scaling.

1. Walls 10 - 12 feet high.
2. Walls 20 feet high.

Stream Crossings.

Stealth and initiative in field operations.

Troop operational methods of infiltration.

Discipline and Morale.

To all appearances the discipline and morale of commandos is exceptionally high. This may be in large measure accounted for by the fact that all commando personnel are selected volunteers who applied for this type of duty because of the prospects of frequent action.

In talks with officers and sergeants major we gained the impression that the discipline is largely self imposed and that the application of disciplinary measures by commanders is a rare necessity.

An excellent spirit of fellowship prevails between officers and enlisted men and is evident in all training and exercises. Officers participate in athletics with the men and two half days a week are set aside for rugger, soccer, cross-country runs, boxing and so forth. All are required to take part in one form or another.

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Officers and enlisted men are normally billeted in various houses throughout the town in which the unit is stationed and an extra living allowance is authorized. Contrary to the expectations of most officers this system has improved morale. It is probable too that the extremely low rate of venereal admissions is due to this form of billeting.

Undoubtedly the fact that commanders have the prerogative of immediately returning a man to his unit for breaches of discipline or inaptitude for commando duties has an important effect in maintaining the existing high disciplinary level.

The varied and realistic nature of the training undertaken is likewise an aid to morale. Current events talks are given weekly by all troop commanders using material furnished by ABCA (Army Bureau of Current Affairs). Outside speakers, (Naval officers, civilians, professors and so on) give weekly talks on the larger aspects of the war, its economics, etc. These all broaden the soldiers' point of view and dispel boredom.

Frequent week ends are granted from Friday P.M. to Monday A.M., and liberal leave policy obtains. The men are not allowed to go stale in training.

(Special Naval Observer, Serial 00013, A16-3)

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MECHANIZED VEHICLES

SAND CHANNELS FOR ARMORED CARS

It has been recommended that sand channels be carried on Humber armored cars, stowed across the nose of the vehicle. From the point of view of loading it is considered that no worse place could have been chosen. The front axle already has the entire weight of the spare wheel imposed upon it, and the additional weight of the sand channels forward of the front axle will aggravate matters still further.

This question of sand channels has been investigated and a new and much lighter design is under consideration by the Director of Tank Design. Modifications for moving the spare wheel from the front to the offside of all armored cars are also being incorporated in all vehicles. It is considered that this will greatly relieve the front spring which, in any case, is being strengthened.

GERMAN HALF-TRACKS USED AS TRACTORS

The Germans make considerable use of half-tracked vehicles as tractors. In many cases they are more nearly three-quarter tracked. It is suggested it would be advantageous for us to develop a fully tracked tractor utilizing the American rubber track and the Cletrac transmission with suitable reduction gear. It is realized that the rubber track would probably be useless elsewhere than in the desert. Such vehicles should be capable of pulling recovery trailers to most places which can be reached by a tank, and it is considered they would be of great value in the forward areas. The vehicle should be fitted with a winch. It is not suggested that vehicles of this type would replace normal wheeled tractors and trailers for use in rear areas.

A Churchill tank chassis is under development in the United Kingdom for similar use as a recovery vehicle.

(M/A Report, London, No. 47672.)

*GERMANS EXPERIMENT WITH
AMPHIBIOUS CARRIERS*

Reports have been received that the Germans are experimenting with an amphibious troop carrier. The particulars given are inconclusive but indicate that the vehicle is somewhat similar to the American "Roebling Alligator" Amphibious Troop Carrier. Following are details of this carrier:

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Length	24' 0"
Width	10' 0"
Height	12' 0"
Speed (roads)	20 m.p.h.
Engine	Not visible, but believed to be gas rather than Diesel.
Track: Type	Flat plates: Plates appeared thin and light in weight.
Width of Track	10"
Estimated Capacity	36 fully equipped troops.

Two propeller shafts extend through the rear of the body hull. Each shaft is about 30 inches from the sidewall of the vehicle. Each propeller consists of two blades, each about 20 inches long. A rudder, about 24 inches high and 18 inches wide, is attached to the rear of each propeller shaft housing.

The sides of the upper part of the hull extend out over the tracks. The lower forward section of the hull curves upward at an angle of approximately 45 degrees. The entire forward section of the hull presents a blunt appearance.

The upper edge of the hull is encircled by a 1½ or 2 inch rope. The bottom of the hull is a flat surface except for the forward end. Ground clearance is estimated to be 26 inches. When first observed, this vehicle was making a 180 degree change in direction, pivoting on the road on one track.

(Issue No. 43, G.S.I., G.H.Q., Middle East, Technical Intelligence Summary.)

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MEDICAL

JAUNDICE AMONG U. S. TROOPS

Twelve hundred additional cases of hepatitis (jaundice) have been reported in Northern Ireland. The majority of cases are hospitalized. The disease is caused from yellow fever vaccine; a study of the epidemic is being made. (Note: There have been reports of jaundice among troops in several other areas.)

(M/A Cable, London.)

PART X

ORDNANCE

BRITISH:

The pull-through thong has been substituted by the British for the cleaning rod used for the Thompson submachine gun.

(M/A Cable, London.)

UNITED STATES: (HAWAII)

It is essential that modifications of barrel reams to the chambers of calibre 50 machine gun barrels be accomplished before departure, or that notification to contrary be given.

The arrival in Hawaii of transient planes without roll tool armorers is seriously depleting local stocks of items which roll tool armorers carry.

(Fort Shafter, J-24)

GERMANY:

It is reported that the Germans have manufactured a new long range flame thrower utilizing a powder containing aluminum.

(Fort Shafter, J-24.)

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QUARTERMASTER

GERMAN NIGHT DRIVING EQUIPMENT

The special night-driving equipment which is fitted to German vehicles was designed by the Nova-Technik G.M.B.H. of Munich in collaboration with the Army Mechanization Experimental Department, Wuensdorf, before the outbreak of war. The equipment consists of the following parts:-

- (a) The black-out headlamp mounted on the left-hand side of the vehicle between 32" and 48" from the ground.
- (b) The special interval-judging rear light and stop light, carried on the left-hand side of the vehicle.
- (c) The additional rear light, fitted with a dimming device, and carried on the left-hand side of the vehicle.
- (d) The additional rear light, fitted with a dimming device, carried on the right-hand side of the vehicle.
- (e) A three-stage dimmer switch is installed.

The Head-Lamp is of a peculiar flattened shape, and makes use of a horizontal 35-watt lamp emitting light rearwards against a semi-oval mirror. This mirror in turn reflects the light back through a glass diffusion-panel under the over-hanging hood. A soft, almost flat-topped beam of light results. The beam is projected for a length of 30-40 meters and a width of about 25 meters and is particularly diffused towards the edges.

It is claimed that the beam from the head-lamp is invisible when on "low," from heights exceeding 500 meters, when on "medium" above 800 meters, and when on "full" above 1500 meters. The same distances also apply to ground observation, horizontally.

It should be noted that the vehicle's normal sidelights are also kept on in order to mark clearly the breadth of the vehicle, but they are masked very thoroughly so that their light is not visible beyond 500 meters.

The headlamp of the leading vehicle is switched down to the lowest possible switch position compatible with the darkness of the night and the danger of observation. The rule is that the darker the night, the less is the light to be used.

In convoys only the leading vehicle will normally use its blackout headlamp, and all the remaining vehicles will switch to the H position

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(see above), using the Interval-judging panel to keep station.

It is possible that drivers are trained to follow a convoy with the switch in H position and without sidelights, in which case each fifth vehicle would have its headlamp switched on.

It is emphasized that care is to be taken when negotiating gradients at night, as ground observers may obtain a glimpse of the light source when the vehicle is climbing a hill or just descending into a valley. The headlamp should be switched off when it begins to illuminate the crest of a rise.

(Issue No. 43, G.S.I., G.H.Q., Middle East, Technical Intelligence Summary.)

PROTECTIVE CLOTHING FOR GERMAN ARMORED CAR CREWS

A German Army Council Instruction of May 7, 1941, authorizes the issue of protective clothing or overalls to the crews of armored cars. The suits are to consist of trousers and jacket, made of rushgreen drill, similar in pattern to the black field Service dress.

The suit will be worn either as a camouflage over the black Field Service dress, or as a summer uniform without the black tunic or trousers.

(Issue No. 43, G.S.I., G.H.Q., Middle East, Technical Intelligence Summary.)

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SIGNAL CORPS

JAP TYPE P3A RADIO DESCRIBED

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Following is a description of the Japanese Type P3A radio set:

The transmitter has a single valve oscillator/amplifier using type valve UY 510 B. The power supply is obtained from a hand driven generator giving 500 volts high voltage and 7.5 volts low voltage. The approximate valve dissipation is 25 watts.

The wave range follows:

400 -- 580 Kcs.)
580 -- 1000 Kcs.)
1000 -- 2000 Kcs.) Each range has a set of plug-in coils.
2000 -- 3000 Kcs.)
3000 -- 5700 Kcs.)

The set is crystal controlled. Three crystals come with the set -- 2960, 3283, 5550 Kcs.

Rod aerials are not used. A simple type aerial with metal mast sections is employed.

A built-in key is used, with an extension key breaking the negative lead. The general performance is good, and the components and finish are excellent.

The receiver has a 5-valve superhet - high frequency Mixer, Intermediate frequency detector and penthode low frequency, with regenerator on the high frequency stage.

The power supply is derived from dry batteries both for high voltage and low voltage. The high voltage is 90 tapped at 67.5, and the low voltage 3.

Following is the wave range:

350 -- 625 Kcs.)
625 -- 1100 Kcs.)
1100 -- 1950 Kcs.) Each range with a set of plug-in coils.
1950 -- 3450 Kcs.)
3450 -- 6000 Kcs.)

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Two pair headphones are supplied with the set. The operation is simple and the performance good.

(M/A Report, London, No. 48097)

DESCRIPTION OF RADIO NEEDED IN ICELAND

Recommendations have been made as to the need for numerous radios of the following type: battery operated, voice range of 50 miles, operational simplicity (desire transceiver type), 4 bands crystal controlled, 1500-440 kilocycles frequency range, powered by twelve or six volt batteries, verticle type antennae preferred like BC 69 J. (Halli-crafter at - 12 - A modified), SCR 543 type is recommended. SCR 281 with BC 69 A, if modified, is desirable for use with battery. Motor generators (Jannette) of six and twelve volts have previously been furnished with SCR 281. The BC 69 A Antenna is suggested. Operation by gasoline is considered undesirable owing to the need of positive quick starting action for antiaircraft intelligence system. The SCR 281 or SCR 543 with BC 69 A unit and two battery sets furnished per radio is recommended, with one gasoline powered charging set furnished for each radio. Each set should have spare parts kit, and crystals for set. The frequency is to be determined and ordered later.

(J-147, Iceland)

SUBMARINE DETECTION

It is believed that radio sets direction finding SCR 206 A or equivalent can be used to locate submarines which surface at night to transmit information gathered during the day. Submarines cannot be picked up by Rader detectors. A skilled operator is needed for each set.

(J-29, Ft. Shafter)

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PART XIII

TANKS

OPERATION OF U. S. TANKS IN LIBYA

In recent operations in Libya, British bombings of friendly tanks from the air, and anti-tank action against friendly tanks were evident during the entire battle. The need for clearer identification marks on our tanks has been suggested.

The United States medium tank in this battle gave an excellent performance, according to the British. Some British observers said medium tanks had been hit as high as twelve times by 50 mm and even 88 mm shells and were still in operation. It is also reported that as far as is known the front of the American medium tanks have not been penetrated.

(M/A Cairo, J-11)

TANK REQUIREMENTS IN LIBYAN FIGHTING

Crews of the American made medium tanks, now designated as "General Grants" are asking for as much 75 mm ammunition as it is possible to carry. Seeking a total operational capacity of from 80 to 90 rounds, they are prepared to forego 37 mm and Browning ammunition and also to remove the front hull guns and mounting.

A plan has been worked out by the Middle East Engineers which will permit the following ammunition load:

75 mm	81 rounds
37 mm	80 rounds
.303 mm	5000 rounds
.450 mm	700 rounds

Military Engineering has been cabled for stowage diagrams and details of the scheme referred to.

The British are considering the development of command tanks. These would be standard tanks suitably modified to carry two radio sets, the armament being replaced by dummy equipment. Vehicles of this nature are being considered for use as observation posts, for Royal Horse Artillery (completely motorized) and field artillery units in Armoured Divisions.

(G-2 COMMENT: The Germans have command tanks. The British feel the need of them, not only as command tanks but also as O.Ps for artillery supporting tank units.

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The basic principle for artillery O.Ps is that the O.P. should be in the same type of vehicle used by the supported unit. Therefore an armored car is more suitable for artillery supporting an Infantry Division. The American Scout Car has been used with success.)

No decision has yet been taken on the requirements for command tanks. A description of the "British Crusader" tank modifications is promised in the next technical report and drawings are being sent separately by air mail. It is stated that the "General Grant" has not yet been investigated in this regard.

Removal of the auxiliary turret on the "Crusader" tank has been approved and this is being accomplished. The opening in the hull is being blanked off and the space used for stowage.

The frequency of failure of the 8,500 pound springs in the suspension of the American medium tank (General Grant) is becoming very high. Various theories have been put forth to account for this, but none is entirely satisfactory. The main reason appears to be that the springs are not suited to the demands made upon them.

Three cases of failure of the big end bearing of the master connecting rod have occurred. No explanation can be found for the fractures. It is interesting to note, however, that a case of sudden fall in oil pressure occurred in an engine while on the test bed. Investigation showed an air lock in the oil suction line and it was necessary to prime the line before the pump would deliver any oil. Users should be warned that the system must be most carefully checked for leaks and that the failure to get oil pressure on starting is probably due to an air lock in the suction line.

A weakness in design which has been brought out as a result of the investigation into fires is the considerable area which present designs of fuel tanks offer to hostile fire. In future designs consideration should be given to keeping fuel tanks as low and unexposed as possible.

(G-2 COMMENT: The proper protection of ammunition should also be considered.)

The P.8 compasses have proved to be quite indispensable to tanks, but they are not yet sufficiently accurate to allow them to be used as a sole method of navigation. Apart from leakage of fluid and breakages of the glass of the grid ring, no defects have occurred in the same compass equipment. It is suggested that the supply of a metal cover to fit

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over the compass would save damage. P.8 compasses are now being issued with a brass cover which meets the point raised.

The engine oil tank on Crusaders is in two parts, interconnected by a small pipe. It has been reported by units that it takes a driver up to one hour to fill it with oil, and that the flow between the tanks is so slow that an impatient man is apt to assume that both tanks are full when only the one into which the filler passes is really full. A modification is being introduced by which an additional connecting pipe 2" diameter will be run between the tops of the tanks.

(G-2 COMMENT: The oil system is also a source of much difficulty.)

During the recent fighting there were two cases of British Valentine tank drivers being killed and collapsing over the gear lever. The remainder of the crew were unable to remove the driver to get at the gear lever on the clutch and were unable to stop the vehicle. A similar incident occurred in a British Matilda tank during General Wavell's advance, although in this case it should have been possible to disengage the clutches with the hand wheels provided. It is considered that all Armoured Force vehicles should be fitted with a means for stopping the engine from the fighting chamber.

A "dead man's switch" is fitted to most gasoline driven tanks. The question of providing the British Covenanter and the American tanks with this switch is being considered.

(M/A Report, London, No. 47672.)

BRITISH EXPERIMENT IN TANK RADIO CONTROL

The British have adapted a system of radio control to operate on a tank. The project is successful but still entirely experimental.

The British have applied radio control to aircraft ("Queen Bee"). The Admiralty has also placed it on motor launches. Now it has been extended to the tank, experimentally. A U. S. observer accompanied by a British Junior Officer, saw and operated a Matilda tank equipped with radio control.

The tank had been stripped of its turret for ease of accessibility, and various devices had been added to operate the vehicle with push buttons. There were two engine speeds available. The gears were selected automatically according to speed of the vehicle and position of the

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throttle, (similar to Oldsmobile hydromatic selection). Braking and turning were operated by compressed air on pistons. The tank would reverse and turn while reversing.

The radio control consisted of two standard Number 19 sets, and was operated by impulses in two separate tones. The set in the tank controlled the push buttons and hence the tank. The control was mounted on a truck, though it could have been on another tank if desired. On the top of the control radio was a control box with three levers and a switch. The positions of these levers regulated the behavior of the tank. The switch set off a smoke candle on the tank.

While there are a few changes to be made in the apparatus, it functioned very well. Its range is claimed to be three miles, though it is advantageous to the controller to observe its actions to avoid obstacles. It could, of course, be controlled from an airplane.

Only the experimental model has been produced. So far it is a "toy" but as soon as it is perfected it will be presented to the War Office for decision as to whether or not it will be used, and what uses it will be put to. It has been suggested as a decoy, smoke or mine layer, mine field clearer (coupled with use of "Snake" or other device, demolition bomb (similar to the Beetle) etc.

(M/A Report, London, No. 48034.)

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SECTION II

A TACTICAL STUDY
OF

THE EFFECTIVENESS OF THE GERMAN 88 MM ANTI-AIRCRAFT GUN AS AN
ANTI-TANK WEAPON IN THE LIBYAN BATTLE

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A Tactical Study

Of

The Effectiveness of the German 88 MM Anti-Aircraft Gun As An

Anti-Tank Weapon in the Libyan Battle

Recent cables from American military observers in Cairo and at the front with the Eighth British Army in Libya stress the important role being played by the German 88 MM anti-aircraft gun in the ground phase of the desert battles now in progress.

The effectiveness of this weapon as a tank destroyer was rather clearly apparent in the course of the November and December British Libyan offensive. One of our observers at that time stated in an official report that the 88 MM was the most feared weapon which the British tanks had to face, and that the destruction wrought by it, on both chassis and turret of the British tanks, was incomparably greater than that caused by any other Axis weapon.

The characteristics of this gun are as follows:

Muzzle velocity	2750 feet per second
Weight of shell	19.8 pounds
Vertical range	37,000 feet
Horizontal range	16,000 yards
Weight in firing position	5.2 tons
The gun is tractor drawn.	
It is provided with a steel shield of unknown thickness.	

An American military observer who had many opportunities to witness this gun in Germany in 1940, speaks of this weapon as follows:

"The 88 MM is basically a gun for firing on moving targets. The crew is also specially trained for firing on highly rapid moving targets, primarily on airplanes. The whole control apparatus is designed for fast moving targets with a very rapid rate of fire: 25 rounds per minute. The gun is capable of great volume fire and extreme accuracy against moving targets of any type. It is equally efficient on targets on the ground as well as in the air. For attacks on armored vehicles, it is provided with a special armor-piercing shell."

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The German 88 MM anti-aircraft gun was designed and constructed in secret in the ten year period prior to the advent of Hitler, when the German army was subject to rigid personnel and material limitations. It is known that it was the plan of its designers to construct a dual purpose anti-aircraft and anti-tank weapon. The anti-tank purpose of the weapon was, however, veiled in secrecy and the German intentions in this regard did not become known to the world until the Polish campaign of 1939.

However, so definitely was the Axis attitude offensive, not only in Poland but in the French campaign of 1940, as well, that United Nations observers did not grasp at the time the full significance and effectiveness of this weapon.

Commencing in 1940, the Germans began to provide these guns with an armored shield in order to protect its personnel against small arms bullets as well as smaller anti-tank projectiles.

It appears that this weapon has played an important role throughout the Russian campaign. However, far more exact information is available as to its use in Libya, than on the Russian battlefields.

In November 1941, when Gen. Auchinleck launched his major offensive, Marshal Rommel, his opponent, created three tank proof localities along his front line: at Bardia, Sollum and in the vicinity of Halfia pass. The defenses of each of these strong points were built around a battalion (12) of 88 MM AA guns, so sighted as to provide all round protection. These guns were supported by a large number of smaller anti-tank weapons. So well organized were these strong points that they were never seriously attacked, and only fell when the British had pushed on to Benghazi and when the water and food stocks of the strong points became exhausted. The British ascribe the long resistance put up by these strong points to the difficulty they found in coping with these dual purpose weapons.

In the battle now raging in Libya, Rommel's offensive use of these weapons is of considerable interest. The anti-aircraft guns appear to follow closely his armored vehicles. As soon as the front begins to stabilize, the 88 MM AA guns go into position and around them is then organized a "tank proof" locality. The German tanks are then withdrawn for offensive operations elsewhere.

The effectiveness of these weapons is clearly brought out from the following quotations from reports of observers now at the front in the desert battle around Tobruk:

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One report includes the following statement:

"The German 88 MM guns penetrate the armour of all British tanks. British tanks dare not attack them. Up to now the British seem incapable of dealing with these weapons."

Another observer reports as follows:

"At a point in the Knightsbridge area, the 4th British armored brigade faced some 35 German tanks of the Mark III and IV type drawn up in line and obviously inviting attack. These tanks were supported by a battalion of anti-aircraft guns (12). The commander of the 4th Brigade refused to attack at all because of the presence of these guns on the battlefield.

"Slight firing occurred throughout the day. Towards evening the superior British tank force withdrew and the German tanks attacked after nightfall in a new direction. Their 88 MM guns had checked the British all day and permitted Rommel to seize the initiative as soon as the British threat had vanished."

Still a third report reads as follows:

"The greatest single tank destroyer is the German 88 MM anti-aircraft gun. For example, on May 27th at 8:00 A. M., Axis forces having enveloped Bir Hacheim, a German tank force of sixty tanks attacked the British 22nd Brigade some distance to the northeast. The British moved to attack this force with 50 light and medium American tanks. It soon became apparent that this British force was inadequate and the Brigadier commanding ordered a second regiment of 50 tanks into action. In ten minutes the 88 MM German AA guns destroyed 8 American medium tanks of this reinforcing regiment. All day thereafter, the British engaged the enemy half-heartedly and finally withdrew. Sixteen American medium tanks were lost in all. These sixteen fell victims without a single exception to the 88 MM AA gun."

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