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Bedouins of the Desert Patrol's Camel Corps, Trans-Jordan Army. (See article on page 36).

The object of the Canadian Army Journal, which is published by the Directorate of Military Training under authority of the Chief of the General Staff, is to provide officers of the Active, Reserve and Supplementary Reserve Forces with information designed to keep them abreast of current military trends and topics, and to stimulate interest in current military affairs.

CHIEF OF THE GENERAL STAFF

Lieutenant-General G. G. Simonds, CB, CBE, DSO, CD, whose message to the Canadian Army is published on pages 2 and 3 of this issue.

A MESSAGE TO THE CANADIAN ARMY FROM THE CHIEF OF THE GENERAL STAFF

There are few national activities of our country in which Canadians ought to take greater satisfaction than in the record and achievements of the Canadian Army. To serve it has always been my greatest pride and I believe that every soldier who has the privilege to belong to it should share that feeling.

I believe the Canadian Army today is fulfilling its duty to Canada in a manner fully in keeping with its high record of service in the past. If I did not hold that conviction, I would not continue as its head. The high tributes paid to Canadian troops serving in Korea and Europe have not come from me or from any other Canadian officer or civilian. They have come unsolicited from Supreme Commanders and a number of highly responsible observers, whose impartiality is beyond a doubt. Canadian soldiers serving at home are every bit as good as the Canadian soldiers serving abroad. Many have already served in Canada, Korea and Europe. The appreciation of their service is probably less openly expressed because they are not in the position of being compared with other armies by impartial critics. Canadians are notoriously critical of their own institutions.

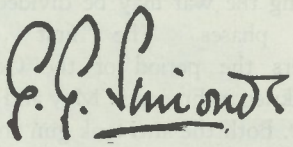
In recent weeks and months the Army has been the target of unremitting attacks from many sources. We have been criticized for the indiscipline of Canadian soldiers. We have been criticized for too much discipline. We have been criticized for extravagance and criticized for not providing a whole host of things which cost a very great deal of money. We have been criticized for lack of morale and accused of complacency and arrogance when we have shown or proclaimed a pride in the Canadian Army.

We must expect and welcome constructive criticism. No one of us would claim that the Canadian Army is perfect and the expansion of the last two years has accentuated faults and weaknesses. These faults and weaknesses call for our full attention and the application of corrective action and improvement. Dishonesty, lack of integrity

or indifference to sound administration are intolerable and will continue to be ruthlessly removed from the Canadian Army as diseased flesh from its body.

None of this should give cause for any discouragement or depression. The only justification for the existence of the Canadian Army is to defend democracy of which free public criticism is an essential element. Some of this criticism has been, and will continue to be, unfairly biased and irresponsible but that will be as clear to the citizens and taxpayers outside the Army as to those that serve in it.

The Canadian Army today is certainly not perfect and in several respects falls far short of the standards which I hope and believe we can attain. I have made our policies and objectives abundantly clear to General Officers of Commands and to Commanders abroad. I have confidence that these will be conveyed to all the Army and pressed with loyalty and vigour. I charge every soldier to apply himself in all those matters where we clearly need improvement but not to be discouraged or depressed by criticisms which are neither founded on truth nor justified in the light of our positive achievements.



(G. G. Simonds)
Lieutenant-General
Chief of the General Staff.

POST-WAR DEVELOPMENT OF ANTI-TANK TACTICS

By "Anson"*

One serious problem to be faced in the next war will be the most economical and efficient use of all measures for anti-tank defence. The aim of this article is to consider certain aspects of anti-tank organization and deployment, taking into account the development of anti-tank tactics during the 1939–45 war and the principles evolved.

The evolution of anti-tank tactics during the war may be divided into five phases. The first phase covers the period of the German blitzkrieg in France in May and June, 1940. Both the anti-tank gun and the anti-tank rifle were used successfully against German tanks but usually the guns were sited to fire frontally and, when they had opened fire against the leading tanks, were knocked out by the supporting tanks. The campaign was short and suitable counter-measures could not be evolved. The second phase covers the period in the Western Desert in 1940 and early 1941 when the British were in action against Italian forces. Italian tanks mounted a light gun only slightly heavier than the two-pounder. The British anti-tank gun, firing frontally, was used successfully against Italian tanks, sometimes firing whilst still on its portee. The third phase covers the period in the Western Desert from the arrival of the Germans in 1941 until the withdrawal of the Allied Forces to the El Alamein line in July 1942.

German Tanks in the Western Desert

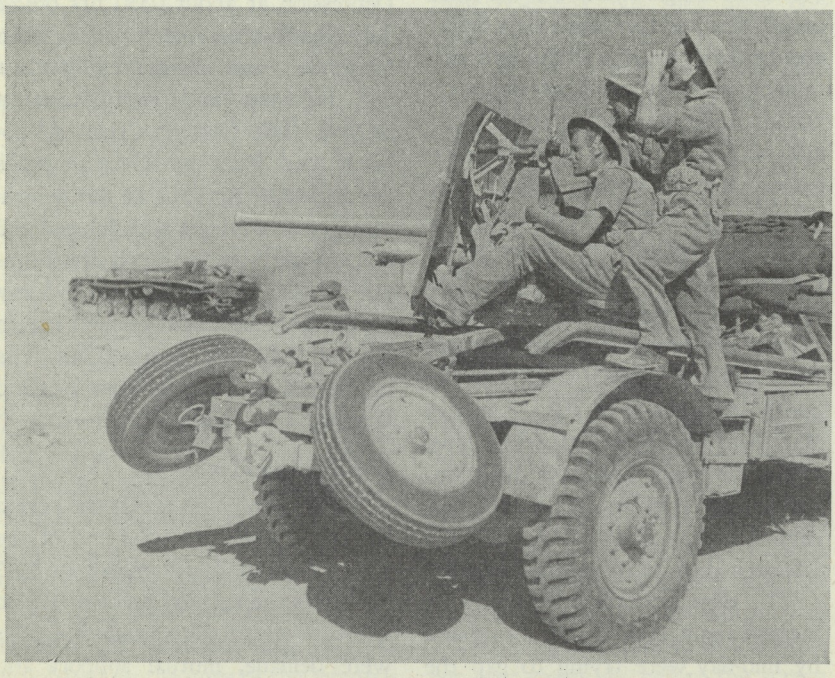
When German tanks with their heavier guns started to operate in the Western Desert they were able to stand off and destroy British anti-tank guns. In reconnoitring before an attack, German tanks deliberately fired at the British defences to induce anti-tank guns to open fire and to disclose their positions. The latter were then neutralized or destroyed as part of the fire plan in the main attack. British tanks were under-gunned at this time and could not engage German tanks at long ranges, so anti-tank guns were forced to take

*Reproduced from the British Army Journal by kind permission of Her Majesty's Stationery Office. United Kingdom Crown Copyright is reserved. Acknowledgement is made by the author to Brigadier G. H. Clifton, DSO, MC, of the New Zealand Liaison Staff, who kindly provided many of the details of the action of the New Zealand Division.—Editor.

up defiladed positions to survive. On the other hand, the Germans were able to use their 88-mm dual purpose guns firing frontally and these ended many British tank actions.

During this period the Allies favoured the brigade group organization: a series of defensive positions were occupied by brigade groups, out of supporting distance of each other and usually unsupported by mobile reserves. The Germans were able to choose their direction of advance to suit local conditions, to probe for weak spots and then overrun the positions with massed tank and infantry attacks. There were many instances, of which these are some:

5 South African Brigade Group at Sidi-Rezegh, Nov. 1941—This Brigade was on the escarpment overlooking Sidi-Rezegh Landing Ground, which elements of 7 Armoured Division were fighting to hold, supported by South African guns and Infantry. In the late afternoon of 23 Nov. 1941, a hundred German tanks attacked the brigade group with the sun behind them.



A 2-pounder being fired from a portée.

Engaged by a flanking battery of 25-pounders which knocked out nine tanks, they swerved off and attacked again from the south against the soft-skinned tail of the brigade. The whole brigade group was overrun within twenty minutes and suffered heavy losses. A heavily-committed New Zealand brigade, three miles away, was unable to help.

18 *Indian Infantry Brigade Group at Deir El Shien, July 1942.*—This formation was holding a series of ridges rising above a central depression about four miles to the north-west of the Ruweisat Ridge. It had arrived there on 28 June and had taken up a defensive position, roughly in the form of a semi-circle with two battalions on the circumference facing north, west and south and with one battalion across the diameter, facing east. There were remnants of two field regiments within the position in addition to anti-tank guns. The brigade was trying to fill a small part of the fifteen-mile gap between the "Alamein Box" held by the South Africans and the "Kaponga Box" held by 6 New Zealand Brigade. It had forty-eight hours in which to prepare its position but was handicapped by the stony ground and the late arrival of its full quota of mines.

The Germans started probing attacks at about 1000 hrs on 1 July and by mid-day were trying to gap the minefield on the northern perimeter, but infantry attempts to penetrate the position were defeated. Soon after mid-day a heavy dust storm blew up, limiting visibility to a few yards. The Germans took full advantage of this, penetrated the minefield with infantry and tanks and overran each battalion in turn, finally completing the destruction of the last battalion after dark.

6 *New Zealand Brigade Group in El Mreir Depression, July* 1942.—After a night attack through minefields, two battalions and brigade headquarters reached the final objective in the Depression at about 0330 hrs on 22 July. Battle transport including both 6-pounder and 2-pounder portees got forward and reorganization started. The Germans reacted violently and forty-two German tanks lined the northern rim of the depression before daylight and deluged the defence with machine gun fire. Burning vehicles lit up the area and any anti-tank guns which opened fire in the half light were knocked out. The tanks then overran the New Zealand Brigade.

The Turning Point

The fourth phase covers the period from July 1942 until the end of the North African Campaign in June 1943 This was the turning point in Allied anti-tank tactics. The basic principles were defilade, mutual support and depth; a quick deployment drill,

including the layout of anti-tank guns, was frequently practised, so that the reorganization of a captured position could be effected by day or by night, before the inevitable enemy counter-attack could be launched. Infantry anti-tank platoons and troops RA were organized into sections, each of three or four guns, so that they could deploy quickly, roughly on a triangular or quadrangular layout in accordance with these principles. The Infantry were taught to rely on their own anti-tank guns whether RA anti-tank guns were available or not.

There are two outstanding actions in which infantry anti-tank guns played the dominant part:

On 27 Oct. 1942 after 2 Rifle Brigade had occupied Kidney Ridge during the El Alamein Battle, it was attacked throughout the day by 15 and 21 Panzer Divisions. All attacks were repulsed with heavy losses and about fifty tanks were destroyed by their anti-tank guns.

On 6 Mar. 1943, 131 Brigade of 7 Armoured Division was attacked four times by 15, 21 and part of 10 Panzer Divisions. All attacks were beaten off and fifty-two enemy tanks knocked out; all but seven had been destroyed by anti-tank guns.

At this time the framework of the anti-tank defence in infantry areas was based on the guns of the infantry units. The guns of anti-tank regiments RA were included within the divisional framework and were sited to fill gaps between units and to deepen the defensive belt, the whole being co-ordinated by the anti-tank battery and regimental commanders. Tanks were used to defend newly-won positions until the anti-tank guns were dug in and camouflaged; but it was a point of honour that they should be released from this role as quickly as possible. Infantrymen gained great confidence in their own anti-tank guns. They realized that guns sited in defilade could not fire forward of their positions, but they were prepared to allow enemy tanks to reach and even penetrate their positions in an attack, knowing that their anti-tank guns would eventually knock out the tanks. A very close liaison existed between artillery and infantry anti-tank units and sub-units and the former could be withdrawn to a more threatened area without interfering with the layout of the infantry anti-tank guns.

The firepower of the Sherman tanks which had just arrived in the Middle East, enabled the German 88-mm anti-tank screens to be pierced but usually after severe tank losses, as occurred to 9 Armoured Brigade when it ran into a screen near the Rahman Track on the morning of 2 Nov. 1942 and suffered seventy-five per cent casualties before the screen was broken. Concentrated artillery

A 6-pounder in the Western Desert.

fire proved a less costly method of breaking such a screen. This was done with great effect on many occasions, as at the battle of Medjez El Bab on the morning of 6 June 1943, when the last 88-mm anti-tank screen in front of Tunis was destroyed by concentrations of fire from the artillery of 5 Corps, thus allowing 7 Armoured Division to push through to Tunis.

Sicily, Italy and North-West Europe

The fifth phase covers the period from the landing in Sicily in July 1943 until the end of the war in 1945. There were many examples of successful anti-tank actions but except in the operations of 6 Airborne Division on the River Orne in June 44 and of 1 AB Division at Arnhem in Sept. 1944, there are few instances quoted in divisional and regimental histories of towed anti-tank guns in action against massed enemy tank attacks, unassisted by tanks or SP guns.

In Sicily and Italy the ground did not allow the employment of tanks in mass, except in such areas as the plains of Catania, Salerno and Anzio, but both there and in North-West Europe the Allies held such an overwhelming superiority of tanks, SP guns and rocket-firing aircraft that towed anti-tank guns did not play the vital part that was forced on them in North Africa and were no longer needed to form the backbone of anti-tank defence. In some theatres officers and men of anti-tank units and sub-units were used as infantrymen or as porters.

Applying These Lessons

Many officers and men serving today gained their main war experience in 1944 and 1945 and the earlier conditions when there was a shortage of tanks, SP guns and close support aircraft may be forgotten. Such conditions are likely to be met

in the early stages of the next war when the tactics evolved in the fourth phase will be needed again.

The terrain may vary from the plains to the mountains of Europe, Middle East and Central Asia. The potential enemy is likely to make full use of his superiority in material and manpower, both on the ground and in the air and to vary the methods, direction and timings of his attacks. He may attempt to succeed by infiltration, by massed attacks, or by a combination of both, but whichever methods he uses, his tanks and infantry will act in close co-operation. Allied defensive tactics must be designed to meet every form of concerted attack whatever variations the enemy may use and it is important to remember the fate which overcame isolated brigade groups in the last war, in view of the wide fronts which will have to be held in a future war. The best use of every anti-tank weapon, towed, SP or manhandled will help towards finding a solution.

The Principles of Anti-tank Tactics

Surprise is vital for success. The enemy will always be searching for the positions of anti-tank guns and once he has found one he will take steps to destroy or neutralize it. Every anti-tank gun in a permanent position must, therefore, be effectively concealed, camouflaged and the tracks thereto obliterated, so that the enemy can see no trace of the gun, nor the flash when it fires. It must also be protected by infantry against enemy infantry.

There are three basic principles for the siting of anti-tank guns:

Defilade.—The gun and its flash must be totally hidden by the ground or by an obstacle from enemy observers—a matter of life or death to the gun team. An enemy tank entering the arc of fire of a defiladed gun is likely to present a target in enfilade, and its crew has less chance of spotting the anti-tank gun.

Mutual Support.—The layout must be such that the arc of effective fire of at least one gun protects the blind approaches to another, so that no enemy tank can stalk a gun without itself being engaged.

Depth.—If the crust of the anti-tank defence should be broken by enemy tanks, they will be engaged by other anti-tank guns positioned in depth.

Anti-tank guns deployed in defiladed positions cannot engage enemy tanks which stand off to harass the infantry in their positions. Sniping guns must engage these tanks; they may be tanks, SP guns or even towed anti-tank guns, but the essence of their use is that they should not fire from their battle positions and that they should move after each engagement to avoid being destroyed when their position has been revealed.

Co-ordinating the Layout

The divisional commander must first decide on his policy for anti-tank defence, based on his appreciation of the probable weight and direction of enemy thrusts and will issue orders accordingly. The CRA is designated as co-ordinator of anti-tank defence in a division, but this responsibility is sometimes delegated to the CO of the divisional regiment RAC, possibly on the assumption that anti-tank defence depends on the layout of anti-tank guns alone.

The successful defence of a position will depend on the co-ordination of all measures to counter a concerted attack by enemy tanks and infantry. Such measures include the layout of anti-tank and anti-personnel minefields, the use of obstacles, the layout of anti-tank guns and of the divisional and affiliated artillery in an anti-tank role and the selection of defensive fire tasks. The CRA has the experience and authority to do this, working closely with the CO of the divisional regiment RAC and the CRE.

At brigade level the CO of the affiliated field regiment RA should do a similar task, in conjunction with OC RAC squadron and OC RE field squadron. At certain times he may be too busy if there are several RA units supporting the brigade and the brigade commander may then have to co-ordinate or depute another officer to do so.

The Framework of Anti-tank Defence

As the framework of the anti-tank defence is based on the divisional regiment RAC there is some danger that infantry anti-tank guns may only be used to fill gaps within their battalion areas. The subsequent withdrawal of tanks of the divisional regiment RAC to meet an unexpected threat elsewhere would leave the infantry anti-tank guns unco-ordinated, forcing them to move their positions at a critical time.

Whatever the layout of the divisional regiment RAC, infantry anti-tank guns in battalion areas should be mutually supporting and, whenever possible, this should be extended throughout the brigade position. The divisional commander will have more flexibility in the deployment of his divisional regiment RAC as he can safely leave the infantry to look after their own anti-tank defence when there are more serious threats elsewhere. The infantry will learn to rely on their own anti-tank guns and this will enhance the *esprit de corps* of infantry anti-tank platoons. Not only will the divisional commander make the best use of all anti-tank weapons but the full and flexible use of the divisional regiment RAC will enable him to maintain his armour intact and to avoid dispersing it to meet enemy tank attacks.

Further Considerations in the Divisional Layout

Platoon and section anti-tank weapons are primarily intended for the close defence of their own sub-unit positions but may be used to cover gaps. They are particularly useful in smoke, fog and darkness in the hands of skilled men, as they can be used offensively for stalking tanks. All anti-tank weapons, whether infantry or RAC, must have permanent battle positions dug and camouflaged with alternative positions selected and dug. Just as reserve infantry rehearse counter-attacks so must reserve sub-units of the divisional regiment RAC reconnoitre alternative positions to meet possible tank attacks.

Battle positions should be occupied, except by sniping guns which should return to their battle positions when their sniping tasks are done. In fog, smoke and darkness all anti-tank guns and tanks should be in their battle positions and arrangements must be made to illuminate targets if the enemy should attack in darkness. When sniping guns cannot engage enemy tanks which are harassing the infantry, or which are forming up for an attack, concentrations of medium and heavy artillery often prove effective.

Speed in the occupation of a defensive position is important, especially when troops are fighting on wide fronts against superior numbers. It is essential for reorganization after an attack. The organization of anti-tank units and sub-units must permit quick deployment and control when deployed. The divisional regiment RAC is so organized, but infantry anti-tank platoons lack this organization and system of control.

After an attack in daylight, tanks should remain on the position to cover reorganization. If possible, these should be the tanks of the armoured unit which has supported the attack to allow tanks of the divisional regiment RAC to prepare their battle positions, but if not, a proportion of the latter must be used. Covered by armour, infantry anti-tank guns and tanks of the divisional regiment RAC should be deployed, dug in and camouflaged, concurrently with the infantry reorganization. When complete, the covering tanks should be withdrawn immediately. After an attack at night, infantry will have to protect the reorganization and not tanks, but the anti-tank layout must be completed by dawn.

Anti-tank gun sub-units must therefore be organized and trained for quick deployment, by day or by night, and a special drill is required to enable anti-tank guns to be brought up, with other supporting weapons and stores, directly an objective has been gained in an attack.

Organization and Deployment of Infantry Anti-tank Platoons

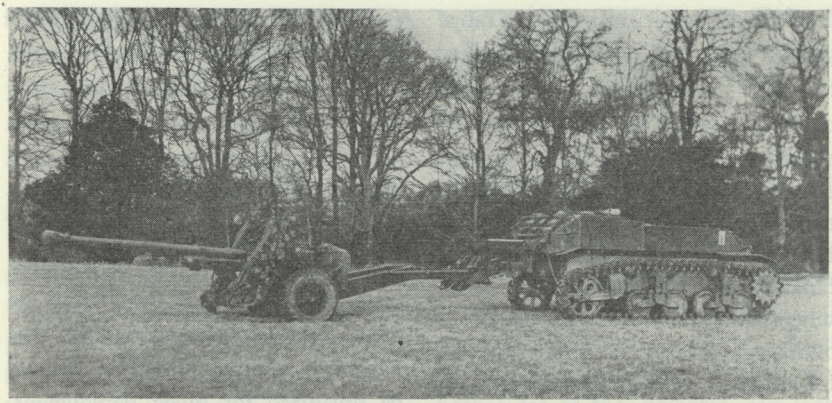
During the North African campaign, anti-tank troops RA and infantry anti-tank platoons were usually organized into two or more sections each of three or four guns, according to the calibre of the weapons and the number of guns in the troop or platoon. The number depended on availability and on the probable enemy tank threat, but was usually six, eight or nine. There was wireless or line communication down to sections.

The object of the section organization was to enable a platoon or troop to deploy speedily, each section roughly on a quadrangular or triangular layout, defending a definite feature based on the principles of defilade, mutual support and depth. In a battalion, the platoon commander obtained the policy for the anti-tank layout from the CO and was responsible for its execution, in close consulation with the company commanders in whose areas the guns were to be placed.

There were usually two officers in a troop or platoon and an experienced sergeant-major or sergeant. If there were two sections, the platoon commander chose the gun positions for one section whilst the second in command chose those for the other. If there were three sections, the troop or platoon warrant officer or NCO chose those for the third. The troop or platoon commander later co-ordinated the layout of the whole in consultation with the anti-tank battery commander. The advantage of this method was quick co-ordination of anti-tank defence and relief of the infantry company commander from the responsibility for siting anti-tank guns.

After the war the infantry anti-tank platoon was reorganized with six separate gun detachments and one platoon commander, with no communication between detachments. A platoon commander cannot now organize the layout of the anti-tank defence quickly as he will take time to inspect the siting of each individual detachment, nor will he be able to control his platoon in action. As long as tanks of the divisional regiment RAC are available to form the framework of the defence this may not be serious, but they may well be moved elsewhere.

The system whereby anti-tank detachments are placed under command or in support of rifle companies does not afford a complete solution. Firstly the company commander will be very busy in organizing his platoon positions; secondly he is unlikely to choose the best positions for the guns to fit in with the co-ordinated anti-tank layout; and thirdly he may place a gun in a position at variance with the basic principles of anti-tank tactics.



A 17-pounder with Stuart tower.

Korea and the Future

When 29 Infantry Brigade was training for Korea, the anti-tank platoon of each battalion was issued with six 17-pounder guns. Authority was obtained for each platoon to have two officers and to be organized into three sections, each of two guns. The guns of each section could therefore obtain mutual support as well as defilade, whilst depth could be arranged by positioning one or two of the sections in rear. This was not the ideal solution, because a three-gun section organization would have incorporated all three principles, but was chosen owing to the shortness of time for training. The platoons were trained intensively in gunnery, maintenance, deployment and concealment; they left for Korea with confidence in their organization and with high *esprit de corps*.

Once it is accepted that infantry anti-tank guns can play a major role in the framework of the anti-tank defence, platoons must be properly organized for speed and flexibility in operation. A suitable organization would be two sections each of three guns, with signal communications down to each section headquarters. There should be two officers, and sections should be commanded by sergeants, with a warrant officer as platoon sergeant. If extra guns should be allotted to an infantry anti-tank platoon, three sections each of three guns could be formed.

In mountainous country, sections each of two guns might be preferable and both establishments could be tested to decide which is the more suitable for all purposes.

Opening Ranges

No anti-tank gun should open

fire from its battle position at a range greater than will ensure an effective hit with the first shot. . . The field of fire should be limited to the effective range of the gun, so that enemy tanks cannot stand off out of effective range and engage the anti-tank gun. This is less likely to occur to tanks of the divisional regiment RAC when equipped with heavy guns but once one is spotted the enemy may call for smoke or artillery fire to neutralize it. Sniping guns, firing frontally, should not fire beyond their effective range, but must be certain of hitting within two or three rounds.

More Reliance on the Infantry Anti-tank Guns

In a future war the Western Allies are likely to be opposed by an enemy who, in the early stages, will have superiority in manpower and in all types of equipment, including tanks. The fullest use must therefore be made of all anti-tank weapons and there must be flexibility in organization to counter unexpected thrusts.

The proposals in this article that more reliance should be placed on infantry anti-tank guns and that the infantry anti-tank platoons should be organized for quick deployment, would help the divisional regiment RAC in forming the framework of the anti-tank defence and would allow it more flexibility in its use, thus creating an additional reserve in the hands of the divisional commander and further allowing him to conserve his armour.

The Fog of Battle

The battle for Caen was one of the most bitterly contested engagements of the Normandy Campaign. Even in this grim struggle, however, various humorous incidents are recorded by participants. The following took place on 27th June, when the 3rd (British) Infantry Division was attacking a position north of Caen.

> At seven minutes past [4:00 a.m.] the barrage came down as arranged, and eight minutes later in they went. It was still fairly dark. Dense clouds thrown up by the bursting shells added to the already terrifying atmosphere. The memory must accompany those who were present to the grave. It cannot be described. The one incident of light relief that occurred towards the end of the engagement is evidence of the confusion of the struggle. C Company commander of the Suffolks, trying to arrange consolidation, was harassed by a spandau that kept interrupting him. 'Suddenly seeing two tanks, he crossed to one of them to ask for fire support on to the intruder. A head rose from the turret and each stared at each other in silence. The gun began to swing round, the British officer bolted, and though chased back on to the position, managed to reach a slit trench before being fired at. Lieutenant Woodward with a PIAT disabled one of the Mark IVs and the other was knocked out by Private Crick . . .' (Norman Scarfe, *Assault Division* [London, 1947], p. 111).—*Contributed by Lieut. R. H. Roy, Historical Section, Army Headquarters, Ottawa.*

THE DOMINANT WEAPON

By
MAJOR REGINALD HARGREAVES*

Amidst all the din and chatter of Brens, Brownings, Schmeissers, Vickers, Katushas, Stens, Bazookas, machine-pistols, Tommy-guns, and the like, the soldier seems, over the past few years, to have developed a fatal tendency to neglect that most tried and trusty of all his weapons—the ordinary rifle.

An official analysis of the Bastogne battle of December 1944 is now available, for example, which tells a sufficiently revealing story. With the Germans all-out to achieve a break-through, the situation was desperate enough to demand the fullest employment of every weapon available. Yet it is authoritatively affirmed that only twenty-five to thirty per cent of the men of the U.S. 106th Division, as those of the 101st Airborne Division, who came to their support, voluntarily fired their rifles. Earlier, in the vital attack on Carentan, it is reported that an average of one man in twenty-five loosed off his piece of his own volition. Accounts from Korea suggest that the ratio, both with the U.S. forces and those of the Commonwealth Division, has not improved.

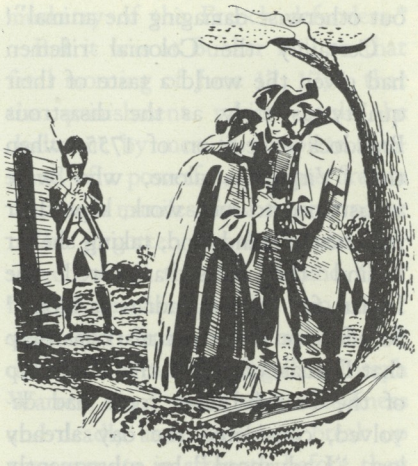
This not only reveals a very lamentable state of affairs, but marks a sad departure from a long and carefully cherished tradition. Men of the English-speaking peoples, on both sides of the Atlantic, can look back on the days when their prowess with firearms was justly famed the wide world over, even if the Britishers had been forced to learn the hard way, between 1775 and 1783, as the targets of an American marksmanship infinitely superior to their own.

The British troops that fought in North America between 1775 and 1783 were armed, almost exclusively, with the "Brown Bess", a smooth-bore flintlock musket, with a priming pan, three feet, eight inches long in the barrel, and weighing 14 pounds. Theoretically, the weapon was effective up to 300 yards, but it was a very exceptional marksman who could register a hit at anything over 100 yards, especially when the 14-inch bayonet, weighing over a pound, was affixed to the muzzle. A really accomplished shot could load and fire five times in a minute, although he had to reckon on an average of

* *Major Hargreaves, a reserve officer of the British Army, is author of several books on military subjects. This article is reprinted from the* American Rifleman *by courtesy of the editors.*—Editor.

four misfires in twelve. Most men were content to loose off two to three rounds a minute; with the fixed bayonet making it difficult to ram down the charge, the rate of fire was probably reduced to one discharge every sixty seconds.

Rapid fire was, indeed, discouraged: "There is no need", General James Wolfe once affirmed, "for firing very fast; a cool, well-levelled fire, with the pieces carefully loaded, is more destructive and formidable than the quickest fire in confusion"—which sounds suspiciously like trying to make a virtue of necessity. All accounts agree that the British, disdaining to cultivate individual marksmanship, were content to rely on the effect of steady volley-firing, stolidly maintained in the teeth of whatever blizzard of hostile missiles might be hurled against their close-packed ranks. It was an effective method of battle-fighting only if their opponents were prepared to confront them in the open in the same close-order, and slug it out in what the Duke of Wellington was one day to describe as a "damned pounding match". It was obviously no battle-tactic against such wily and elusive opponents as the American



colonists, skilled marksmen as they were, fighting in loose open-order, adroit in taking every advantage of natural cover, and versed in all the wiles they had learned in long years of Indian fighting in virgin country.

In addition, although the official weapon of the Continental armies was the French "Charleville", many of the men, both in the Militia and the Continental Line, were armed with "frontier" rifles manufactured by such master-gunsmiths as John Frazier and Schmidt. Furthermore, the smallbore, muzzleloading, flint-lock "Kentucky" rifle could advance real claims to rank as a veritable weapon of precision, especially in the hands of such experts as Morgan's riflemen. Legend said that they could sever a squirrel's tail from its body at anything up to 200 yards "with-

Though the British took Bunker Hill on June 17, 1775, the deadly musket fire of colonial troops at ranges of 20 and 40 yards accounted for 1,054 English troops out of 3,500.

out otherwise damaging the animal"!

Certainly the Colonial riflemen had given the world a taste of their quality as early as the disastrous Braddock expedition of 1755, when the "Virginians alone, who were accustomed to such work, kept their presence of mind, and, taking shelter behind the trees, answered the Indian fire in the Indian fashion".[1] So effective was their marksmanship that Dumas, on whom the leadership of the French-Indian force had devolved, considered the day already lost. "I advanced," he subsequently confessed, "with the assurance that comes from despair".[2] But when some of the British redcoats sought to emulate their Virginian comrades-in-arms, "Braddock would have none of such things. Such fighting was not prescribed in the drill-book nor familiar on the battlefields of Flanders, and he would tolerate no such disregard of order and discipline. Raging and cursing furiously, he drove British and Virginians alike back to their fellows with his sword".[3] The chance to outshoot their antagonists in a fire fight in which the balance was already veering in their favour, was denied to British redcoats and Virginia militiamen alike, in deference to a European mode of battle-fighting in which accurate individual marksmanship was not understood, for the simple reason that it had never been practised.

The stiff, formalized, set-to-partners type of European warfare had, indeed, been prolific on occasions wherein the whole fortune of the day could have been radically altered by the presence of a few riflemen with the presence of mind and the skill to use their weapons properly.

In Marlborough's campaign of 1708, for example, the French were particularly anxious to cut off a convoy taking vital supplies from Ostend to the British Commander in Brussels. To guard the wagon train, a force of redcoats took up position in the defile of Wynendale, the only approach to which was bounded on either side by thick woods, in each of which was stationed an allied German battalion to take the French in enfilade.

With the most reprehensible lack of precaution with regard to their flanks, the numerically superior French came boldly on, to halt just within cannon range and open fire with nineteen pieces of artillery. After two hours' rather profitless bombardment, a ruffle of drums led forward the Gallic infantry in four lines, supported by as many of Horse and Dragoons. Entering the open space in front of the British position, and with their outer files almost

[1] *Hon. Sir John Fortescue, "History of the British Army", Vol. II, page 282.*

[2] *Francis Parkman, "Montcalm and Wolfe", page 223.*

[3] *Fortescue, op. cit.*

brushing the coverts as they passed, they were staggered by a blast of fire which smote them from ahead and from both flanks. With their wings shrinking in on their centre, throwing it into considerable confusion, only the most desperate efforts on the part of their Commander, Count de la Mothe, sufficed to restore some sort of order and again swing the white-coated lines forward. A spatter of fire was still coming from the Germans on either flank, but it was ponderously slow and entirely lacking in accurate aim.

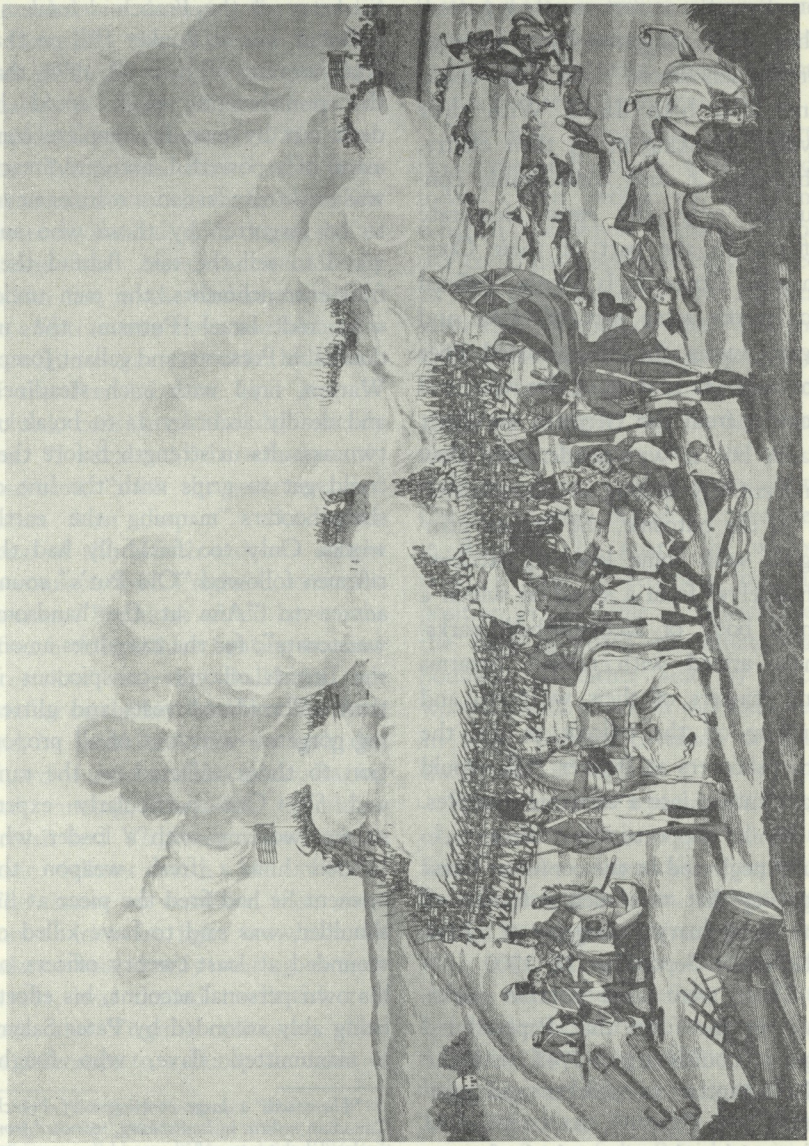
In the outcome, the French managed, with some loss, to extricate themselves from a situation which a small body of accomplished marksmen—armed with reliable firearms and masters of their weapons, and picking off the officers as did the sharpshooters at Bunker Hill—could have turned into a veritable shambles.

Similar opportunities were woefully neglected in the confused forest fighting that was such a feature of the sanguinary struggle at Malplaquet on September 11, 1709.

There were some notable marksmen in the force that Peperell led against Louisbourg in 1745, with the Northampton ironworker and gunsmith, Seth Pomeroy, to set a standard of straight shooting which far exceeded the unexpected accurate musketry of the French defenders.*

But it was at Bunker Hill on that fatal morning of June 17, 1775, that the punishment which could be dealt out by men in complete command of a powerful, accurate firearm was made manifest in a manner never to be forgotten by those who survived to tell the tale. Behind their frail entrenchments, the men under wily old Israel Putnam, the indomitable Prescott, and gallant Joseph Warren, fired with such steadiness and deadly accuracy as to break up two assaults in strength before they could get to grips with the line of sharpshooters manning the earthworks. Only too faithfully had the riflemen followed "Old Put's" sound advice to "Aim at the handsome waistcoats", for the casualties among the British officers—conspicuous in their embroidered vests and glittering gorgets—were out of all proportion to those inflicted on the rank and file. One particularly expert sniper, working with a loader who handed him a fresh weapon the moment he had fired the piece at his shoulder, was said to have killed or wounded at least twenty officers on his own personal account, his efforts being ably seconded by Peter Salem, a manumitted slave, who fought

**There was a large contingent of French-Canadian militia in Louisbourg, recruited from the local habitants, which may have accounted for a skill in marksmanship far beyond the average French regular.*



throughout, and survived, the whole course of the war. By the time the British leader, General Howe, had forced home his third and last assault at that point of the bayonet, out of the 2,500 redcoats engaged, nineteen officers and two hundred and seven men had been slain, and seventy officers and seven hundred and fifty other ranks had fallen wounded—a toll exacted by entirely unsupported musketry.

It was a similar story at Bennington in the August of 1777. A mixed force of dismounted Brunswick dragoons,* British redcoats and Canadian volunteers, totalling just over 400, set out to raid the stores and horse depot at Bennington, under the German Colonel Baum, an officer trained exclusively in the formalized mode of fighting practised on the battlefields of Europe.

Crashing and blundering through the tangled New Hampshire thickets which lay between them and their goal, they were an easy prey for "fighting John Stark" and his backwoods militiamen getting to work comfortably in their shirt-sleeves, and with all the accuracy of fire characteristic of men habituated by circumstance to conserve their ammunition and make every shot tell. The Brunswickers and redcoats fought bravely enough—"It was the hottest action I ever saw in my life", admitted Stark, a veteran of the Plains of Abraham battle, under Wolfe, and Bunker Hill—but neither Britisher nor German was a match for ever-elusive antagonists they could rarely hit even when they did see them, and whose counter-fire was deadly.

An 18th-century British army was no friend to innovation, which accounts for the lukewarm reception accorded the excellent repeating rifle devised by Patrick Ferguson, a Major in Frazer's (71st) Highlanders.

The firearm, fifty inches in length, weighed seven and a half pounds, and was provided with a movable backsight for ranges from 100 to 500 yards, while the breach was closed by a vertical screw plug. In the inventor's own hands, the weapon was capable of a rate of fire of seven shots a minute, and on one occasion Ferguson himself put five balls into the bullseye of the target, and four

* *Each Brunswick dragoon wore huge jack-boots, stiff leather breeches, enormous gauntlets and a hat heavy with feathers. His broadsword weighed a solid twelve pounds, he carried a heavy carbine and the usual haversack and waterbottle and was about as suitably equipped for forest fighting as a mediaeval knight in armour.*

In the Battle of New Orleans, January 8, 1815, Andrew Jackson's riflemen, drawn up behind bales of cotton, scored the only major U.S. victory in the War of 1812. Within a few minutes of the landing of British troops under Sir Edward Pakenham—who was attempting a frontal assault—the British suffered more than 2,000 casualties to Jackson's 13 killed and 58 wounded.

within a few inches of it, at a range of 100 yards. Certainly, in competent hands, the Ferguson rifle was a formidable tool, and it was only the Scotsman's commendable dislike of "a sitting shot" that spared George Washington himself, when the American Commander-in-Chief, out of a reconnaissance, came within easy range of his concealed antagonist, on the eve of the battle of Brandywine.*

But Ferguson's corps of riflemen, though formidable in the speed and accuracy of its firepower, was so negligible in numbers as to bring little influence to bear on the course of the campaign. Ferguson himself met a gallant end at the battle of King's Mountain on October 7, 1780, a fire-fight if ever there was one. Perched on the top of a hundred-foot crag with heavily timbered slopes, the Scotsman and his followers were assailed by a party of trappers, backwoodsmen, and borderlands militia, about 1,500 strong under Colonels Cleveland, Shelby, and Campbell. In the shrewd comment of "Light Horse Harry" Lee, Ferguson had chosen a position "more assailable by the rifle than defensible by the bayonet"; and his resistance to a skillful and resolutely pressed assault would have collapsed incontinently had not the deadly marksmanship of the attack been offset by equally good practice on the part of Ferguson's own sharpshooters. But with the death of their leader, struck down by no less than seven balls, the heart went out of the defence, and de Peyster, on whom the command had devolved, had no option but to send out a flag of truce. A white-hot contest between skilled and well-matched riflemen had ended in victory for the side which could bring the greater volume of fire to bear.

The lessons of King's Mountain, as of many another example of the decisive power wielded by a body of experienced marksmen with a natural genius for taking full advantage of the configuration of the ground, were by no means lost on the British who, far too often, had found themselves the victims of a skill superior to their own.

More "light companies" were added to the ordinary infantry battalion, and far greater attention was paid to training in musketry. Then in 1797 the 5th Battalion of the 60th* (Royal Americans) was turned into a green-jacketed jaeger unit, armed with the new Baker rifle. This was only the first step in the introduction of specific Rifle and Light Infantry regiments in the British establishment, which in due course produced the famous "Light Bobs" of the Peninsular campaign of 1808-14.

* *Some authorities affirm that it was not George Washington, but his distant cousin, William.*

* *Originally numbered the 62nd.*

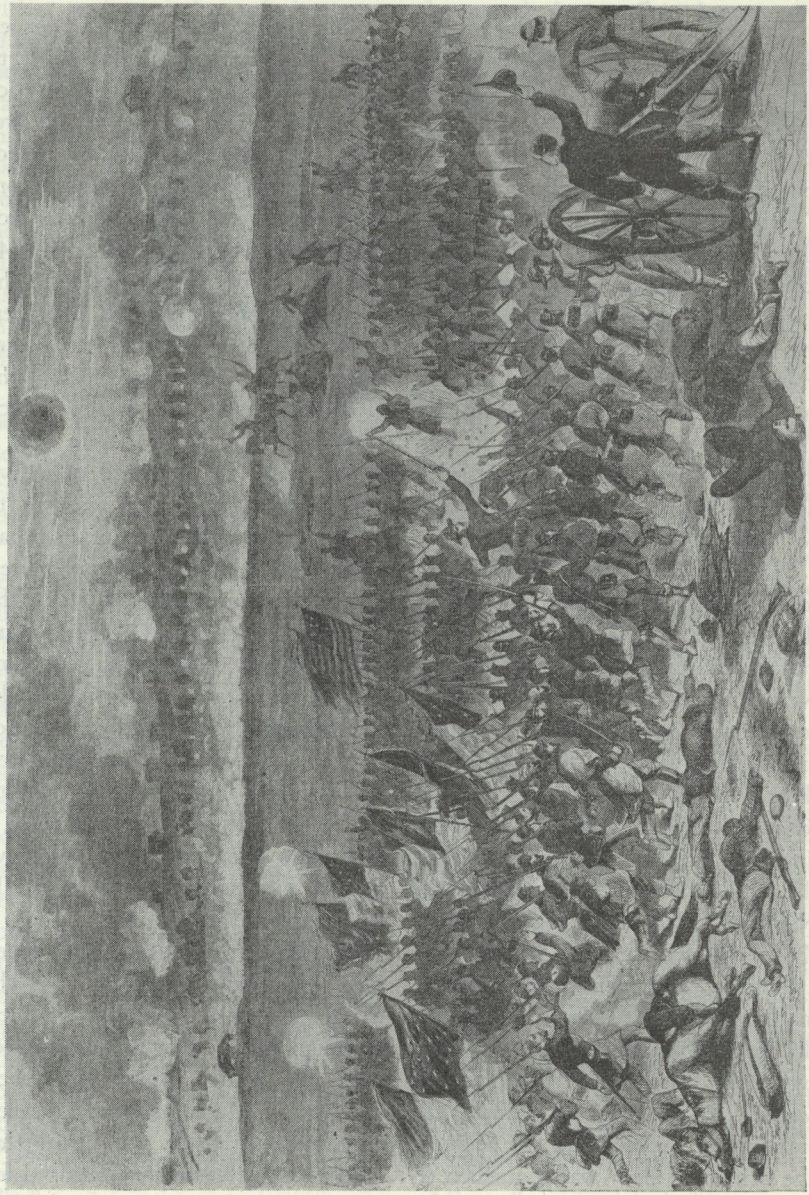
The value of these swift-moving new formations, with the attention they devoted to the perfecting of their marksmanship, was demonstrated again and again the hard-fought battles in Portugal and Spain. There Wellington's attenuated "line", through the controlled strength and precision of its musketry, could always be relied upon to get the better of the Gallic "column", irrespective of the numerical advantage almost invariably enjoyed by the French. It is not too much to say that, had there been no Morgan's rifles in 1797, there would have been no "Light Bobs" in 1808.

In a way, the French, in all their contests with the British, committed the same fault the latter had been guilty of throughout the fighting in New England and the South—they consistently opposed mass to aimed fire, seeking vainly to overwhelm by sheer weight of numbers. Their consistent failure is written in Wellington's long list of victories, as in the far heavier casualties suffered by Napoleon's legions, compared with those inflicted on the British. Incidentally, had there been French marksmen at Waterloo to match the deadly sharpshooters of Bunker Hill, by early afternoon there would scarcely have been a gunner left standing, so exposed was the position the British artillery was compelled to occupy.

The long peace which ensued after Waterloo was beneficial to almost everything save the practice of musketry and the science of firearms. It is true that Forsyth's device of the percussion cap marked a considerable advance on the old flintlock mechanism, but it was not until 1842 that the British Army completed the conversion of its firearms into percussion weapons, other military forces following suit. But rifles—such as the Brunswick, and the Jacob, which superseded the Baker—were still a rarity, while the standard of individual marksmanship was such as to make Daniel Morgan and Ethan Allen turn in their respective graves.

The forces mustered for the Crimean campaign (1854–6) were armed at the outset with the same old "Brown Bess", converted to take the percussion cap; and it was not until the campaign was well advanced that the troops were re-equipped with the Minie rifle, which yielded place, a few years later, to the three-groove Enfield, a weapon capable of really accurate rapid fire.

But precision-shooting with speed was still sadly neglected by the major powers' military forces, although in the Plevna campaign of 1877 the Turks, armed with their excellent Martini-Peabody rifles, demonstrated again and again that well-controlled, well-aimed rapid fire can be relied upon with absolute



confidence to blast out of existence any head-on, bull-at-a-gate frontal attack delivered in close formation.

But the lesson, if read, was not properly understood. It needed the salutary experience of the Boer War of 1899–1902 to drive home the fact that the most perfectly disciplined professional army in the world is helpless in the face of an opponent who has mastered the dual arts of accurate rapid fire and taking every advantage of natural cover. As weapons there was not a great deal to choose between the Boer Mauser and the British Lee-Enfield; it was in the skill with which they employed their firearms that the *vortrekkers* so patently excelled.

But for once the British military authorities read and correctly interpreted the writing on the wall. In the years between the termination of hostilities in South Africa and the outbreak of war in 1914, the British Army devoted far more attention to the practice of musketry than the troops of any other nation in Europe.

It was a gruelling, sometimes wearisome tutelage, but it paid the most handsome of dividends when the minuscule British Expeditionary Force made contact with the swarming German advance, early in 1914. Perfected in a system of rapid fire which could attain fifteen aimed

One of the costly defeats of Federal troops early in the Civil War occurred at Fredericksburg, Virginia, on December 13, 1862. Humphrey's division, under what has been called the worst leadership of the war, was decimated in the attack on Southern troops.

shots a minute, the expert rifleman of that original force of long-service soldiers fairly mowed down the oncoming Germans in swathes, stemming their headlong advance until it wavered to a standstill. "We had always been told," grumbled one wounded German officer captive, "that you had no more than two machine guns to a battalion; but it's obvious you must have at least sixteen." But he was wrong. Two machine guns was the battalion "establishment", and the tempest of steel which had played such havoc with the German advance was fired from the rifles of men whom long years of practice and indoctrination had imbued with a mastery of confidence in their weapon which rendered it the dominant factor of the battlefield.

In all battles, as Field Marshal Wavell once put it, "the moment comes when Private Snodgrass has to advance straight to his front." He will do so with all the greater confidence if, between his hands, he holds a rifle he has mastered and learned to trust. For that matter, in the conditions of open warfare such as prevail in Korea, and will reproduce themselves in any foreseeable conflict, even administrative troops and technical specialists may very easily find themselves confronted with situations wherein the only answer will be to shoot it out—with their rifles.

All gadgets and "trimmings" apart, once he has really mastered it, the rifle still remains the soldier's most mobile, effective, and reliable instrument of war. In action, the man and his rifle form the smallest possible team, and therefore the least conspicuous target. Since he can carry up to 250 rounds on his own person, the rifleman, trained to make every shot tell, need have little fear of running short of ammunition. Moreover, since the rifle is far less wasteful of ammunition than any known variety of automatic or machine gun, its supply offers fewer targets to hostile artillery and "sneak" aerial attack along the lines of communication immediately to the front. Easily replaced if injured or put permanently out of action, the bayoneted rifle, employed in close action as a stabbing weapon or as a club, is as useful at one yard as at a thousand. So long as he is alert and watchful, no man with a rifle in his fist can be "jumped" or caught at a disadvantage. In short, despite the rival claims of the many ingenious weapons placed at the service of the Infantry, in the hands of troops who have thoroughly mastered its potentialities the rifle can still claim its rightful place as the dominant weapon of the battlefield.

THE EVOLUTION OF DEFENSIVE ACTION

By
COLONEL GIOVANNI GATTA*

The art of war, particularly tactics, is in a state of continuous evolution.

The principal factor in this evolution is the weapons and forces used. As combat means change, so do the tactical methods employed.

While this evolution is manifested in both offensive and defensive action, this article will confine itself to defensive action and its evolution from a linear form to the present organization in depth.

Linear Defence

Continuous linear defence, which was practiced for nearly two centuries, was a result of the popular belief that the armament of the infantry consisted of only one weapon. Even after abolishing the pike in favour of the gun with its bayonet, the infantry armament consisted of a single type weapon, and thus, the linear type defence was maintained.

With the advent of the machine gun, a change was made in the defence by substituting a machine gun for a section of line of the same fire capacity. This rapid-fire weapon, capable of laying down a continuous stream of movable fire, became a strong point. With the increase in the number and kinds of unit weapons, the strong point increased by grouping mortars, anti-tank guns, and assault forces with automatic weapons to form a solid resistance in place. And so, solid-line defence gave way to a defence in which scattered strong points were established, but the fire power was not increased. The only advantage gained through the use of the new weapons was a reduction in the number of men required to man the defences.

In order to increase the fire power available in the defence, it was necessary to echelon the defensive elements in depth. This was possible because the very nature of the new defensive concept permitted firing through the intervals between the advance elements. Thus, the defence was transformed from a linear form to a form organized in depth.

Lessons of the Second World War

The experiences of World War I had shown that the defence should

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thin the forces occupying the advance posts, and strengthen those directly behind the advance posts. This procedure resulted in the establishment of two defence zones: an observation zone and, behind it, a sector of resistance. The primary missions of the forces in the observation zone were to provide surveillance and, through the use of strong points, to channelize the enemy into predetermined avenues of approach which were better suited for resistance. The primary missions for the forces in the sector of resistance were to break, arrest, or force the enemy to withdraw by counter-attacks. The sector of resistance was divided into three smaller zones: the combat zone, the support zone, and the zone of reserves.

By organizing the main defensive positions into several zones, the defending forces were able to channelize the enemy forces in to the areas best suited for defensive action, instead of being forced to fight in areas where the terrain was more favourable to the enemy.

Between the Wars

During the period immediately preceding the outbreak of World War II, the concept of organizing defensive strong points and a defence in depth began to gain headway. The main reasons for this were:

1. The great penetrating possibilities of armoured vehicles.

2. The importance of strong points in the battles of Belfort, Verdun, Reims, Arras, and Ypres in World War I.

This concept brought out clearly that defence, whether in the strategic or tactical domain, or as practised by a large or small unit, must be considered in depth as well as in the width of the frontal position.

Defence During World War II

At the beginning of World War II, offensive action surprised the defence with its mobility and striking power.

The use of motorized transport permitted the offence to bring mass to bear at preselected points and at a predetermined time. After the action had started, this mobility permitted attacking forces to be reinforced easily with reserves to provide an attack in depth. In addition, the striking power and mobility of armoured units permitted the offence to break through defensive positions with relative ease and speed.

The inability to halt or retard offensive forces for the time necessary to prepare for the defence resulted in an overwhelming advantage for the offensive forces. The defender but rarely succeeded in manœuvering in such a way as to regain the initiative and inflict decisive blows.

The first lesson that was learned from the war was that defensive

positions must be organized for all around defence. Such a defence still permitted frontal continuity by means of supporting fires and close co-operation between adjacent strong points.

The first test of this new concept was in the construction of the *Dyle* defence line between Antwerp and Namur. The individual defensive elements were organized as strong points in such a way as to be able to resist attacks even from the flanks and the rear.

Later, a second lesson was learned by providing more depth in the defence and organizing rear positions for a position defence.

These lessons formed the basis for organizing successive defence positions. The forces in the first position had the task of smashing the hostile formations or channelizing them toward areas most favourable for defence. The units in the second position had the task of showing or wearing these formations down, or stopping them. The mobile reserves, located in the third position, had the task of counter-attacking and annihilating hostile formations.

This defensive concept, even during World War II, did not possess any new characteristics. Even in the past, the defence always had been based on the possession of the most important terrain and key points and the manning of such positions with the best forces available.

Conclusions

The new aspects of war which must concern defence are:

1. The great strategic and tactical mobility of present-day large units, which permits their employment with great rapidity.

2. The great striking and crushing power of armoured units, particularly when their action is combined with close-support aircraft.

3. The great vulnerability of defensive positions once they are discovered by air observation.

4. The greater possibilities of attack by air-landed and amphibious forces.

5. The increased range of modern weapons.

6. The increased employment of self-propelled weapons.

In view of these aspects, it is necessary for the defence to be able to react quickly against a concentration of forces and be able to halt, repel, or annihilate the attacking forces.

In order to achieve this, the defence must be based on the ability to move forces quickly to danger areas and, with the paucity of forces normally available, limit static defence to key points. In addition, an organization in depth should be maintained only along the easiest routes of penetration or the direction of the

The Double Standard

The Editor,
Canadian Army Journal.

Dear Sir:

As a former member of the Historical Section, I thought that the following excerpt from Tolstoi's "War and Peace" might be of interest to the readers of the Canadian Army Journal because it describes the double standard which existed in the Russian Officers' Corps as far back as the Czarist's days.

"When Boris entered the room, Prince Andrey was listening to an old general, wearing his decorations, who was reporting something to Prince Andrey, with an expression of soldierly servility on his purple face 'Alright, please wait!', he said to the general, speaking in Russian with the French accent which he used when he spoke with contempt. The moment he noticed Boris he stopped listening to the general who trotted imploringly after him and begged to be heard, while Prince Andrey turned to Boris with a cheerful smile and a nod of the head. Boris now clearly understood—what he had already guessed—that side by side with the system of discipline and subordination which were laid down in the Army Regulations, there existed a different and a more real system—the system which compelled a tightly laced general with a purple face to wait respectfully for his turn while a mere captain like Prince Andrey chatted with a mere second lieutenant like Boris. Boris decided at once that he would be guided not by the official system but by this other unwritten system.—*Capt. B. J. Legge, Adjutant, 2nd Armoured Divisional Column, RCASC(RF).*

THE EVOLUTION OF DEFENSIVE ACTION

(*Continued from preceding page*)

enemy's main effort. In this way, defensive forces will be able to employ their reserve forces quickly in central areas.

In the sense of its depth, the defence area comprises:

1. A zone of security, corresponding to the terrain where the advance elements of the defence operate, with the mission of security.

2. A zone of resistance, corresponding to the terrain in which are deployed the organic means and the reinforcing means of the defence, with the mission of defence to the death.

The organization of the defence may assume differing aspects in individual cases depending on specific missions, the nature of the terrain, the relationship between forces and the front to be defended, and the enemy situation.

Errors Mean Lives

In peace time differences of opinion may be allowed to go by the board without great harm being done, as it may be possible to adjust them at a more convenient season. In war the case is different—chickens remorselessly and rapidly come home to roost, errors can seldom be rectified (the enemy will see to that), and men's lives are at stake.—*Field Marshal Sir William Robertson.*

ROAD MAP IN THE SKY

By
Lieut.-Col. J. A. Stairs, MBE, Directorate of Armament Development,
Army Headquarters, Ottawa

Those who travel by air can pass the time with interest if they take the trouble to consult a map to see what lies along the route. Map-reading from the air is quite easy and a much simpler process than map-reading on the ground. How it can be done is explained in what follows.

Before boarding a plane, pick up from your local garage a road map which will cover the trip. Learn how to fold the map from any tired commuter who reads a newspaper in the five o'clock crush. Do the folding while still on the ground.

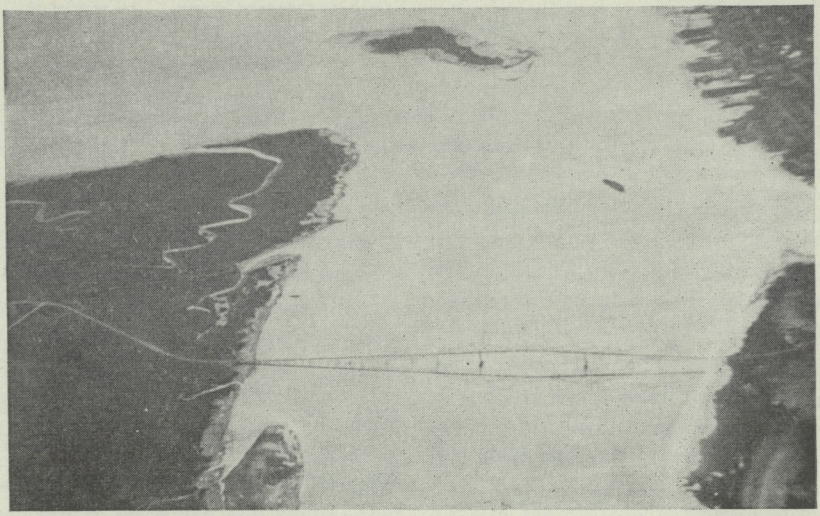
Consult your timetable to see what route the plane will take and the length of time, in the air, remembering to make allowance for any change of time zone. Mark the route on the map and divide it into quarters or sixths or some other convenient fraction. Divide the time in the air (from the timetable) by the same fraction and mark off along the route the time of passage over each dividing point.

This is only a rough guide. The plane is usually fifteen or twenty minutes late getting off the ground, so if you have marked the actual times on your map, these will all have to be moved forward. A better way is to use "H" for the time of departure and put times in as "H plus". Of course, the timetable takes no account of head or tail winds, and you are certain to introduce further error by forgetting to check your watch in the excitement of take off.

Since all large aircraft follow definite air lanes from point to point, the straight line you have drawn on your map can only be considered an approximation. This is particularly noticeable when the airlane jogs to avoid a security area. In spite of this, the economics of flying will almost always prevent the straight line from being in gross error, and that is really all one wants.

How to get a good seat is the next big problem. Long before walking out onto the tarmac, one should decide on which side of the plane one wants to sit. On a hot day with bright sunshine, the side away from the sun is cooler, easier on the eyes, and permits much better ground observation.

But a second factor is what you want to see en route. Your map may show that the cities, lakes, mountains, or deserts you wish to look at are



Prominent inlets, islands, a bridge all make recognition easy even if this were not a large seaport as well. It is Charleston, South Carolina.

predominantly on one side or the other.

Most people try for a seat at the front end. Although one can see forward, the view up front is restricted by the wing and motors, and the latter are noisy. A seat at the rear can be well behind the wing and usually provides a much finer view of the ground.

A tip to remember, in many airports, is that some seconds before the flight is called on the loudspeaker in the waiting room, the actual departure gate outside the building, opposite the plane, is opened for passengers to board. The number of the gate, for any flight, is usually marked up behind the ticket counter. The experienced traveller waits at the gate. The novice, waiting inside, will find the best seats taken.

And now for the flight itself. Note the time of take off. Once in the air, the direction taken may be unexpected if the plane is following a special airlane away from the city. Several minutes can elapse before turning toward destination. This first manœuvre is followed in clear weather by remembering the time of day and by using the sun's position to determine the changing line of flight. The sun also tells you when you are on course.

But now the trick is to map-read. One must concentrate on the big features. The best of these are the

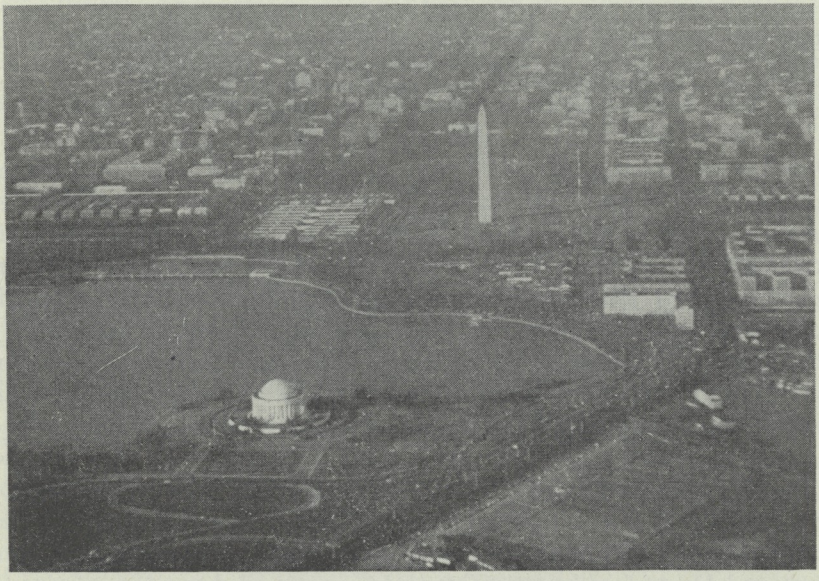
large bodies of water, cities, towns, main highways and sometimes special features such as prominent buildings, army camps or a runway covered with B36 aircraft.

Do not become confused with small details. Many creeks and ponds appear on the ground that are not on the map. Roads must be treated with caution as many are not marked and, of those that are, only the main twists and turns are shown. They are best used in conjunction with cities, or where they bridge large spans of water, or where there are only a few of them as happens on the desert or in the mountains.

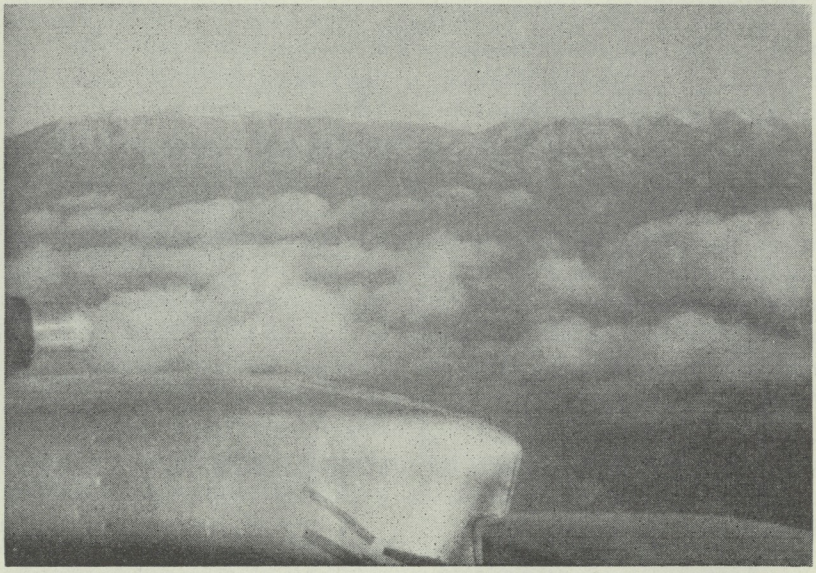
Do not forget how fast the plane is moving. Refer continually to the times along the line on your map. You are probably somewhere within twenty or thirty miles of the position shown by dead reckoning. When trying to recognize distant features, remember the effect of foreshortening.

Once you are located, make a fix on the map and note how far you are in time and space from the calculated position. With another fix you can begin to correct the route and make allowance for the ground speed of the aircraft. Keep checking the map to see what interesting features lie ahead.

A pair of binoculars is a great



Washington, D.C., showing the Jefferson Monument in the foreground and the Washington Monument near the centre of the photograph.



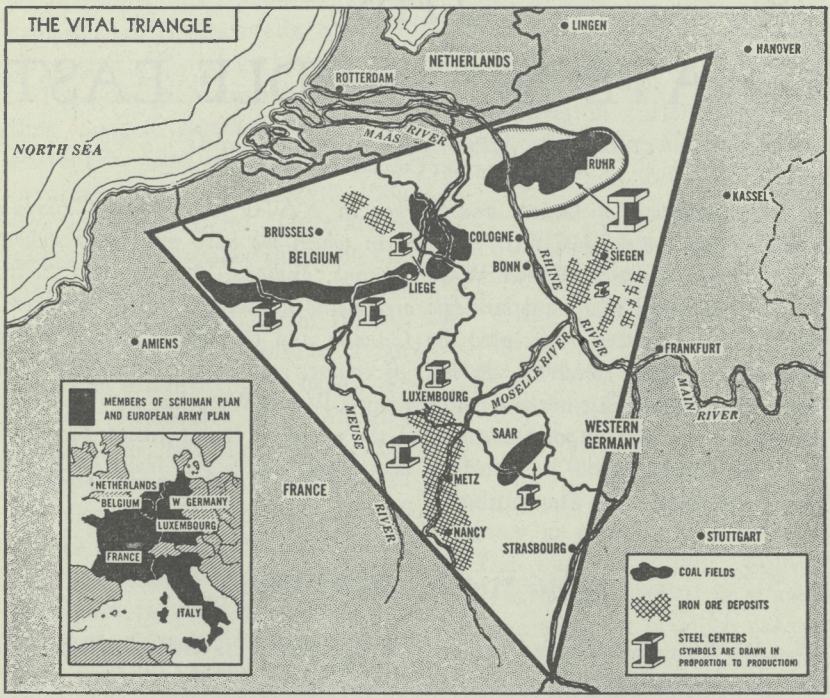
Mountain ranges are easily seen, but are not too helpful when you are trying to orient yourself. A few peaks are marked on road maps, but the many peaks seen whose distance and height are uncertain make recognition difficult. This is the San Bernardino Range, Southern California. Part of the aircraft from which this photograph was taken can be seen in the lower part of the picture.

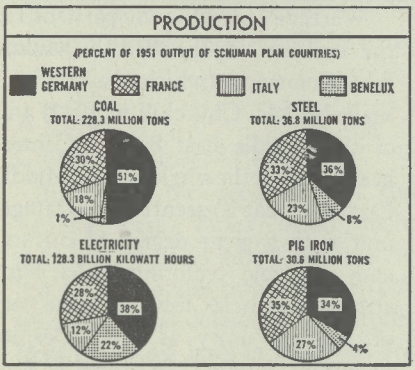
help and good photographs can also be obtained, even with a cheap camera. A yellow cloud filter or a red haze cutting filter can often improve the picture if lens speed and lighting conditions permit. Photographs of cities, particularly big cities, are of great interest if one can obtain a map and match the two up after the trip.

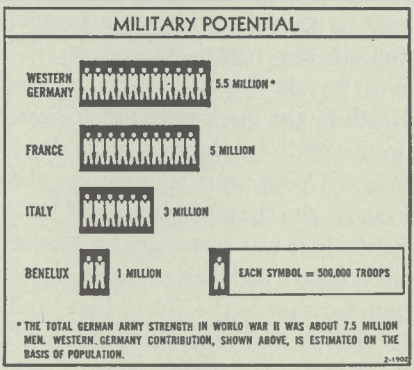
A final word on night, and clouds. Map-reading by night is not difficult. It is done by identifying the cities and towns close to the positions indicated by dead reckoning. These can often be recognized by the well-lit road patterns which lead out of them or by the dark outline of water which lies in or near them, or by their positions relative to one another. Direction, particularly at take off, can be checked by the stars.

The most challenging situation arises when trying to obtain a fix with only an occasional glimpse of the ground through cloud. This can be done if one is lucky enough to spot a large feature and quick enough to recognize it on the map. That it can be done at all shows how easy map-reading is when done from the sky.

Three Reasons Why Western Germany is Important to the Western Nations







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THE STRATEGIC MIDDLE EAST

By
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The inclusion of Greece and Turkey in NATO has carried Canada's boundary into the Middle East, an area in which we have previously shown little interest. In two World Wars, Britons, Indians, Anzacs, and South Africans defended that vital strategic area while we were occupied elsewhere. The commitments now accepted by Canada and the United States, along with other NATO countries, do not, of course, mean that Canadians will fight in the Middle East in the event of a third World War, but they do tie us more closely to that important corner of the world. It is imperative, therefore, that Canadians should be informed about the significant features of the historic Middle East.—The Author.

* * *

I: The Middle East in History

What We Mean by "Middle East"

The name "Middle East" has only recently gained a wide acceptance to indicate the region washed on the West by the Mediterranean, on the North by the Black and Caspian Seas, on the South by the Red Sea and the Indian Ocean, and running on the East up into the arid plateaux of Iran. Formerly it was customary to refer to the northern and western parts of this vast territory as the "Near East" and to restrict the term "Middle East" to the Persian Gulf Area. Occasionally, the sub-continent of India was thrown in with the latter for good measure.

Wartime usage, and particularly the creation of the British Middle East Command (which was divided again by Mr. Churchill in 1942) and of the Middle East Supply Centre, has conferred the single name "Middle East" on what is essentially a strategic unit with a great degree of cultural and economic uniformity and with strong tendencies towards some sort of political unity as well. Despite important internal variations in geography and some differences in

economic and social structure, and despite the fact that the Middle East, now more than ever in its written history, is politically "Balkanized", it is essentially a single geographic and strategic unit.

The principal states which can be thus lumped together under one convenient name are Turkey, Syria, Lebanon, Israel, Jordan, Egypt, Iraq, Iran and Saudi-Arabia. There are in addition a few smaller units, on the Arabian peninsula, most of them more or less dependent on Great Britain. There are some arguments in favour of adding to these already named the Sudan, Cyrenaica, Cyprus, and Afghanistan; but these places, and perhaps the eastern highlands of Iran also, are really border territories for the Middle East proper. Furthermore, geography and history have given them particular problems which are distinct from, and not necessarily important to, Middle East security. Hence these border areas will be referred to only incidentally in what follows.

A Variety of Climes and Physical Regions

Internally the geography of the Middle East varies much more markedly than is often realized. It lies all in the sub-tropical zone, but because of great differences of altitude, from below sea level in the Dead Sea area to twenty thousand-foot peaks in eastern Iran, it possesses a wide variety of climates. For instance, while mountains in Lebanon may have snow, the Red Sea may be scorching hot; winter nights in Egypt are often bitterly cold; and the Caspian littoral is balmy while the winters in parts of north-east Turkey can be deep in snow. Rainfall varies from practically nil in large areas of the Arabian peninsula and Egypt to 120 inches per annum in the mountains of north-east Asia Minor. Although much of Egypt, Arabia, Jordan, Iraq, and Iran are desert where nothing grows, other places like the Nile Delta and the shores of the Caspian are richly verdant. There are forests in the north-east, and rich, though fairly dry, steppe country in parts of Syria and Iraq.

The most important cultivable areas of the Middle East lie in a great arc, the main part of which has come to be called the "Fertile Crescent". Together with the valley of the Nile, the Fertile Crescent forms a stretch of fruitful land which extends like a great bent bow from Egypt up the Mediterranean coast and down the valleys of the Tigris and Euphrates to the Persian Gulf. In the inside of the bow is the great desert peninsula of Arabia, called by the Arabs themselves the "island of Arabia". Outside of the bow, protecting it, are the deserts of Egypt and Lybia, the plateau of Asia Minor, and the deserts

and mountains of Iran. From the desert has come the fanaticism which, merging with the relatively high cultures developed in the Fertile Crescent and the Nile Valley, has made the peoples of the Middle East an important factor in world history.

Peoples and Religions

Within an area of two million square miles, that is to say nearly twenty-five times as big as the United Kingdom, live about fifty-five millions of people, barely more than in the United Kingdom. They can be divided into four main ethnic and linguistic groups, namely Turks (in Turkey), Persians (in Iran), Jews (in Israel), and Arabs (in all the other states). The Arabs, occupying some of the poorest lands, are spread over a large proportion of the whole region and have not yet achieved political integration.

But these three groups are not by any means pure racial strains. The Egyptians, for instance, who speak Arabic are only to a small extent Arabic by descent. Modern Turks are a mixture of the Turkish invaders of Asia Minor with the original inhabitants in a ratio of about one to three. In addition to the four main groups who have achieved separate political existence and recognition, there are also important racial minorities of which the most important are the Armenians in Turkey and the Kurds in Iran.

The greatest factor tending toward political unity in the Middle East is religion. The vast majority of the inhabitants of all the Arab states (excluding Lebanon), of Persia, and of Turkey, are Moslems. But there are important religious minorities in some of these, and there are grave internal sect-divisions in the Moslem world. Lebanon is slightly more than fifty per cent Christian. Israel is, of course, Jewish. Even so, the whole area is predominantly Moslem, and (except for Iran) was nominally under the rule of the Sultan of Turkey in what was really a religious rather than a political state, within the memory of people over forty.

What makes religion in the Middle East a factor of unusual concern is the fact that three of the world's religions look to it as the birth-place of their faiths. Islamic predominance in the area has in the past been a source of unity; and today, more than ever, Moslem countries outside of the Middle East, for instance Pakistan and Indonesia, feel a strong bond of sympathy for the Arab peoples and support them in their political aspirations. But Christians and Jews throughout the rest of the world are deeply concerned in whatever happens in the area and so a unity based on religion would now be difficult to achieve and maintain.

The Cross-Roads of the Old World

The real importance of the Middle East has always been its strategic position. It is sometimes spoken of as forming a land-bridge between three continents. Strictly speaking, it is a vital strategic bridge only between Asia and Africa. Asia and Europe are a single land-mass and need no bridge to join them; and Europe and Africa are hardly more closely connected by land through the Middle East than they are at the western end of the Mediterranean.

However, the easiest land route from Europe to India passes directly through the Middle East. In the past this route, much more than the land-bridge from Asia to Africa, possessed great importance. In the future, as the untutored masses of the Dark Continent come to be influenced either by Asian fanaticism or European and American Liberalism, the land-bridge from Asia to Africa may come to be of tremendous significance.

The importance of the Middle East land-bridges was, however, always increased, even in the most remote times, by the fact that the region was virtually a system of portages as well. It connected the highways of ocean commerce. These portages are supplemented by natural and artificial waterways. It was for the portages and the waterways, as much as for the land-bridges, that great wars were fought.

The coming of air power has increased the strategic significance of the Middle East as a cross-roads of vital arteries of communication. Air routes from all parts of Europe (and even from North America) pass through the area en route to East Africa, India, South-east Asia, the Far East, the South Seas, and Australasia. Detours are practically non-existent. An air-staging route was opened up across tropical Africa during the war but it can be little more than a wartime emergency alternative; and the routes directly across the land-mass of Euro-Asia are obstructed by the Iron Curtain, by the Himalayas, and by the very vastness and emptiness of East Asia. The Middle East route is a bottleneck through which some of the most important air routes in the world must pass.

Ancient Wars

Quite apart from all other considerations, because it is so important a centre of communications, the Middle East has always figured prominently in contests of world power; and it seems likely that it always will. The persistence of its role in history, despite all the political, economic, and technical developments which man has made, is remarkable. The Ancient Empires of the Nile and the Tigris-Euphrates fought for control of the Syrian-Suez land-bridges


RELATIVELY MORE FERTILE AND SETTLED AREAS
LESS POPULOUS PLATEAUX, MOUNTAINS, DESERTS, ETC
ATLANTIC OCEAN
EUROPE
ASIA
BLACK SEA
GREECE
USSR
CASPIAN SEA
USSR
TURKEY
MEDITERRANEAN SEA
LEBANON
SYRIA
IRAQ
TIGRIS R.
EUPHRATES R.
JORDAN R.
ISRAEL
IRAN
AFGHANISTAN
PAKISTAN
PERSIAN GULF
QATAR
LIBYA
EGYPT
SAUDI ARABIA
RED SEA
OMAN
YEMEN
ADEN PROT.
INDIA
AFRICA
SUDAN
NILE R.
INDIAN OCEAN
400 0 400 800 MILES

between Asia and Africa. The Greeks staved off the attempts of the Persians to invade Europe. Alexander retaliated by crossing through the Middle East and penetrating into Asia as far as India. The Romans strove with the Parthians for long years in an attempt to secure the eastern end of their Mediterranean Empire. When the Parthians were overthrown by a revival of Persian power, the Romans found a new foe against whom their veteran legions could not prevail.

The Arab Conquests and the Crusades

In the seventh century A.D. the tide turned for a thousand years. From the very heart of the Middle East, the Arabian Peninsula, there arose a world power which thrust far into the west and spread its tentacles east as well. The Arabs, made fanatical in their religious fervour by their prophet Mohammed, seized the Fertile Crescent, destroyed the Persian Empire, robbed the Byzantine (or Eastern Roman) Empire of its Asiatic and African Provinces, and plunged through the Iberian Peninsula into France. They were stopped by Charles Martel in 732 A.D. near Poitiers, less than 200 miles from Paris. By the movement known to us as the Crusades, Mediæval Christendom struck back in an effort to win the Holy Land from the infidel. The Crusades were also an attempt to gain control of the western ends of the portages through the Middle East across which came the riches of India. The crusading movement was finally thrown back by the Seljuk Turks, a warrior people from Central Asia, who had been converted to Islam and had overthrown the last Arab Caliphate. Successive waves of Turkish invaders through the centuries then poured across the land-bridge into Europe. They captured Byzantium (Constantinople or Istanbul) the capital of the East Roman Empire in 1453, overran the Balkans, and invaded the heart of Europe in the sixteenth and seventeenth centuries. Europe was saved from Ottoman Turkish conquest by a Pole, John Sobieski, who defeated them at the gates of Vienna in 1683.

The Advent of Russia

From the eighteenth to the twentieth century the Ottoman Empire controlled the Middle East, much of North Africa, and the Balkans, but was slowly declining. During the same period a new power on the borders of Asia and Europe, the heir of a mating of Viking and Tartar peoples and cultures, began to press relentlessly towards the Dardanelles, one of the great waterways across the northern flank of the Middle East. Empress Catherine the Great of Russia, seizing ice-free ports on the

Black Sea from the Turks, realized that they would be useless if an enemy controlled the passage out into the Mediterranean. From her time a foothold on the Bosphorus became the ultimate aim of Russian foreign policy.

Early in the nineteenth century, sensitive to this expansion of Russia, France and Britain were in turn drawn into the Levant (the Eastern Mediterranean). Emperor Napoleon I, with a soldier's realization of the strategic importance of the area, thrust through the Middle East on the route to India, only to have his boats burned behind him by Nelson at the battle of the Nile. Without seapower his plan was futile.

During the whole of the nineteenth century Britain, France and Russia strove unsuccessfully to solve the "Eastern Question" posed by the decay of Turkey and by the growing power-vacuum in the Middle East. The "problem of the Straits", the heart of this "Eastern Question", brought on the Crimean War which was fought on the Northern fringe of the Middle East.

Britain in the Middle East

Britain had already been convinced by Napoleon's Egyptian venture that her interest in the Mediterranean inevitably involved her in Levantine questions. In 1869 the digging of the Suez Canal greatly shortened the route to India and as a result the "life-line of the British Empire" now passed right through the Middle East. Thence forward, Britain was concerned not merely with maintaining Turkey as a means of preventing Russia's imperial expansion into the Mediterranean but also with the security of the second great Middle East waterway, the route through Suez and the Red Sea. Britain leased Cyprus from Turkey in 1878. In 1882 the internal weakness of Egypt led to the creation of a virtual British Protectorate over Egypt although the land of the Pharoahs was still nominally subject to the ancient liege, the Sultan of Turkey.

The Second World War was caused by a "Near East" crisis; and the position which Britain had gained in Egypt during the nineteenth century made possible the successful defence of Suez. But attempts to open a passage through the Dardanelles, the second great Middle East waterway, in order to connect the Western allies with Russia, failed disastrously. Even so, the retention of control of the Mediterranean and a foothold in the Middle East was the means by which the Central Powers were contained. Had Britain not been able to base her troops in Egypt the Turks, backed by Germany and Austria, would have had a practically unrestricted passage through into the Indian Ocean and Southern Asia.

In the Second World War the Mediterranean sea-route was lost to Britain for three years, but even so British possession of a base in Egypt proved a vital link in the containment of the Axis. By maintaining her position in Egypt Britain prevented the Nazis from using the Africa-Asia land-bridge through the Middle East as a great hook to swing at southern Russia, or to link with Japan east of Suez. As a result of the success of the British Eighth Army and of the benevolent neutrality of Turkey (and also because Hitler failed to realize the strategic possibilities) the Axis offensive through the Middle East came to nothing. But the Allied counter-offensive began from Middle East Bases. The counter-attack through Africa to the "soft underbelly of Europe", the first step in the long road to Rome and Berlin, was begun at Alamein a few weeks before the landings in North Africa and nearly two years before the invasion of Normandy.

Lessons to be Learned

From this brief resumé of the world struggles which have centred in the Middle East several valuable lessons can be derived. The first is the prominence of the Middle East in the politics of world rivalries. At various times the nations have fought for different strategic features in the area, sometimes for a land-bridge, sometimes to defend a water-route, and sometimes to contain a continent; but the enduring strategic importance of the Middle East in one way or another has been constant. It is clear that in the possession of land power the Middle East becomes a bridge from continent to continent. To contain such a power on one continent by sea-power is impossible without control of the vital Middle East. To make best use of possession the Middle East sea-power is invaluable.

The Clash of Civilizations

Secondly, and perhaps even more important, a large number of the wars which were fought in the Middle East were more than mere struggles for power. Situated at the crossroads of world highways the Middle East is inevitably a meeting place of peoples. On several occasions the Middle East saw clashes between vastly different concepts of civilization. The Greek contest with Persia preserved the seeds of European liberty against Asiatic tyranny. The Arab and Turkish imperial conquests, and the Crusades, were conflicts between two world religious movements. Despite the taint of imperial rivalry, liberalism and autocracy were at loggerheads in the struggles which revolved around the Eastern Question of the Nineteenth Century and again in the First World War. The men who fought in the Western Desert under

General Montgomery were fighting for freedom against totalitarianism. The Middle East has thus repeatedly featured as a cockpit in which life and death struggles have been fought between peoples with opposing concepts of civilization. To the visionaries it is, not unnaturally, the location of Armageddon.

The Background of the Peoples of the Middle East

Lastly, a point which is all too frequently forgotten or neglected, the history of the great world contests in the Middle East reminds us that its peoples have a long background of civilization. The vast majority of the inhabitants of this area are not primitive or savage peoples. They have marched in the van of civilization only to lag by the way-side.

Scientists believe that the Nile Valley and the delta of the twin rivers were the cradle of civilization. Some even believe that all civilizations can be traced back to a single origin in the Middle East. The people of Egypt, although Arabic speaking, are racially largely the descendants of the Egyptians of the Pharoahs. The poorest "fellah" of Egypt must be regarded, not as a backward savage, but as a descendant of two of the greatest civilizations in world history.

As recently as the early nineteenth century an Albanian adventurer, Mehemet Ali, built up an efficient military force in Egypt, defeated the rebellious Wahhabi sect (led by an ancestor of King Ibn Saud) in Arabia, conquered the Sudan and Syria, and threatened to overthrow Turkish overlordship and to re-establish an Arab Caliphate. Mehemet Ali relied on Albanians and Turks for his officials and officers; but his son Ibrahim, who was an even greater military leader, was bent on adopting the Arab peoples as the medium for realizing his ambition. Only the intervention of Russia and Britain prevented the revival of a modern Arab military power controlling all the Middle East.

Much of the present-day complexity of the situation in the Middle East can be explained by these deductions drawn from a study of its history. In the Middle East there is abundant explosive material piled up where it is most likely, if ignited, to start a world-wide conflict. The most important strategic prize in power politics, situated also at a point where civilizations clash, the Middle East is inhabited by a people who have been left behind by modern techniques but who have retained a fierce pride of race and a religion which can stir men to the greatest heights of fanaticism and conquest. The peoples of the Middle East, if they could be welded into a harmonious unit, would become an incalculable force for good or for evil. On the other hand, in their

New Transport Radar

A new lightweight radar set that "maps" every detail of terrain and weather obstacles up to 200 miles in front of an aircraft is now in production for the [U.S.] Navy and Air Force, it was announced jointly by the Radio Corporation of America and the Navy.

Specifications for the new transport radar were prepared by the Navy Bureau of Aeronautics and co-ordinated with the Air Force to include recommendations reflecting its experience with radar.

According to Mr. W. W. Watts, vice-president of RCA's Victor Division, the new unit permits the pilot to see a close-up of a selected area as if he were using a powerful telescope that could penetrate through darkness and clouds, and can be used for these four general types of operations:

1. As a means of collision warning. It will show mountains and in some instances aircraft in the vicinity.

2. As an accurate indicator of weather conditions. It will show the position of thunderheads and other cloud formations, and will enable the pilot to avoid turbulent weather or select the safest course through it.

3. As a means of position location when standard landmarks are not visible. It can pick up the signal of ground based radar range units.

4. As a means of mapping terrain. Through a special discrimination circuit, it shows the pilot the salient characteristics of the land over which he is flying.

On a recent flight from Westover AFB, Mass., to Frankfurt, Germany, in a military C-97 equipped with the new radar, the first islands of the Azores were observed at a distance of 195 miles from an altitude of 17,000 feet, Watts said. An RCA technician aboard the flight stated that "the entire chain of islands was mapped with excellent definition, and navigation to Lages by radar was easily accomplished. On the same flight the landing approach at Frankfurt was made by means of the radar, with the runway clearly defined." — *Army-Navy-Air Force Journal (U.S.).*

THE STRATEGIC MIDDLE EAST

(Continued from preceding page)

disunity, they represent a great source of danger to world peace. In any case, the Middle East is one of the most important keys in world security. He who rules the Middle East may rule the world.

(The next part, "The Middle East from Caliphate to Mandate", will describe the immediate background of current Middle Eastern problems.—Author).

(To be continued)

THE MOBILITY OF ONE MAN

By
BRIGADIER-GENERAL S. L. A. MARSHALL*

PART 2

Lessons from Omaha

In the initial assault waves at Omaha Beachhead there were companies whose men started ashore, each with four cartons of cigarettes in his pack—as if the object of operations was trading with the French.

Some never made the shore because of the cigarettes. They dropped into deep holes during the wade-in or they fell into the tide nicked by a bullet. Then they soaked up so much weight they could not rise again. They drowned. Some were carried out to sea but the greater number were cast upon the beach. It impressed the survivors unforgettably—that line of dead men along the sands, many of whom had received but trifling wounds. One man said of this sight: "They looked like wax: I thought of Madame Tussaud's."

There are no final death statistics on Omaha. If any are in time published, they will be at best a rough approximation. No one can say with authority whether more men died directly from enemy fire than perished because of the excess weight that made them easy victims of the water.

But when I had concluded my work with the survivors of the companies which had landed during the initial Omaha assault, the impression was inescapable that weight and water—directly or indirectly—were the cause of the greater part of our losses at the beach.

Believing that this was the great lesson of the Omaha operation, and that it was more strongly illuminated there than in other landings during World War II because of the decisiveness of that operation and the numbers engaged, I feel that the tactical facts deserve even closer scrutiny than those questions of

*The author has served in the United States Army for more than 30 years, and during the Second World War he spent many months in both the Pacific and European theatres as a historian. This article is reprinted from the Infantry Journal (now consolidated with the United States Army Combat Forces Journal). The sketches are reproduced from the Infantry Journal, and the photographs of Canadian infantrymen were supplied by the Directorate of Public Relations (Army), Ottawa.—Editor.

higher strategy on which we differed with the British or among ourselves.

The fundamental error was a simple one. We overestimated the physical strength of men in the conditions of combat. This almost cost us the beachhead. Since it is the same kind of mistake that armies and their commanders have been making for centuries, there is every reason to believe it will happen again.

The mistake can be blamed only in part on the staff. In war our treatment of any basic problem reflects in large measure our thinking on the same problem during peace. It was so in this case. The general correctives needed could only have been applied by concrete thinking on the problem well in advance of war.

The root of the trouble lies here. We do lip service to the principle that the aim in logistics is not simply to support and supply the men on the fire line, but to relieve them of all unnecessary strain and tension. But it is lip service only.

We are reluctant to believe *absolutely* that 5,000 relatively fresh fighting men will defeat 15,000 worn-out men in the opposing line any day in the week.

In the hour of decision, the strength of an army cannot be counted in bodies but in the numbers of men who are spiritually willing and physically able to pick up and move on forward fighting.

At Omaha Beachhead our count of such men was extremely low. Certainly fear of death played a part in the paralysis of some of the men who couldn't get over the sands. However, we would be selling short our own human material, and would once again be guilty of gross ignor-

ance about the underlying causes of terror among men who fight, if we took it for granted that the only reason so many men collapsed at Omaha was because they had to go through bullet and shell fire once they hit the shore.

To say that they would all have made it had they landed on a dry run exercise doesn't mean a thing.

Eyewitness Account

On D-Day, Capt. Richard F. Bush landed with the assault waves at Omaha Beach. He was a field artilleryman. He went in on the same mission as the late Lieut. Col. "Moon" Mullins, one of the immortals of that great undertaking. Their task was to prepare the way for the landing of their own guns. But the guns didn't arrive. Again, someone's excess caution defeated the end in view. The guns were to be brought in on DUKWs. But somebody decided that the DUKWs and their cargo would be vulnerable to fire from the shore. So each DUKW was protected with a rampart of eighteen sandbags. Between this weight and the roughness of the water, every gun save one was drowned at sea.

So it was that Bush and Mullins spent their morning trying to persuade demoralized infantrymen to resume their duty. Mullins was killed while trying to lead friendly tanks against German pillboxes punishing the American flanks. There is no braver story in our history than the action of this one man on that particular morning.

That is what Bush—Mullins's companion—said of the men among

whom he moved: "They lay there motionless and staring into space. They were so thoroughly shocked that they had no consciousness of what went on. Many had forgotten they had firearms to use. Others who had lost their arms didn't seem to see that there were weapons lying all around them. Some could not hold a weapon after it was forced into their hands. Others, when told to start cleaning a rifle, simply stared as if they had never heard such an order before. Their nerves were spent and nothing could be done about them. The fire continued to search for them, and if they were hit, they slumped lower into the sands and did not even call out for an aid man."

Words almost identical with these were written by Captain Hoenig back during the Franco-Prussian War. He had seen the rout of the Prussian 38th Brigade on the field of Mars-la-Tour. It had lost fifty-three per cent of its strength in a few hours. He noted of the survivors that their eyes stared but saw nothing, and if their ears heard they conveyed no message to the brain. He said of them: "I saw madness in these men, the madness that arises *from bodily exhaustion combined with the most abject terror.*"

It is unfortunate that such scenes from war are rarely understood in their full significance. Among soldiers, it is traditional to think of this condition of acute battlefield shock as occurring in a body of men only after a terrible defeat, when all hope is fled. From such a superficial conclusion can be drawn no more profitable moral than that in war, as elsewhere, it is prudent always to be on the winning side.

Because there is much more than that to be learned, I turn back to my original notes on the operation at Omaha Beachhead for values which received only passing notice in the official published account, although that account was based on these same notes.

This one passage tells a small part of what happened to Company E of the 16th Infantry, on the morning of June 6, 1944:

Altogether the company lost 105 men during the day. But of that number, only one man was killed during the advance from the top of the beach inland. Most of the others were lost in the water. Many who were wounded on leaving the boats got only as far as the edge of the sand. They collapsed there and were overtaken and drowned by the tide, which moved at the pace of a man in a slow walk. In attempting to save some of these men, others were knocked down by enemy fire, and they too were drowned by the tide. The wounding of a man at the water's edge usually meant his death.

Men of "D" Company, The Royal Canadian Regiment, get their first experience of Korean hills during Exercise "Charlie Horse".

The company line, on leaving the boats, halted just beyond the water, and the men immediately dropped to the sand. Sergeants Fitzsimons, Ellis and Toth, among others, tried to rally the line and get it to move forward. They realized, they said, that they were in a death trap and that the only way to save the company was to get it across the beach.

And so the leaders shouted to the men. But on arising they found that they were stopped by their own physical weakness. The three sergeants said that after dragging themselves forward a few steps at a time, they had to drop because their legs wouldn't support them. They said, also, that they and the others would probably have remained inert had not the tide kept moving behind them so that they had to advance to escape being drowned.

Fitzsimons saw two of his men—Privates Walch and Spencer—drop onto the sand, and saw their bodies blown into the air again. They had been killed outright by dropping on mines. Such incidents did not affect the halting pace of the company. It continued to go forward at the speed of the tide until the high-water mark was reached. There for a time it halted.

Though the company lost more men to the water behind it than to the fire from in front, it required one hour to cross 250 yards of beach.

These facts were established at a company critique which included all surviving witnesses. What went into the record was read to the company for their free comment. It therefore comprises as accurate a statement as is within human means. Many of the men were seasoned veterans, already accustomed to the sights and sounds of combat. Without doubt, heavy shock, resulting from unusually hard initial losses, was partly responsible for their semi-paralyzed advance.

And that is the point! Through research conducted during World War II, our medical service now knows more about the effects of battle shock, and somewhat more of the causes, than men have ever known before. But I would point out that this knowledge will never be of general utility to the Army so long as it is considered a subject primarily of interest to the psychiatrists. What is requisite is that the branches which deal with tactics become equally well informed about the root causes of shock—instead of remaining satisfied with the narrow view that it occurs in some men "because they don't know how to take it." Only so can we apply preventive medicine.

The heart of the lesson is that *all men* feel shock in battle in some degree. It will vary from man to man, according to the intensity of each man's fear. And from situation to situation, according to the measure of success or failure felt by most of those directly concerned. But in one impor-

tant respect, its consequences do not vary.

In the measure that the man is shocked nervously, and that fear comes uppermost, he becomes physically weak. His body is drained of muscular power and of mental co-ordination.

For these reasons, every extra pound he carries on his back reduces all of his tactical capabilities.

This being the case, we are moving only through the kindergarten of leadership when we speak of troops becoming "mentally pinned" by a low combat morale. That is, unless we are willing to accept the other half of it—that they may also become "morally pinned" by the faulty logistics of their superiors.

The Weakness of the Strong

It is elementary that there can be no true economy of men's powers on the battlefield unless there is respect for the natural physical limitations of the average individual. But since it appears radical in that it undercuts the traditional belief that by encouraging men to think brave thoughts we can stimulate them to endeavours they scarcely dream of, some further illustration is required. It is provided by the experience of Company M, 116th Infantry, on the same day at Omaha Beachhead and in the same phase of the landing.

This company was an outstanding success. It started the day without heavy losses and with the unique accomplishment of getting all of its living members and all their equipment across the beach. The word "unique" means exactly that. No other infantry company at Omaha did that well in this particular.

Paratroop-trained soldiers of the 1st Battalion, Princess Patricia's Canadian Light Infantry, move along a twisting trail toward the front in Korea.

By nightfall, Company M had completed the deepest advance within the regimental sector. That is the record, and the company needs no apologist. It can stand on what it did.

Company M's boat sections had expected to come ashore under cover of a rifle company. Had the plan

worked out, they would have landed on an already-won portion of the beach. But that wasn't the way it happened. The sections landed dry against a strip of coast still under control by the enemy and vigorously defended by fire from the heights. However, the sections were well collected when they debarked on the sand: the small boats had brought them in pretty much in line.

That, too, was unique good fortune among the assault forces at Omaha. It reacted on Company M like a moral tonic, largely offsetting the shock that came from the unexpected tactical situation. The company line paused very briefly at the water's edge—a pause not arising from indecision or need to rest the men. It was made so that the line could organize, and its members could look for routes through the belt of obstacles ahead and study the beaten zones where machine-gun fire (there were six guns on them) was kicking up the sand beyond the belt of obstacles.

The company commander gave the order: "Carry everything to the shingle!" It was repeated from man to man. They started the advance with that intent and they made good.

Losing only a few men, Company M crossed the beach and gained the seawall. The manner of that advance is most interesting. They made it *crawling*. And it took them just ten minutes to get across the narrow beach. It had taken Company E, 116th Infantry, *one hour*, with the men walking only a few steps at a time.

The comparison is unfair because the moral, physical and tactical circumstances were totally unlike. But it is for the very reason that Company M 116th had a relatively successful experience in its first combat engagement, and that it continued to be an exceptionally aggressive unit on until the close of the war, that what its members said of their first advance is like a star shell illuminating an otherwise dark landscape.

Said Pfc. Hugo de Santis:

"We all knew we were carrying too much weight. It was pinning us down when the situation called for us to bound forward. The equipment had some of us whipped before we started. We would have either dropped it at the edge of the beach or remained there with it, if we had not been vigorously led."

Said Lieut. John S. Cooper:

"A few of the men were so weak from fear that they found it physically impossible to carry much more than their own weight. So the stronger men took the double risk of returning and helping the weaker men to move their stuff across the beach."

Said Serg. Bruce Heisley:

"We were all shaky and weak.

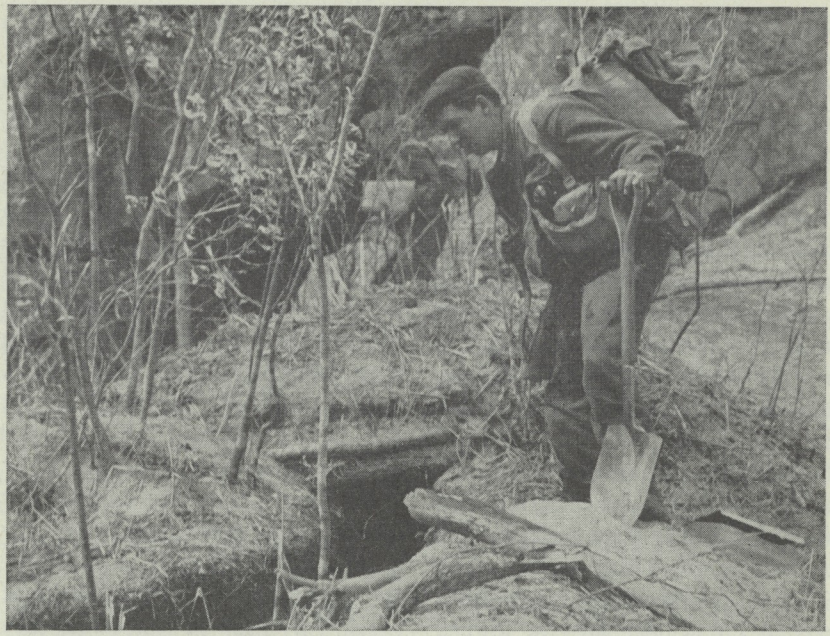
I was that way though I had not been seasick during the ride in. In fact I didn't know my strength was gone until I hit the beach. I was carrying part of a machine gun. Normally I could run with it. I wanted to do so now but I found I couldn't even walk with it. I could barely lift it. So I crawled across the sand dragging it with me. I felt ashamed of my own weakness. But on looking around, I saw the others crawling and dragging the weights which they normally carried."

Said S/Sgt. Thomas B. Turner:

"We were all surprised to find that we had suddenly gone weak, and we were surprised to discover how much fire men can move through without getting hit. Under fire we learned what we had never been told—*that fear and fatigue are about the same in their effect on an advance.*"

These were typical of many such statements made by men in the assault forces at Omaha. They help to explain the spectacle of hundreds of infantrymen stranded along the edge of the sands while the issue was being settled by a few relatively small bands which continued on to the high ground. The day was won by a small minority of those present, rallied by a few highly inspired leaders, prominent among them being Brig. Gen. "Dutch" Cota, who was already exploring the far side of the hill when his infantry companies came over the crest.

As for the men who couldn't get started, newspaper correspondents generously described them as "fighting grimly for a narrow strip of beach." *By their own accounts*, they were not "fighting grimly". They were dead beat and their formations had become stagnant. The substance



The problem of this Canadian infantryman is whether to dig a new trench or enlarge and re-model this one left by the retreating enemy.

of their testimony was that they lacked the physical strength the situation required.

Fear Equals Fatigue

Reading the tactical notes from Omaha Beachhead, some might say that they prove only that we had not sufficiently hardened our men for war. But to drop it there makes all exploration of the case futile, since these troops were as well trained and conditioned as American troops are ever likely to be in the future. Also, as I have previously pointed out, training has its limits: it can never condition men to the accomplishment of battle tasks which are in excess of their natural physical capacities.

The real lesson is the one so clearly put by Staff Sergeant Turner: "*Fear and fatigue are the same in their effect on an advance.*" Nothing need be added to that and nothing taken away.

It is an objective statement of one of the most elementary truths of battle. Yet that truth has remained buried for centuries and it remained

for an American enlisted man at Omaha Beach to say it for the first time in unequivocal language.

Whether you measure the matter by the standards of tactics or medicine, the result will be as stated. Fear and fatigue produce an immediate effect which appears to be identical. The man, whether tired or frightened, suffers a loss of muscular function and has a pervading feeling of physical weakness. The reduction of function as the consequence of fear is hence effectively the same as from physical fatigue. These facts, which were to be learned by observation of the forces of the battlefield, have more recently been confirmed in the laboratory. It can be shown that where there is chronic stress from fear over a considerable period, the physiological changes are comparable to those of fatigue. There is excessive action of the adrenal medulla and changes in the blood stream and muscle.

During the Central Pacific campaigns, two majors-general, Archibald V. Arnold and Ralph C. Smith, were impressed by the phenomenon that if a skirmish line was halted two or three times during an attack by sudden enemy fire, it became impossible to get any further action from the men, even though none had been hurt. They asked me to determine why. The explanation, though not sensed clearly at the time, was that the attacking companies were being drained of their muscle power by the repeated impact of sudden fear. The stone of glycogen in the muscles of the men was being burned up from this cause just as surely, though less efficiently, as if they were exhausting themselves in digging a line of entrenchments.

No appeal to spiritual forces can reverse these processes except in the measure that the appeal contributes to the relief of fear. It is as vain to believe otherwise as to think that mortals can be trained to remain absolutely unafraid in the face of death. In battle, whatever wears out the muscles reacts on the mind and whatever impairs the mind drains physical strength.

Tired men take fright more easily.
Frightened men swiftly tire.

The arrest of fear is as essential to the recovery of physical vigour by men as is rest to the body which has been spent by hard marching or hard work.

We are therefore dealing with a chain reaction. Half of control during battle comes of the commander's avoiding useless expenditure of the physical resources of his men while taking action to break the hold of fear. The other half of it comes from sensible preparation beforehand.

When a man is tossed into combat carrying such weight that his shoulders ache and his knees shake, he has lost his main chance to conquer

quickly his early fear, usually his worst. Through losing it, the probability is lessened that he will make a satisfactory early adjustment and become an efficient firer, and the chance is increased that he will become either a mental casualty or a combat goldbrick. From faulty appreciation of the logistical limits of the human carrier come the loss of tactical opportunity and the wastage of good manpower, since it is self-evident that nothing contributes more to the growth of lasting confidence in the soldier than having a successful experience his first time out in battle.

Seasonal Change

Battle Shock, resulting from an excessive load on the soldier, is a far greater danger during summer operations than in normal winter operations when the cold is not intense enough to slow the muscle and chill the bone.

As a man becomes dehydrated during summer fighting, his courage flows out through his pores, along with his muscular strength. He loses his will to fight or to take constructive action. And the worst part of it is that he is not likely to understand that his sudden loss of will power and courage is because his physical strength has been sapped and that it may be within his power to check it.

Reduced to this condition, the soldier fails to dig a foxhole, even though he knows that he is in danger. The officer fails to properly inspect his position. Troops fail to reconnoitre the immediate area of their bivouac. Commanders hesitate to give orders and defer important decisions. This is not because the voices of conscience and reason don't tell them they are

doing wrong, but because they lack the will to respond. In this state of slackness, the attitude of men becomes one of general indifference to the possible consequences of inaction.

Through such tests as Task Force Frigid, we have begun to survey the effects of excessively low temperatures upon the tactical efficiency of the average individual. But it has been known for fifty years that the soldier's muscle power is seriously impaired by hot weather. Near the close of the nineteenth century, tests were conducted by the "Institute William Frederick" in Germany to measure the effect on soldiers carrying various loads under varying conditions of temperature.

It was found that if the weather was brisk, a load of forty-eight pounds could be carried on a 15-mile march by seasoned men of military physique. But in warm weather the same load caused an impairment of physical powers and the man did not return to a normal state until some time during the day following the march.

When the load was increased to sixty-nine pounds, even when the weather was cool, the man showed pronounced distress. Furthermore, *no amount of practice marching with this load made any change in the man's reactions.* He continued always to show distress in about the same amount. The conclusion was therefore drawn that it is impossible to condition the average soldier to marching with this much weight no matter how much training he is given—a finding which flatly refutes the traditional view that a weight of about sixty-five pounds is a fair and proper load for a soldier.

During warm weather, under a load of sixty pounds, the man under test began to show physical distress almost immediately, and the loss of physical power, from marching with that weight, was measurable for several days afterward. This means in effect that even if a man could go into battle with no more nerves than a robot, the carrying of sixty pounds into a prolonged engagement would result ultimately in physical breakdown.

From the physical findings alone, the Institute concluded that forty-eight pounds per man was the absolute limit under the stress and fatigue of the combat field.

The William Frederick studies, in common with all other scientific inquiries into the physical effects of over-loading, had the curious blind spot directing almost no attention to the fact that physical breakdown is accompanied in ratio by a decline in the mental and moral powers of men. Yet this is of extreme importance operationally, since it means that when mobility is lost because of physically exhausted troops, defensive protection is lost with it.

That is particularly the case during operations in excessive temperatures. Post-war exercises have shown us that men have zero mobility, and hence zero fighting power when the weather gets fifty degrees below zero. In hot-weather operations, dehydration is as great a danger to the soldier. It drains his whole physiological mechanism. When the all-important body salts are reduced to subnormal levels, the loss reacts directly on the nerve system and the brain. An otherwise courageous man may be turned into a creature incapable of making positive decisions or of contending against his own fears. He is defeated by his own sweat. Anyone who has suffered a slight case of heat prostration can attest to the feeling of helplessness which attends the victim. It becomes almost impossible to string words together coherently or to force one's self to take the simplest action.

I do not doubt that there has been many a case of apparent cowardice on the battlefield, wherein it was adjudged that the offence called for a firing squad, when what was really needed were a few salt tablets.

And if salt can be replaced, why not the other vital elements in body chemistry?

It would seem possible and practical that research could be directed toward the development of substances which might quickly correct the physiological changes from prolonged fear reaction.

Looking at tactics through the eyes of the physician, Col. Albert P. Clark, Medical Corps, said in 1941: "If I had the opportunity to select personally 5,000 men from the 48,000 in this, and feed them a specially

prepared diet which included increased vitamin and mineral content, I would have a small army of unbeatable men within six months. They would be men who would fight with rocks and their bare fists if they lost their weapons."

It is a challenging idea—that by better diet control we can build men up physically until they become relatively fear-proof. But if there is substance to it, then it becomes not too wild a dream to expect that a "fear pill" may give a soldier increased mobility in the future—something which while not wholly eliminating fear, will slow down its wearing effect on the muscles.

The Load of War

As with any other problem in war, it is easier to state the factors than to outline the general means of correction. But at least several primary steps are indicated.

For one, it is necessary for the modern army to break away from the stubborn idea, dating from the Medes and the Persians, that what a soldier can carry on a hard road march during training is a fair measure of the load that he can manage efficiently when under fire. It simply isn't so. Once the fighting begins, we are dealing with a different man.

For another, it is necessary that we clear our thinking about what extra weight on the average man's back does to the forces of the battlefield. Von Moltke, that generous fellow who put 200 rounds of ammunitions aboard the soldier, once remarked that "An army which marches light will manœuvre freely." It is a thought worthy of a schoolboy. While true enough, it is still nowhere near enough. If extra weight on the man had only the effect of hampering freedom of movement, we could afford it.

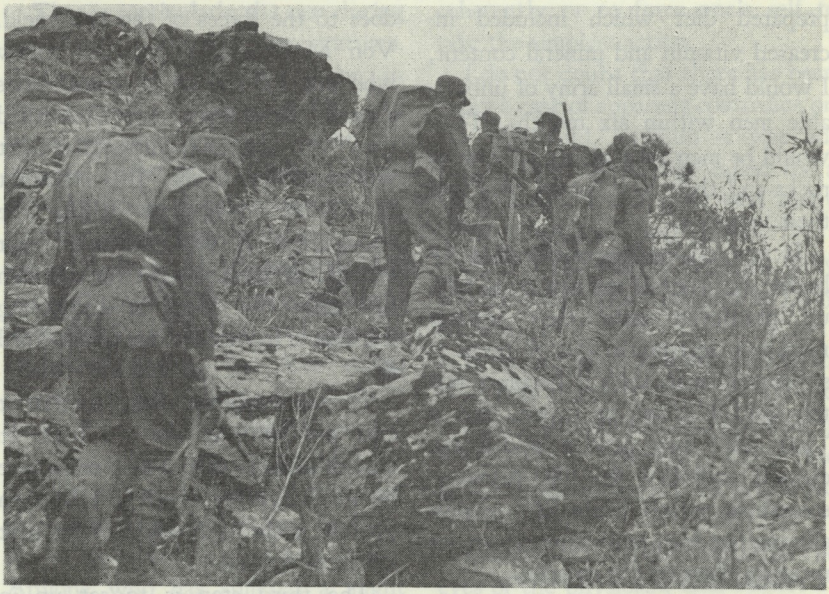
Its real curse on tactics is that it kills fire right at the fire base. It wastes soldiers who might otherwise be good fighting men. It kills men because it cheats the man of his best means of defence.

The third step is to set up in peacetime a system of absolute control which will make it impossible for any staff, once the firing begins, to override common sense simply because it has overstrained its imagination.

That means training for weight-carrying, but arming for fleetness of foot.

It means having the courage to believe that the soldier with only five clips in his pocket but spring in his gait is tenfold stronger than the man who is foundered under the weight of ammunition he will never use.

It means schooling the soldier until he believes that a toughened back and strong legs will give him his



Men of the Royal 22e Régiment climb over the rugged top of a Korean hill

main chance for survival, but at the same time schooling the command and staff to treat those firm muscles as the Army's most precious combat assets.

There may be an objection that this is easy to say but hard to do. The tremendous increase in the weight of material carried by the soldier over any earlier period is a much marked aspect of warfare today. So why speak of lightening the burden of the soldier when the tonnage figures rise higher even while you look at them?

The answer is that this has relatively little to do with the problem. We need only take one look at the over-all figures to make it immediately clear that the combat soldier can carry only a few of the things he needs to sustain him day after day. Actually the over-all increase in the weight of war has less to do with the overburdening of the combat soldier than a general indifference toward his problem and the failure to afford him additional relief.

The records of the Makin operation, a part of the expedition into the Gilbert Islands in November 1943, have at least one unique entry. So far as I know, it was the only operation

by American forces in World War II which was weighed out to the last pound, and is therefore the only source of a basic logistical figure for one man in combat.

Everything which was carried on the APAs for the immediate use of the battalion landing teams, as well as the combat tonnage in the auxiliary craft, the replacement items and thirty days of maintenance for all services, was tabulated and computed. The total figures were then divided by the number of effectives.

The first set of figures covered matériel aboard the ships carrying the landing teams. It included individual and organizational equipment, organic weapons and vehicles, five units of fire for all weapons, C and R rations for twelve days, medical supplies for ten days, seven days of gasoline per vehicle on board, and five gallons of water for each man.

When this cargo, all of which was needed to get the BLTs into combat on a reasonable minimum basis, was weighed out, it averaged *523 pounds per man.*

On the supply ships were B rations for twenty-four days, five gallons of water per man, thirty days of medical, engineering, quartermaster and signal supply, fifteen days of gasoline per vehicle in the BLTs and thirty days of fuel supply for the LVTs, bulldozers and tractors. When this was added to the base load and averaged, the figure became *1,850 pounds per man.*

The expedition was a little light on alligators and had only a few DUKWs. But its strength in armour was greater than that which normally supports an infantry regiment—one battalion had been added. When these weights—the tanks and amphibian craft—were added to the earlier totals and averaged, the expedition weighed *1,921.99 pounds per man.*

Roughly, then, we can say that it takes one ton of material to see one man through a thirty-day campaign. That is considerably less than the usual offhand estimate. But it is still such a weighty package that it is evident that what a man is required to carry into battle is not regulated by the necessity of relieving other types of carriers. Jeeps, weasels and alligators are landing right with him, ready to do the heavy work.

The fighting man could not even leave the boat or cross the line of departure if he had to carry everything needed to sustain him for one day of fighting.

It is this distinction which makes all of the difference between the problem of the modern army and that of the Roman legion, or for that matter, of the army that fought at San Juan Hill.

In our times, armies have mastered the problem of developing transport which directly feeds the line of fire. There are instances without number

from World War II of jeeps carrying ammunition to men who were under fire at ranges of less than 200 yards, and of weasels and half-tracks carrying supplies up to the OPL.

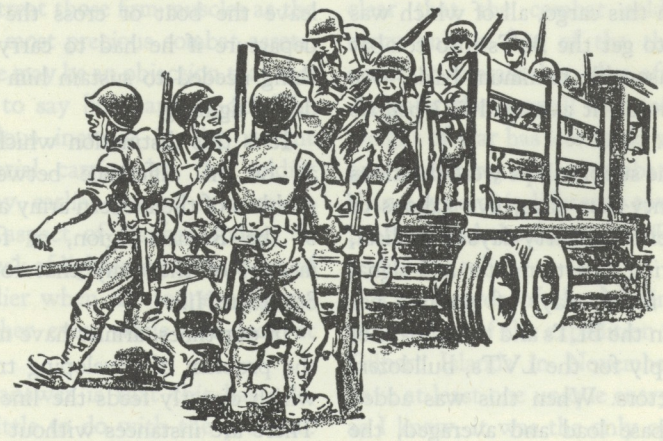
Probably in the future we will bring forth an even better jeep, with stronger traction and a lower silhouette. We will also improve the design of our amphibian craft, so that they are sturdier, more fire resistant and possessed of better road qualities.

But it is less important that we make technical improvements in our combat vehicles than that we commit them to the primary task of putting better legs under the soldier.

The Rule of Safety

In *War as I knew It*, Gen. George S. Patton, Jr., wrote: "No soldier should be compelled to walk until he actually enters battle. [From that point forward he should] carry nothing but what he wears, his ammunition, his rations and his toilet articles. [When the battle is concluded] he should get new uniforms, new everything."

These are perfectly practical rules. The only amendment that might strengthen them would be to add that rations and ammunitions should be specified only in the amounts which reason and experienced tell us the soldier is likely to expend in one day. Beyond that, everything should be committed to first line transport. This includes entrenching tools since twenty heavy and sharp-edge spades will give better protection any day to an entire company than 200 of the play shovels carried by soldiers. If we are dealing with mountains operation or any special situation where first line transport will have difficulty getting through, it is wiser to assign part of



the troops temporarily to special duty as bearers and carriers, excusing them from fire responsibilities.

If we are ever to have a wholly mobile army—mobile afoot as well as when motorized on the road—the fighting soldier should be expected to carry only the minimum of weapons and supplies which will give him personal protection and enable him to advance against the enemy *in the immediate situation.* He should not be loaded for tomorrow or the day after. He should not be "given an axe in case he may have to break down a door."

It is better to take the chance that soldiers will sleep cold for a night or two than to risk that they will become exhausted in battle from carrying too heavy a blanket load.

It is wiser to teach them to conserve food, how to live off the countryside, and the importance of equalizing the use of captured enemy stores than it is to take the chance of encumbering them with an overload of rations.

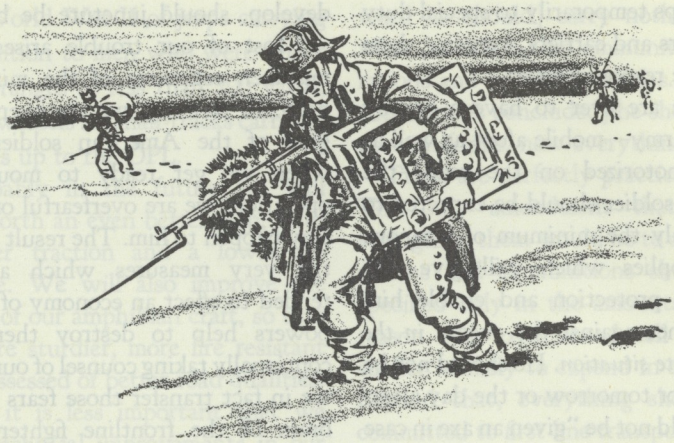
It is sounder to teach them to worry less about personal hygiene and appearance during the hours in which they are fighting for their lives than to weigh them down with extra changes of clothing. It is more prudent to keep them light and thereby assist them to maintain juncture than to overload them with munitions and weapons in anticipation of the dire situations which might develop, should juncture be broken.

Most of our trouble arises from mistaken estimates of the minimum need. In training, we are over-indulgent of the American soldier, and when we get ready to mount an operation, we are overfearful of what may happen to him. The result is that the very measures which are intended to effect an economy of men's powers help to destroy them. By continually taking counsel of our fears, we in fact transfer those fears to the brain of the frontline fighter with every unnecessary pound which we load on his back.

Since in any great war of the future we will have to travel faster and farther than we have ever gone before, it is a good question whether the standard of individual mobility set by our troops during World War II will suffice, if we are to be victorious.

The possibilities of the kind of competition we may meet were outlined by Lieut. Gen. Sir Giffard Martel, who was chief of the British Military Mission to Russia during the most critical period of the late war.

He wrote: "The rank and file [of the Red Army] were magnificent from a physical point of view. Much of the equipment which we carry on vehicles accompanying the infantry are carried on the man's back in Russia. The Russians seem capable of carrying these great loads. They are exceptionally tough.



"Many of them arrived on September 6 and slept on the ground. It was bitterly cold and a little snow had fallen. The men had no blankets. But when we saw them on September 7 they were getting up and shaking themselves and seemed in good heart. Not a word was said about the cold. Two meals a day seemed to suffice for these troops."

This was the discipline to which Russian soldiers were being submitted *during a training manoeuvre.*

Of Human Nature

The average staff solution for the problem is to play it safe and load the soldier with everything he could possibly need.

When you ask a high commander why we haven't found a better way, the only answer you commonly hear is that no real harm is done because, when the battle crisis comes, the soldier will use his common sense and discard those items he doesn't immediately need.

I hold that this idea is fallacious and as a basis for staff procedure it can be shown that it is directly counter to the interests of the Army.

The absence of reasonable and resolute standards, established during time of peace, means that our untried troops will have to start every war and every operation overloaded with unnecessary items of gear. They will pay an unnecessary price while they learn through trial-and-error what it takes to survive on the field of combat.

Even in peace, it is the unremitting obligation of the Army to look toward the possibility of war; in so doing, no goal can be more worthy than to strive to give the combat soldier the finest starting chance.

There may be room for difference of opinion about strategy but there

should be none about what should be loaded on a soldier's back. It should not be necessary to profit from the mistakes of a North Africa landing in order to do a little better when going into Sicily. A first battle well conducted, of which it can be observed that the lives of men were given every sensible safeguard consistent with the tactical problem, is the certain threshold to continuing fortune. But neither a first nor a last battle will be well conducted if its fundamental planning is based upon a false evaluation of the human element.

Surely that consideration is uppermost, or should be so, in our whole effort to mould character by means of military training. The more we pound the ideal of duty into men, the less becomes the chance that they will turn intensely practical the moment that danger threatens. This is particularly true of the *first* battle and of the earnest young soldier who has learned the rules but not the ways of an army, and who has visions of being stood before a court if he throws away his pup tent pins. The abandonment of his equipment, or any part thereof, under the pressure of fear must seem to him a flight from duty. For the time being, it is more likely to be the final step in his demoralization than the initial step toward his moral recovery.

Above all, battle is a test of manhood. When the mind becomes flooded with a fatal doubt of one's ability to do man's work, the doors are opened wide to personal failure. Disregard of this rather elementary fact was the cause of many of our combat fatigue cases.

The veteran soldier, on the other hand, becomes a realist after one of two baths of fire. He learns what isn't needed and he is no longer afraid to throw it away. He becomes willing to forage after, and carry along, those items of supply and fighting gear which are not provided by the tables, but which battle has proved to be highly useful to the unit's welfare and his personal progress.

It didn't take the majority of troops more than twenty-four hours after landing on Normandy to overrule the high command's ideas of the need for gas protective equipment. It didn't take the average man long to discover that the issue trench knife had less practical value than a common sheathe knife. The average young officer quickly learned that it was smart to throw away the abominable issue musette bag and substitute the easier riding light pack. In the school of combat operations, the first great lesson is that the primary duty is to keep going and that one's conduct and conscience must be squared by this rule.

But there are definite limits to the realism even of the combat veteran.

Being human, he is by nature acquisitive. He hoards his possessions and he is most loath to throw away anything which he personally prizes, whether it be a weapon for which he has a sentimental fondness (such as a Luger pistol or Samurai sword) or an undersize sweater knitted by loving hands at home.

Looting is a word not unknown in our Army. Though we still observe an official silence toward it, it is a tactical fact with which to reckon. Some commanders during World War II tended to systematize it, rather than ignore it, and so made it an incentive to troops.

There may be good moral grounds for doubting that it is possible thus to convert vice into virtue. But scruples aside, one had only to watch some of our regiments on the march to realize that if we are going to keep soldiers light on their feet in the future, we will have a hard choice to make. Either we will have to take absolute measures against looting, or else supply the Army with a moving conveyor belt which will carry this junk to the rear and post it on its way to the hallowed hearth of the American home.

Otherwise, what is likely to happen is best illustrated by the classic tale of Sergeant Bourgoyne, a member of Napoleon's army at Moscow.

When the army quit Moscow on October 19, 1912, Bourgoyne hefted his pack and decided that it was too heavy. So he examined its contents to see what he could discard. According to his *Memoirs*, he found "some pounds of sugar, some rice, some biscuits, a partly full bottle of liquor, a woman's Chinese dress embroidered in gold and silver, a bit of the cross of Ivan the Great, my own uniform, a woman's large riding cloak hazel-colored and lined with green velvet, two silver pictures in relief, one representing the judgment of Paris on Mount Ida and the other showing Neptune on a chariot, several lockets, and a Russian prince's spittoon set with brilliants."

But having found the pack too heavy, Bourgoyne could not get out of his mind the visions of the lovely women in Paris who might be seduced by some of these objects. So he did not lighten the pack. He went on his way for another month carrying his treasures. Then at the Battle of Krasnoe he lost everything, including his sixteen rounds of ammunition which he had been unable to fire because the weight of the prince's jewelled spittoon, and the other loot, had made him less than half a man.

There is something of Bourgoyne in the spirit of every soldier. Maybe some of us have less appetite for plunder. But in most of us there is the same reluctance to eschew pride of possession in the face of danger. We are rarely willing to strip down

to the minumum military and personal essentials—which we must do if we are to fight and survive.

Under conditions of far greater stress, Maj. Robert K. Whiteley, Medical Corps, noted this trait in human nature as he witnessed the organization of the "Death March" from Mariveles to Camp O'Donnell in the Philippines on April 10, 1942.

There was virtually no leadership in the camp and each man had to think things out for himself. Most of the men were extremely weak from malaria and dysentery. They were told at the start that the march would be about 120 miles, and they were warned that those who fell out would be killed on the spot.

Said Whiteley: "I was surprised at the inability of average men to weigh the relative importance of things and discard every object which meant increased danger. Many started out carrying extra blankets, shirts, drawers and extra shoes. Some carried sewing kits, mirrors, framed pictures, clocks, flashlights, and cameras. These weights put many of them in the ditch. They paid for the mistake with their lives." They were not the first soldiers to do this; nor, I fear, will they be the last.

In war, every march toward the enemy has essentially the same nature as the event witnessed by Whiteley, and every advance toward the enemy engages the same possible forfeit. The main chance for life and for successful action comes when that simple fact is recognized by the soldier and his superiors.

Toward Solution

After studying this problem until it had digested nearly everything that history had to say about it, the British Commission which wrote

The Load Carried by the Soldier, finally tossed in the sponge and failed to make any specific recommendations. It concluded with these words: "Everyone agrees that equipment must be lightened. But when it comes to saying what equipment can be dispensed with, there is endless variety of opinion. Aye, there's the rub."

I simply dissent from any such fatal finding as this because I am convinced that the solution is already pointed up in the eminently practical terms of the battlefield. Let us by all means get at "the rub". There are several fundamental factors that argue for the elimination of excess equipment.

Point No. 1: There are the studies made by the Germans, British and others showing that the optimum marching load for the average man is not more than one-third of body weight.

Point No. 2: There are the proofs offered in this study (in which I feel the majority of combat men will concur) that men always experience a loss of muscular strength when moving against fire, and that they will therefore suffer a serious and unnecessary tactical impairment unless they go into battle packing less weight than they were conditioned to march with in training. If there is any lingering doubt that this loss of muscular strength is actual and acute let us think once more of your own combat experience; how much less exhausting it was to march away from the front than toward it, though there was no difference in the load!

Point No. 3: We have seen that we invariably carry more food, more munitions, more everything into combat than there is any reason to believe we will use.

These three points suggest a formula which is well within our reach, and without engaging in elaborate research on how to lighten the various items of issue.

We can get at it this way: According to the Quartermaster Corps, the average American soldier is 5 feet 8.3 inches tall, and weighs 153.6 pounds. This means that at one-third of body weight, his optimum load for marching during the training period (including the clothing he wears) is slightly more than fifty-one pounds.

If that load were increased to fifty-five pounds during training marches, he probably wouldn't be hurt. But on the other hand, it would contribute nothing toward toughening him physically. Furthermore, it is possible to keep within fifty-one pounds and still permit him to carry his combat essentials as well as two blankets and a raincoat. So there is no material justification for raising

the load above that level during training.

But it is still necessary to work toward a lighter requirement for combat. Therefore, I have arbitrarily decided that the maximum combat load for the individual should never be more than *four-fifths of the optimum training load.* This eighty per cent figure has not been proved by any scientific fatigue tests; such tests would prove nothing because they could not simulate the conditions of combat. I grant that there are many men who would be able to carry more than that. Also, it would undoubtedly turn out that as men became experienced in combat and less susceptible to its nerve-shattering effects, they would become better conditioned to the carrying of heavier weights when it was required by a field emergency.

I arrived at the eighty per cent formula because it is within the area of the practical, and equally, because I feel strongly that the establishment of a maximum weight limit rule for combat and the steady adherence to it is far more important than any scientific debate about a few pounds more or less.

The optimum figure indicated for the working combat load is therefore forty to forty-one pounds per individual. We can do it, as is shown by the following table of weights. Though we had many variations of combat dress in World War II, according to the climate, the present field uniform strikes a good general average insofar as weight is concerned.

WEIGHT OF CLOTHING

Undershirt, drawers, socks	.62
Shirt, flannel	1.13
Trousers, wool	1.69
Jacket, wool	3.02
Cap, field	.25
Boots, combat	4.13
Belt, waist	.19
Total for the field uniform	11.03
Belt, cartridge 2/48 Rds M-1 ammunition	2.29
Canteen w/cover and cup, filled	2.69
First-aid packet	.40
Helmet w/liner	2.82
Rifle M-1 w/o bayonet, w/sling	10.30
Two (2) Grenades (Fragmentation)	2.62
Light pack w/one (1) K Ration and mess gear	7.79
Includes:	
Haversack and carrier	2.46
Toilet articles	.92
Change of underwear	.43
Two (2) pairs of socks	.38
One (1) K Ration	2.31
Mess gear	1.29
Total, field uniform and battle equipment	39.94

On that figure, I am prepared to stand. One blanket, woollen, OD, would add another four pounds; one raincoat, another three pounds. During initial combat in hot weather, it is better to take a chance without them than to put that much extra weight on men just as they are about to undergo fire for the first time.

I will recognize that the suggested changes are much easier said than accomplished. To say what the soldier should carry in battle to be able to fight and to remain mobile is

the work of but a few minutes. But to weigh what has to be done by the Army to make possible such a reform requires consideration of almost every aspect of the Army's policy, including its training doctrine, its procurement program and its budget.

Certainly the reform could not be accomplished without a considerable increase in organic motor transport within the tactical unit. And though as a nation we have become motorized to the point where we have almost forgotten how to use our legs for walking, we have frequently deprived the Army of needed vehicles. And even when the door was wide open, the Army sometimes shorted itself. In the European Theatre during World War II, there was hardly enough motor transport to go around. Sometimes, to remain mobile we had to imitate Galliéni, and commandeer French taxi-cabs. When any great emergency threatened, as during the Ardennes operation, the rear area communications system had to be drained of every available truck in order to get our front-line elements moved to the decisive area in time. We were as short of a motor power reserve as we were of an infantry reserve.

But while there may be a ceiling on our ability to provide more motorization, we should remember that an increase of organic transportation does not mean, necessarily, an over-all increase for the general Army establishment. We can get greater work out of smaller forces when all men who fight are administered on a basis of absolute logistical efficiency. I repeat that 5,000 resolute and physically conditioned men will hit twice as hard and therefore travel twice as far when they are sent into battle with a reasonable working load as 15,000 men, the majority of whom have been whipped before crossing the starting line by the weight they are carrying. It is necessary to believe that absolutely. We cannot afford any more spectacles like Omaha Beachhead where we prevailed only because of the superhuman valor of a relatively few men.

Whenever great masses of troops become demoralized, it is twice as difficult for the bravest among the brave to become self-starters. We should not have to depend on the mathematical possibility that a few extra hardy individuals will always be present, and will enable us to avoid tactical stagnation. To do so is to ask too much of the law of averages.

The Meaning of Mobility

In closing I would say that we need mobility most of all on the battlefield. Swift and agile movement, rapidity and assurance of thought are the true essentials.

To get it, we must encourage every means of producing stronger

and more accurate fire. Fire is the stuff that wins and there is no substitute for it.

We will not have swift and agile movement, rapidity and assurance of thought—nor even stronger and accurate fire—as long as we cling to the superstition that under danger men can be expected to have more than their normal powers, and that they will outdo their best efforts simply because their lives are at stake. This form of ignorance leads only to needless brutality to our own combat troops—the men we can least afford to hurt.

To attain the desired end each of us should recall to our minds the American soldier as we have seen him at his best on the battlefield: on the fields of Brittany in the heat of summer, his sleeves rolled to the elbow, his shirt front open and his collar rolled in, responding to the primitive urge to strip to the limit because there is a fight ahead; on the atolls of the Pacific, frequently bare to the waist and with his duty belt almost empty, although the enemy was only a hundred or so yards away; in the Argonne Forest, thirty years ago, throwing his pack and overcoat away despite the wintry cold, because the order was to go forward and he had learned to travel light.

Our Army was not assured mobility by the development of mechanization and motorization, though many of us mistakenly think so when we point to such achievements in the last war as the campaign of Western Germany where we put full armies over 600 miles of road in thirty days.

That was phenomenal campaign, and I would not minimize it by pointing out that battles are not won on the road unless one is fighting an unequal opponent. Imperfect though

An infantryman with The Royal Canadian Regiment takes shelter under his poncho while serving in the front lines in Korea. The weather doesn't appear to have dampened his spirits: he still has a smile for the Canadian Army's Public Relations' cameraman.

it was in some particulars, the Army of the United States in World War II was still the most skillfully fashioned military mechanism of all time; it was more than good enough to merit the continuing confidence of our people. It demonstrated a degree of strategic mobility never before known in military forces. It mastered the mechanics of its trade.

But the significance of the achievement should not be exaggerated. We must learn to do as well with men as we have with machines. Up to the zone where men come under fire, ninety per cent of the problem of movement can be solved with the horsepower of our machines. From that line forward, ninety per cent of success depends on will power. The development of tactical mobility is almost wholly in the realm of the human spirit, since battle remains the freest of all free enterprises. Inwardly the fighting man has not greatly changed since the time of the Greeks

and Romans. Whether he moves forward or hesitates in the moment when his life is at stake is almost wholly dependent on how well he has been led. Superior movement on the battlefield is the result of good leadership. The ability to command the loyalties of your men, to learn to think rapidly and resolutely in their behalf while teaching them to do likewise, and to strive always to avoid wasting their force and energy so that it may be applied in strength at the vital time and place—that is leadership of the highest possible calibre.

It is difficult for us to nourish this ancient truth while living in a machine civilization. It becomes very easy for us to play with the idea that we can build superior military power out of superlatively good industrial power.

But if we continue to slight the importance of the human element, that becomes no more possible than it was in the days of the handloom and spinning wheel. The real stuff of fighting mobility is not to be found in the troop carrier, the airplane and the tank. It remains where it has ever been—in the heart, muscle and brain of the average soldier.

The most perfect tank, airplane or self-propelled gun ever built has no mobile characteristics or offensive power on the battlefield until it comes under the control of a willing man. And willing men do not arise automatically simply because a nation has learned how to produce more efficient machinery.

The best brains of our scientists and engineers cannot alter these simple facts. Our production lines can turn out matériel until hell won't have it, and we still will not have solved the age-old mystery. Mobility in war will remain in man, in his fundamental loyalty, in the vision and intelligence which enable him to see opportunity and in the sense of duty which compels him to grasp it quickly and efficiently.

In the first great battle of the modern age of mobility—Cambrai in 1917—the British missed their cast for a great victory largely because of the overloading of the soldier.

When the order came to advance, the British tanks churned forward and cracked the German position. The infantry followed. But after four or five miles, the men collapsed from utter exhaustion, and the gap between infantry and armour could not be closed in time to keep the enemy from reorganizing.

The last great battle of the age can be lost in the same way unless there is due regard for the lesson.

(Concluded)

THE STEAM SLINGSHOT

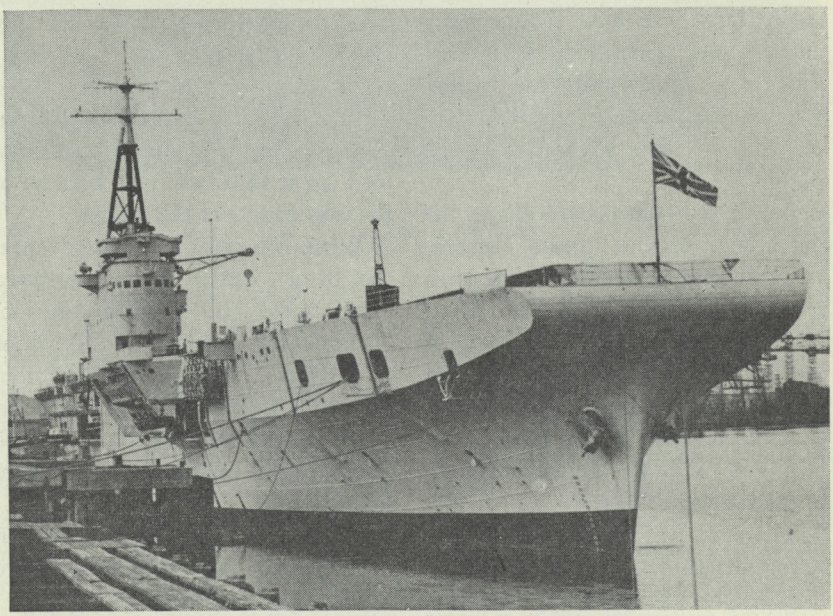
ARTICLE AND PHOTOGRAPH REPRODUCED BY COURTESY OF THE CROWSNEST,
PUBLISHED BY THE DIRECTOR OF NAVAL INFORMATION,
NAVAL HEADQUARTERS, OTTAWA

A new British aircraft catapult which is regarded as one of the most important developments for naval aviation since the Second World War will be adapted for use on U.S. aircraft carriers.

Nicknamed the "steam slingshot", the steam powered catapult proved in recent tests that it can hurl the U.S. Navy's jet fighters into the air even when the carrier is headed down wind or alongside a dock.

Tests of the catapult installed in the Royal Navy carrier, HMS Perseus, were conducted at the U.S. Naval Shipyard, Philadelphia, the Naval Operating Base, Norfolk, and at sea during 1952.

First installation will be made on board the USS Hancock, an Essex



This photo of HMS Perseus shows the forward part of the raised flight deck which was built to meet the requirements of the revolutionary steam-operated aircraft catapult.

class carrier which is undergoing a complete modernization.

In adapting this experimental catapult for its own aircraft carriers, the USN will modify it as necessary for manufacture in the United States.

As installed for trials purposes in the Perseus, the catapult lies in a raised section of the flight deck, with compressors and other machinery on the hangar deck. Developed for the Royal Navy by Messrs. Brown Brothers & Co., Ltd., Edinburgh, the catapult uses the principle of the slotted cylinder, and has no rams or purchase cables. A hook on the aircraft to be launched is connected directly to a piston which is driven along the cylinder by high pressure steam from the ship's boilers. A novel sealing device is used to keep the slotted cylinder steam tight.

While the amount of steam required for sustained operation is large, the tests have shown that the boilers can meet the demand without interfering with ship operations.

During the American tests, the USS Greene, a destroyer, supplied steam to the catapult at pressures higher than were available in HMS Perseus to see if the capacity of the catapult could be increased. It was found readily adaptable to the higher pressures.

In all, 140 test launchings were made using deadweights and the latest type carrier aircraft. Previously the British had fired 126 piloted aircraft and 1,000 deadweights over a 14-month period.

Don't Pass Port to Starboard

Editor,
Canadian Army Journal.

I was surprised to read in your May 1952 issue that the author of the article "Gentlemen—The Queen!" believes that the "usual procedure" at mess dinners "is to have the wine passed around the table to the right". It is distinctly stated by Group Captain A. H. Stradling in *Customs of the Services* (Aldershot, 1948) that:

"Towards the end of dinner, one or more decanters of port are placed in front of the President; having removed the stoppers, he passes the decanters to his left, and in turn each officer, after helping himself, passes the port to the left until it eventually returns to where it started from. Not at any time, or for any purpose, may an officer pass the port to his right."

—*Retired*

LEAGUERING IN MOUNTAIN WARFARE

Captain J. C. Gorman,
Royal Australian Armoured Corps*

The Korean operations changed many desert practices, and one of the most radical changes was shown in the method of leaguering. Conditions were completely different, not only topographically, but militarily as well. In the Korean War, the enemy was relatively primitive compared to the Afrika Korps; they used practically no tanks, and, most important, there was virtually no Chinese Air Force. The line was continuous, ensuring that units could not be outflanked by a large force (unless the flanking divisions collapsed) and the primitive Chinese L of C was unable to cope with long penetrations or sustained offensives. The country being very close, tanks were valley-bound, and most vulnerable to infantry ambushes. The main enemy attacks were carried out by swarms of infantry, supported by accurate mortar fire and some artillery. Thus, out of a different set of local circumstances, the 8th Army adapted itself to meet those circumstances.

The leaguer was studied, in reserve areas, and several rehearsals carried out, and from these the new mountain leaguer was evolved. The main threat being infantry masses, the leaguer became very tight, and dispersal, to counter air attack, was not necessary. Due to the almost complete lack of cover, track discipline was important.

In action, the squadrons, all of whom operated independently, one being forward at all times, were generally busy fighting and supporting infantry attacks until darkness ended operations. The hills being alive with groups of enemy infantry, the leaguer was always as far back as possible, compatible with dawn requirements. This was about two miles in rear of the confused area, where enemy and allied infantry were somewhat mixed. Thus the leaguer was always occupied after dark. The squadron second-in-command picked the area, always dry paddy fields, and the squadron drove down to it. Tanks were guided in by the troop leaders, nose to tail, to make a complete circle, leaving an entrance, which was blocked later by the last tank. This move resulted in a solid wall of bazooka plates, with

*Reprinted from the Australian Army Journal.—Editor.

about four to five feet between tanks. The guns were laid at 9 o'clock on all tanks, giving all-round defence.

The spare men in the leaguer immediately began to dig narrow pits between the tanks. These were manned, in the event of a raid, by the drivers. It was decided that the leaguer would not in any circumstances break up and spread out, as this would enable the Chinese tank hunting parties to deal with each in turn. The only tanks to move were to be those which would endanger others, *i.e.*, on fire. The guns were loaded with HE (how useful canister would be!) and laid to strike about a hundred yards outside the leaguer. Grenades were laid on the turret roof, and the driver in his pit had a box. Bomb throwers were loaded with parachute flares, and the offensive defence was considered to be complete.

Inside the leaguer were driven generally two medical half tracks, the fitters' half track, the jeep, the two scout cars and the ARV. The tank dozer was left with the regiment, and the A1 echelon trucks drove around outside the leaguer, replenishing fuel, ammunition and food. This duty completed, all the 3-ton trucks withdrew about five or more miles. It was considered that soft-skinned POL and ammunition vehicles presented too much of a risk to be left where they could be struck by tracer bullets and possibly explode. Maintenance was carried out, the fitters working under a canvas lightproof sheet, and the crews then cooked their meal. Due to the lack of fires, this consisted of a can of C rations and tea brewed on the immersion heaters in the tanks.

At no time did a squadron leaguer forward of the local infantry. It was invariably south of the infantry, but the west, east and south flanks were frequently unprotected, and as the enemy were swarming through the hills, and small parties often three miles behind the tanks these three flanks had to be closely watched. Patrols of three or four men were sent out about 200 yards, with either a long string to the sentries, or 88 wireless sets. On the approach of the enemy, they were to give the alarm, and then come in. They wore suitable identification marks.

The alarm being given, crews mounted, switched on the master switch, wireless set, generator, and power traverse. The drivers manned their holes, and the No. 2's were provided by the men from the other vehicles. The RA OP officer was in a position to call down artillery fire. 1 Troop had the responsibility of lighting the area with flares—two or three were kept continually in the air. When 1 Troop had expended its flares, 2 Troop took over and the night became as bright as day. Tanks

switched on and off their big spotlights, which added to the glare and had a dazzling effect on the enemy. We sometimes "attacked" practice leaguers, and the patrols felt horribly naked in the blaze of light. The spotlights often caught patrols advancing, but the distinctive pop of a flare being fired gave the patrol time to get to ground before it burst. It is hopelessly difficult to shoot out a spotlight at night, as we discovered in trying to sight on them.

In April, 1951, we were attacked in such a leaguer. However, it was a fairly peaceful affair, the artillery breaking up the attack about four-hundred yards from the tanks. The Chinese had come around the west flank, and got between the tank leaguer and the infantry. The artillery cut the whole attack to ribbons that night.

When the tanks were in support in the line, things were not so well organized. For weeks at a time in the front line no enemy would be seen. The tanks spread themselves on one side of a road without cover, track discipline, protection or organization. The guns were sited to cover likely approaches, but the leaguer was always full of soft vehicles, visitors, POL dumps, ammunition dumps and similar supplies. Lights blazed most of the night, and thorough maintenance was carried out during the day. Patrols went out every day with infantry companies (usually a troop at a time) and the Liaison Officer, who walked with the company, calling down the tank fire by radio when enemy were encountered. A wired and mined belt extended across the front, the infantry holding the hills. The tight leaguer was only used when it was necessary, which was when the Chinese had broken through, and the front was fluid.

It has been written in many textbooks that a leaguer should be wired in, mines and booby traps laid, and generally made impregnable. An attempt was made to follow this principle, somewhat akin to the Pacific perimeter, but in action it was immediately discarded. Tanks carried rolls of dannert wire, but with the leaguer preparation, maintenance and feeding, issuing of orders and other necessary duties, crews were too tired to undertake engineer operations. The days in battle were long and very tiring. The defence was based on firepower.

Standard warfare training does not always apply in the other types of warfare, and frequently one must discard previous training to adapt oneself to local conditions. This means that regiments, when in reserve, must work harder than in the line, rehearsing, planning and working out new methods. Korean operations are unique in themselves, and it is unlikely that a similar operation would take place elsewhere.

Due to the necessity of making certain administrative adjustments in the publishing schedule, it has been decided to combine Numbers 5 to 9, inclusive, of Volume 6 of the Journal in this issue. Succeeding numbers will be published monthly.

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