

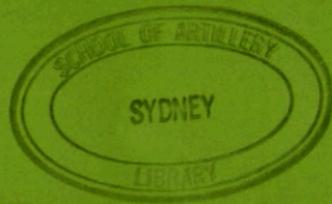
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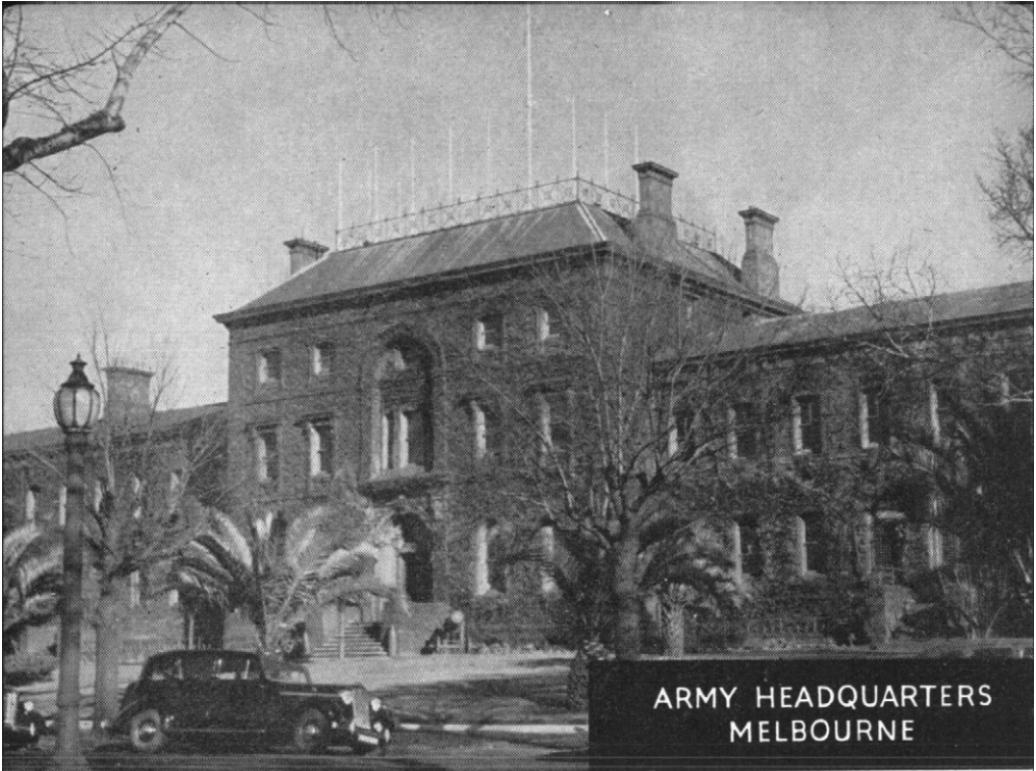
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ARMY HEADQUARTERS
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TANK-INFANTRY SUPPORT



Lieutenant J. C. Gorman, RAAC.

THE primary role of armour in mountain warfare is direct support of the infantry. This is normally done by fire alone, as the movement of armoured vehicles is most restricted by narrow roads and very steep mountain gradients.

In Korea, exercises were conducted to work out a drill to be followed when giving this support to the infantry. The final drill accepted was worked around the Tank Liaison Officer, who is carried on the establishment of every armoured squadron, and after testing the effectiveness of the procedure on several exercises with live ammunition and infantry, was used in action with great success. One of the best points of the drill is that it can apply to any United Nations infantry who are not trained along British lines, and was, in fact, used with Americans and Philipinos in action.

The Tank Liaison Officer is equipped with an 88 portable wireless set and a map. Every tank carries an 88 set, and the only preliminary arrangements that need to be made is to decide upon which channel (A, B, C, or D) to use. In

the case of the American attack, the squadron leader merely asked:

"Do you want us to support you, Colonel?"

"Sure, Major, that would be fine," he replied, and set off with the TLO to carry out the attack.

Typical wireless and verbal messages would be passed as follows. The TLO wants to get in the picture and asks the Colonel how he proposes to carry out this attack.

CO: "We are going to attack up this spur with A and C companies up, and get firm there. Then I will push B company on to take that very high peak. In the initial attack, A will be on the left, and C will be on the right."

The TLO calls up the tanks on his 88 set.

TLO: "Hello Blue 5. Two companies will attack from here to capture hill 274 (giving spot height or map reference). Brass it up now, and I will tell you when to lift. Over."

S/L: Blue 5. Wilco. All stations Blue 1 Ack" (or passes over 19 set).

The 20 Pounder HE comes down all along the ridge and on top of

the crest. Machine gun fire also comes down along the ridge.

CO: "I think you had better lift it now on to the higher hill: You can see the infantry going up now."

TLO: "Blue 5. Stop. Infantry are going in now. The next objective will be the ridge 382—continue to neutralise that. May I have a sub-unit for close support. Over."

S/L: "Blue 5. Wilco. Wait out. (Passes orders to other troops.) Blue 5, Blue 3—Blue 3 will now come under control of Blue 5. Over."

TLO: "Blue 5. Wilco. Out to you. 5 for 3—Co-ax action—continue to shoot along the crest. Can you see the leading infantry. Over."

T/L: "3 for 5. Wilco. Yes. Out."

TLO to CO: "The tanks are now lifting on the far hill, Sir, but I have one troop still keeping heads down along the crest. I can stop them in a split second, and you can go within three yards of Besa fire."

CO: "See that black rock. There is a machine gun about 10 yards to the left of it. Knock it out."

TLO: "Blue 5 for 3. Shell action. Reference top centre hill 274. Right five o'clock, 100 yds. Black rock heap. Over."

T/L: "3. Seen. Over."

TLO: "5 for 3. Rocks left 9 o'clock 10 yds—MG knock it out. Over."

T/L: "3—Wilco—out" or "3—Not seen. Over."

TLO (in latter case: "5 for 3. Co-ax action. Put a burst on left of rocks. Out.")

"5 for 3. Stop. Right 2 yards—go on. Out."

"5 for 3. Stop. Target. Shell go on. Out."

"5 for 3. Stop. Target destroyed. Reference last burst. Right 3 o'clock 15 yds. Infantry—go on."

T/L: "3 for 5 Wilco out."

TLO: "5 for 3. Lift all fire onto the other hill, Over."

TL: "Wilco. All stations 3 acknowledge, Over" and fire is lifted.

CO: "We now hold this hill. I am going to push B company forward. Stop all fire. I would like a troop to go around the back of the hill and cut off any enemy survivors."

TLO: "Hullo Blue 5. Stop. Infantry are now going into final assault. Sunray wants you to send a sub-unit around the left flank and cut off the escape route. Can you do it? Over."

S/L: "Blue 5. Wait out. All stations Blue 1 acknowledge. Over."

T/Ls: "Blue 1 Wilco out" "Blue 2 Wilco out" "Blue 3 Wilco out" "Blue 4 Wilco out."

S/L: "Blue 5. All fire stopped I will send two sub-units around immediately. Tell Sunray they will be in position in figures five. Over."

TLO: "Blue 5. Roger. Out" and to CO "All fire has now stopped, Sir. Two troops will be in position on the other side in five minutes."

The CO tells his company to push on, and the TLO, with his troop, continues to give them close support right on to the objective. If the troop sees an enemy machine gun, the troop leader will knock it out on his own accord. He will sometimes ring up to ask the TLO

to identify some infantry he sees. The latter, if not sure, asks the Colonel and they are identified.

The TLO must keep on the near side of the mountain at all times, as the smallest hill will completely cut out the 88 set. As it is very important that he also be with the Colonel, he asks the CO to also keep on the near side. Tanks going around the mountain, for example, will be out of communication with the TLO, and any messages will have to be relayed by the 19 set.

The wireless links sometimes vary. In the case cited above, 88 sets were being used all on the same channel. Thus, should the squadron leader wish to order fire anywhere, the TLO would be unable to get on the air. However, there is not a great deal of traffic passed, and this is not a serious consideration. Sometimes only the TLO, one troop leader and the squadron leader's operator will be on the 88 set, the remainder on the normal squadron 19 set. In this case, code signs will be cut to the bare minimum and just the number given for identification. Even that may be dropped when TLO and troop leader know each other's voices.

The main infantry attack should, if possible, traverse the near side of any ridge. If a platoon goes over the far side it can receive no fire support from the tanks, and crossing back may run into the tank fire along the crest. On sharp ridges, 20 Pounder HE is safe within 50 yards, and Besa can be fired within a few feet ahead of infantry with complete safety. It is dangerous to fire Besa overhead, as the beaten zone is long and narrow, and bullets are liable to drop.

UN infantry in Korea carry identification panels to identify them to Allied aircraft. These are also very useful to enable tanks to identify their own infantry.

As the tanks almost invariably occupy the floor of the valleys, and shoot up steep mountain sides, they can almost always clearly see the moving infantry through powerful "Times ten" peribinoculars. If smoke is used (which is seldom) much greater care must be taken, and shooting into the sun, with the near side of the mountain in shadow, also cuts down the tank visibility.

The 20 Pounder HE is extremely accurate at the normal operational range. The greatest difficulties are to identify men who may suddenly appear on a skyline, and to identify pin point targets on the verbal instructions given over the air by the TLO. This latter identification takes time and practice, and it helps considerably if both troop leader and TLO use the same terms for an object.

The Chinese usually surround a position and lie along the crest of a ridge, shooting down. Such is their fieldcraft training that they are most difficult to spot. Tanks liberally blast crestlines with HE and Besa as soon as any fire comes down, and, although they probably kill very few of the enemy, the tanks definitely keep the heads down until the infantry are within striking distance of the summit.

In Korea, there are no 95 mm. close support tanks with each squadron. Their inclusion, on the authorised scale of 2 per squadron, would be valuable as the direct fire 20 pounder cannot touch the reverse slopes of a ridge. Mortars usually do this task where possible.

Such is the effectiveness of the tank fire support that Allied infantry have come to expect it for every attack. Initially, the British infantry accepted 8 Hussar demonstrations with great reserve. But since the CO of the Northumberland Fusiliers (since killed in action) acting as gunner in a Centurian, hit his target with the first round, confidence has soared. All the infantry in 29 Brigade have been shown over the Centurians, have seen and taken part in exercises with live ammunition, and have since been in action

with the tanks, and a firm tank-infantry spirit has emerged. It is essential thus to gain the confidence of the infantry for otherwise, in action, they will hang back from the tank fire, and suffer casualties when the enemy emerges and the fire lifts.

This brief summary will give some idea of the need for training and co-operation of tanks and infantry, in order that they will work in battle as they are intended to do—as a smooth machine.

You are fighting to stop armed aggression and maintain peace, not only in Korea, but in your respective homelands. This renewed battle is for the preservation of life and liberty of all free men. These are fundamental in the rights of man — the rock upon which our civilization is founded — and they are the first rights which Communism denies its own people.

The time has come when all men of the free and decent world must steel their souls to face the desperate, bitter and uncompromising battle with armed Communist aggression. Our strength rests on the solid foundation of belief in God, and the rights of man, rather than on the will of dictators, imposed through cruelty and complete disregard of human rights.

—Lieutenant-General J. A. Van Fleet,
Commander, United Nations Forces in Korea.

The
NCO
and
TACTICAL THINKING



Corporal K. L. Hanrahan,

15 National Service Battalion.

LIKE Lieutenant Webb-Belt, Corporal Butt-Plate, too, appreciates the value of Appreciation. (See "Tactical Thinking," AAJ, No. 24). In this sense we need not say that he should assume the powers of a Company Commander, but it is not to be denied him to appreciate the problems which confront his platoon commander.

We have seen how Lieutenant Webb-Belt failed to make a proper appreciation of the tactical layout of a series of German posts in Libya, with the result that he was caught between a cross fire from two posts. His appreciation was based upon an intelligence report, which stated that enemy strength and position was "One HMG, which opened fire at 900 yards from map reference so-and-so."

Corporal Butt-Plate was in a worse position in Korea when his company attacked a hill one after-

noon. All he was told was that they would be carried by tanks along a road to point so-and-so; dismount on the left, form sections into line, and move straight in. No objective was given, no indication of enemy strength, position of posts, etc. No information was given as to re-organization and consolidation, provision for wounded, etc. — just "move straight in."

The attack started and Butt-Plate's section went 40 yards up a fissured hill side and was stopped by heavy rifle and LMG fire. The situation was the same for the other two sections, with the remainder of the company cut to pieces and attempting to make its way across paddy fields, which provided little cover and offered a very poor avenue of approach.

Butt-Plate made a brilliant appreciation of the situation and organized himself to protect the right flank of the platoon (being the ex-

treme right flank section), and attempted to gain fire superiority to the front. Being unsuccessful he managed to work around the right of the opposition and so regained flexibility, better cover, and a much better line of advance; thus reducing the possibility of heavy casualties.

The action was scheduled to take an hour, but resulted in a stiff fight, which lasted all afternoon and continued until midnight. Supporting fire was nil, the position having been previously strafed and rocket-bombed by aircraft for two hours in the morning.

If Lieutenant Webb-Belt had been present he, too, would have been in dire strife, because it was apparent that very little appreciation had been done on a higher level. If he had been given the necessary information he would have, I am sure, passed the relevant information to his NCO's, especially in view of the ever present possibility of his untimely demise.

As a matter of fact Corporal Butt-Plate was forever making his own appreciation, because his officers apparently were tardy of passing on information to him, which must be considered essential if Butt-Plate and his band of heroes were to survive and to function as an efficient sub-unit.

All the other Butt-Plates experienced similar conditions, and the exigencies and uncertainties of active service were a severe school for them. It can only be assumed that all were tried and most were found wanting, purely through a complete absence of training in tactical thinking.

Making appreciations can be a good game, as well as providing a means for judicious exercise of the brain. But it must be played by all even to the extent of making a NCO a temporary platoon commander for a day, giving him 39 men, plus all weapons, and sending him out to the fields to play under adequate supervision.

He must be taught (if he does not already know it) the process of tactical thinking, how to make an appreciation, to induce, deduce, sum up and apply his process of thought to any particular problem on platoon level.

This is not fantastical or illogical, but a necessity, particularly for infantry and armoured corps NCO's.

As Major-General S. H. W. C. Porter has already stated, "If an NCO has been told to charge up a hill, he has to charge up a hill — presumably someone has done his thinking for him. If the NCO is given to thinking he will still think and he will think logically if well trained."

Most patrols, such as reconnaissance and counter patrols, are carried out by a section or two under a corporal or sergeant. He is given (or supposed to be) all necessary information to make the patrol successful. He studies maps and ground, checks weapons and equipment, briefs the men and then moves off. Whether he accomplishes his mission, whether the patrol is ambushed or fails in its objective depends almost entirely on appreciation of the job in hand. The chicken crossing the road may not have done it successfully if a car had come along at the inopportune moment and converted chicken into pate de fois

gras, but the chicken was smart—she made the car a part of her appreciation.

To illustrate, take what happened to Butt-Plate one cold afternoon in Korea.

The section were having tea just before darkness set in. Butt-Plate was called to Platoon HQ and instructed to "Take about four men and do a recce out beyond that second line of ridges." The second line of ridges was about a mile away, without taking into consideration the conformation of the ground. Several villages lay along the route and these would need to be carefully searched to avoid an attack in the rear—or better to keep open the escape route.

Darkness was only half an hour off and the patrol had to be done immediately.

On his way down the hill on the first bound of the patrol, Butt-Plate was further informed that the Pioneers had laid a minefield out front only that morning. He was told how to get through the minefield. Needless to say the patrol was a complete failure. The leading man walked too close to a booby tarped mine, which was not accounted for, but which had been laid by the same Pioneers when they made the mine field, and a casualty resulted. By the time things sorted themselves out it was dark and the patrol was called off, whereupon all and sundry retired to their slit trenches for the night,

and indulged in some hard thinking, accompanied by much muffled cursing.

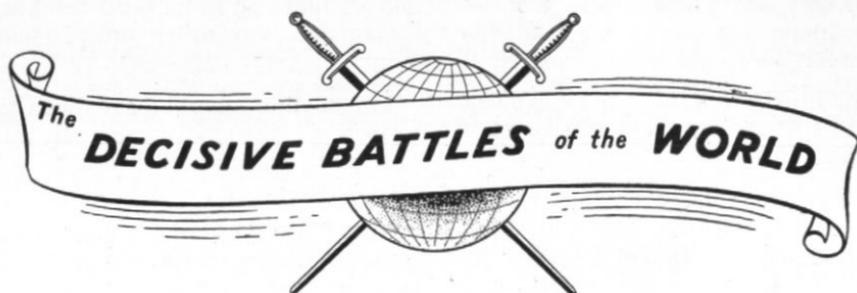
The section should have been informed of the patrol and its purposes and objectives early in the afternoon.

Butt-Plate should have been given maps to study, with all relevant notes attached, and a pair of binoculars (if necessary) to study the ground at least as far as the first ridge. He could have been left to make his own appreciation of the problem, including times of departure and arrival, receiving the pass word before moving out, lines of advance and return, the position of minefields and route(s) through them, if possible the disposition of the enemy should have been given if known (in this case unknown).

Further arrangements could have been made to have the Patrol covered as far as the first ridge (about 800 yards) by the LMG's in the Platoon.

If the patrol had commenced early in the afternoon with the information given for the actual patrol, Butt-Plate would have had at least a sporting chance to accomplish his mission because he could have made a quick appreciation as he ventured into No-Man's land.

If all Butt-Plates were trained to think tactically and logically to make their own appreciations more attacks would be successful and most patrols would be accomplished.



BATTLE OF TOURS AD-732

UNTIL the beginning of the sixth century of our era the people of Arabia had played only a very minor role in the progress of events in Europe and Asia. They were a race of nomads living a precarious existence in the Arabian Peninsula, perpetually harassed by hunger, and constantly engaged in inter-tribal warfare. There was no central government, each tribe followed its own leader and pursued its own interests.

The Arabs of the desert were proud and brave men who were accustomed to freedom. They had never bent the neck beneath the yoke of a foreign conqueror, the uncertain loyalty they gave to their tribal chieftains was more in the nature of friendly deference to a senior rather than allegiance to a ruler. Life in the great spaces of the desert encouraged equality. No man approached another with those varying degrees of regard to which closely organized societies are accustomed. Other peoples might

boast of national freedom. The freedom of the desert was a personal freedom, a freedom to go where one liked, to do what one willed, without reference to any constituted authority.

The Arabs were men of inflammable temper, quick to anger and swift to shed blood, capable of being roused to battle by an appeal to the emotions, by the impassioned recital of a poem enshrining some heroic exploit. The frugal life of the desert bred the soldier and the bandit. Periodic drought demanded self-discipline or drove to rapine and plunder. Inherited blood feuds perpetuated a lust for vengeance. Insecurity necessitated unremitting vigilance, as well as skill in the art of riding and the use of weapons. With a sense of self-esteem went a suspicion of others and intolerance of strangers. The Arabs were the products of a cruel environment, volatile men whose friendship and enmity were alike capricious.

Such were the men whom the religious teachings of Muhammad

welded into a nation and launched upon an astonishing career of intellectual achievement and military conquest, a surge of zeal and energy which came within a hair's breadth of tearing up the nascent Western Civilization by the roots.

Growth of Islam.

When Muhammad died in 632 some of the tribes on the fringe of the small theocratic state he had established around Mecca and Medina threw off their allegiance. Abu Bakr, Muhammad's successor to the temporal and spiritual leadership of Islam, quickly took the field and brought the dissidents under control. From this success his general, Khalid, passed on to the conquest of all Arabia. Within a few years the religion of Islam had been spread, at the point of the sword, throughout the Peninsula.

This early campaign had important effects on the Arab mind. In the military sphere it taught them the value of good leadership and sound organization. Spiritually it gave them a sense of unity and a passionate belief in the idea that they had been chosen by God to spread the faith of Islam throughout the world. Socially it forced them to look beyond the boundaries of Arabia to find an outlet for their energies and the increasing pressure of population, because the new religion forbade inter-tribal strife and the practice of infanticide. Intellectually it opened to their active minds an entrancing prospect of new fields of endeavour.

Early Campaigns.

At this time Arabia's two most powerful neighbours, Persia and Byzantium (Eastern Roman Em-

pire), were declining. Nevertheless either one of them should have been able to cope easily enough with the first attempts of the Arabs to extend their territory and their faith. That they failed to do so is evidence less of their own ineptitude than of the marvellous *élan* and extraordinary daring, which carried the early Arab armies to such astonishing successes.

Shortly after Muhammad's death Abu Bakr had two armies in the field, one attacking the Persians and one engaged in the invasion of Syria. After some indecisive fighting the Persians were finally overthrown at the Battle of Nevehend. In Syria an Arab army of 43,000 men, under Khalid, encountered an army of 80,000 organized on the later Roman model, which had been sent by the Emperor Heraclius to raise the siege of Damascus. Although this was by far the most formidable army yet encountered by the Arabs, they cut it to pieces at the battle of Yermak in 636.

During the next fourteen years the Moslems gradually extended their authority to the shores of the Caspian Sea. They penetrated along the Tigris and the Persian Gulf, and in the next century their power and religion reached to the Indus. A Moslem army even appeared on the Ganges. So great was their fame that even the Emperor of China made overtures to establish peace with these warlike men, lest his kingdom might be threatened.

Concurrently with their conquests in the east, the Arabs had moved towards the west. In 638 their general, Amru, moved against Egypt with a scant 4,000 men. Gathering



recruits on the way, and moving with great rapidity, Amru cooped up the Greco-Roman garrison in Alexandria. After the siege of fourteen months, the city, and with it all Egypt, fell into his hands.

The conquest of Africa west of Egypt took the Arabs from 647 until 709, when the authority of the Caliph was finally and firmly established by his general, Musa, from the Nile to the Atlantic.

Two years later the Saracens, the name given by Europeans to the Moslem invaders, crossed the Strait of Gibraltar and began the conquest of Spain. It was a long and arduous campaign, which ended with the Saracens in possession of the whole Peninsula, with the exception of a narrow strip of country on the north coast and the western end of the Pyrenees.

The major islands of the Mediterranean—Cyprus, Crete, Sicily and Sardinia—also gave allegiance to the Caliph of Islam.

The Armies of Islam.

In the beginning the Saracens were usually heavily outnumbered, their early successes were due mainly to their wonderful morale and incomparable dash. Later, through wholesale conversions to Islam, they usually exceeded the numbers of their opponents.

But that is only half the story of their success. They were well disciplined and used to hardship. They were led by able men, quick to learn from their opponents and to profit by their mistakes. Their enemies were usually good individual fighters — everyone had to be in those turbulent days — but they were not able to stand the

hardship that was the daily portion of the Arab, nor were they united by the ties of a common cause. Islam was a unity imbued with a religious zeal which made death in battle a thing to be sought in the certain faith that it opened the gate to Paradise.

The Arabs had no period of military training other than battle itself. They were born to the sword, and fought as soon as they could wield one. There were no age limits in either direction, greybeards rode beside striplings. They had no hereditary officer corps. Merit was the only key to promotion.

From first to last the Saracen armies consisted principally of cavalry. However, in their European campaigns they felt the need for a firm base to form a pivot of manoeuvre and a rallying point for their striking troops. They provided for this need by organizing a body of heavy infantry, recruited from mercenaries, to form the centre of their line. This body absorbed the shock of the attack, while the cavalry on the wings operated against the enemy's flanks and rear.

Although they disliked fighting on foot, the Saracens could when necessary undertake siege warfare with skill and vigour. When they encountered the sea these men of the desert took to it without hesitation, and built war fleets which defeated those manned by people who had been sailors for centuries.

The Saracen armies usually lived on the country, though foraging was always well organized. The simplicity of their needs enabled them to move rapidly through areas where other armies were impeded by supply trains.

When a country was conquered it was usually given, as a province, to the general who had subdued it. He was responsible for order and good government, and for the provision of supplies and munitions for the first bound of the next advance. He was in absolute command, appointed his own subordinates and removed them at will. All that the Caliph asked for were results.

The Saracens used the weapons customary in that age—the lance, sword, javelin, bow and dagger. One type of sword was heavier at the point than at the base and was designed to deliver a crushing blow. The other, used for in-fighting, was a slender curved weapon, puny in appearance, but very terrible in the hands of an expert. For defence, they wore helmets and chain mail, but they seldom carried shields. They went into battle seeking death rather than avoiding it, and won their way to victory by agility and aggressiveness.

Although the Saracen armies had no organized system of medical evacuation, their general's were alive to the necessity of maintaining the health of their troops. They knew the value of proper diet and the influence of climate on fighting efficiency, and they practiced fumigation and segregation when dealing with contagious diseases. They had some knowledge of the treatment of wounds, and practiced surgery to a limited extent.

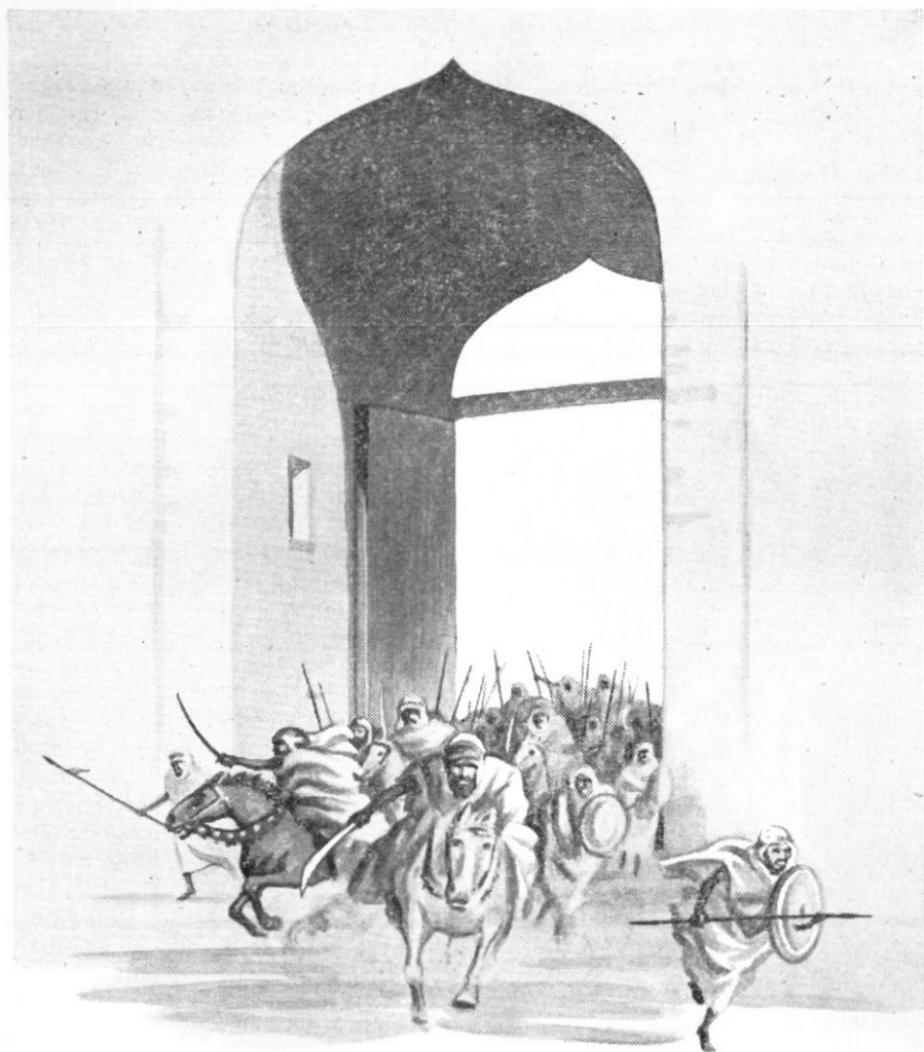
The flexibility of the Saracen armies gave them a great advantage over the cumbersome armies of their adversaries. They were nearly always at the place they were least expected to be. They were able to choose the time and place at which to fight, almost invariably with a

view to taking maximum advantage of their special characteristic — mounted attack.

Unlike the Huns, the Arabs were not a horde of ignorant barbarians spreading frightful devastation in the wake of their armies, killing and burning for the sheer joy of destruction. Plunder they did, and they were terrible in the heat of battle. They were civilized beings, who fought to extend the Moslem concept of life and the laws of Islam throughout the world. They seldom destroyed wantonly. Behind their armies the organs of stable government were promptly established. At the height of their power they were far ahead of Europe in science, art, architecture, mathematics, and general culture. Their university, at Cordova, in Spain, was a great seat of learning which attracted students from all parts of Europe. Baghdad was the centre of culture and knowledge of the eastern world. But their culture and their civilization were different from the concept slowly taking shape in western Europe. Which of those concepts would prevail in Europe was the issue that trembled in the balance when the Saracens crossed the Pyrenees in the year A.D. 732.

State of the West.

Although three centuries had passed since the German conquerors of Rome had crossed the Rhine, no settled system of institutions or government, no amalgamation of the various peoples into one nation, no uniformity of language or habits, had been established in western Europe. Gaul was not yet France. In that, as in other provinces of the Roman Empire of the West, the dominion of the Caesars had been shattered, and barbaric kingdoms



and principalities had arisen on the ruins of the Roman power. But few of them had any permanency, and none of them had consolidated the rest, or any considerable number of the rest, into one coherent and organized civil and political society.

Although their conversion to Christianity and the civilizing influence of Rome operated powerfully

upon the Germanic invaders, and although the Franks (who were originally a confederation of Teutonic tribes) established a decisive superiority over the other conquerors of the province of Gaul, the country now known as France, long remained a chaos of uncombined and shifting elements. The early princes of the Merovingian dynasty were generally engaged in wars

against each other, occasioned by the frequent subdivisions of the Frank monarchy. In addition, the ablest of them found their energies taxed to the utmost to defend the barrier of the Rhine against waves of pagan Germans who continually sought to cross the river and gather their share of the spoils of the Empire.

Rome, and the people of Italy, were fully extended, striving to defend their own territory against the Saracens.

In France there were no standing armies and few regular soldiers. Princes and feudal lords raised forces from the peasantry, as they were required. These forces were usually raised for a specific purpose or for a strictly limited time, at the conclusion of which they could not be kept in being. The peasants could not be kept under arms for long periods as the necessity for winning their subsistence from the soil soon forced them to disperse to their homes to attend to their crops.

The main body of Frankish armies consisted of infantry, principally pikemen and bowmen. Only the well-to-do could afford horses or armour. Consequently the cavalry, although well equipped, was not numerous.

The officers were invariably drawn from the ranks of the well-to-do families, whether they had any aptitude for war or not. There was no settled policy for training either officers or men, no staff system, no supply organization, and no one to care for the sick and wounded.

Nevertheless, some of the Frankish armies could, and did, reach a fair degree of efficiency, particularly when operating on a small scale. Sufficient capable leaders and men accustomed to using their weapons could usually be found for a small army for a limited time. The difficulty was to find sufficient for a large army and to hold them together long enough to accomplish anything worth while.

Most people lived in the little world of their own district; what happened beyond was no concern of theirs. Thus the early raids of the Saracens across the Pyrenees meant nothing at all to the people further north. Few of them realized that these raids were reconnaissance parties seeking information on which to base an invasion in force. And even if they had foreseen it, it is most unlikely that they would have grasped the importance of making a supreme and sustained effort to combine to defend the line of the mountains.

The Saracens Cross the Pyrenees.

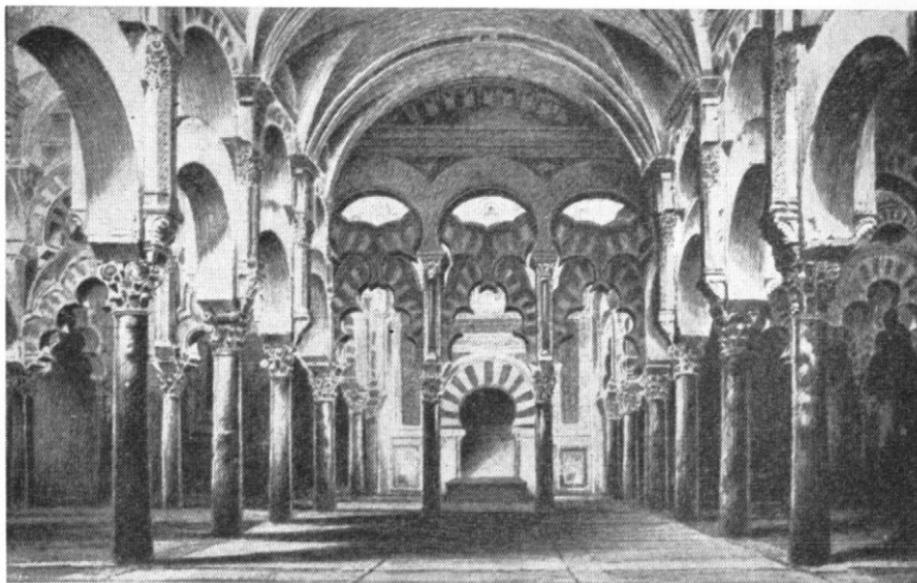
Abderame, the Saracenic commander in Spain, prepared his expedition with great care. Knowing that the political and economic situation of the Franks would make it extremely difficult for them to combine against him, in the early stages at any rate, he planned to make extreme mobility the keynote of his campaign. Through this mobility he expected to defeat his opponents in detail.

Besides the troops he already had at his disposal, he raised a special corps of Spanish mercenaries equipped with machines which, he hoped, would enable him to capture without delay the fortified towns

he would encounter. In addition, he brought over from Africa a hand-picked body of light Berber cavalry officered by Arabs of proven valour and skill. The whole army was superbly equipped, while the morale of the troops, springing from religious fervour, the prospect of plunder and a long unbroken run of victories, was at concert pitch. This fine army of 80,000 men, the best that western Europe had seen for many a long day, followed Abde-

For some extraordinary reason, perhaps an exaggerated sense of chivalry, Eudes failed to use the river as an obstacle. He elected to fight a defensive battle with the river immediately behind him. When his ranks were broken by the Arab cavalry those of this men who escaped the Saracenic scimitars were drowned in the stream.

There was no further opposition in the south, except from walled towns which vainly tried to defend



Interior of the Mosque at Cordova

rame across the Pyrenees in the summer of 732.

As anticipated by Abderame, the Frankish princes proceeded to oppose him one by one. The first few were easily brushed aside. The first formidable enemy to be encountered was Eudes, Count of Aquitaine, who attempted to hold the Saracens on the River Garonne.

themselves. The main flood of invasion poured up the Garonne towards Bordeaux, a strong corps moved on Lyons, while the Berber cavalry ravaged the country as far west as Besancon.

Charles Martel.

As soon as he heard that the Saracens had crossed the Pyrenees in force, Charles Martel, Duke of

Austrasia, began the collection of an army. Engaged with his national competitors in perpetual contests for power, engaged also in more serious struggles with the barbarians from the north, Charles Martel added experienced skill to his natural courage. He had organized from his veterans a well-equipped militia, which could be concentrated at short notice—provided it was not harvest time. In addition, he maintained stocks of weapons to arm any of the peasants too poor to provide for themselves.

Practically alone among the princes of the north, Charles Martel saw clearly the real menace of Abderame's invasion. He realized that effective opposition would require an army of considerable size, one that could not be fully outfitted from his existing stocks. While the additional men and weapons were being collected he called up his militia and put them into hard training. At the same time he employed all his persuasive powers in his appeals to neighbouring lords to join with him against the common foe.

Meanwhile Abderame had taken Bordeaux and Lyons and was advancing on Tours.

Battle of Tours.

Although Charles had succeeded in collecting a considerable army, he was in a delicate position. He saw that if he could give the Saracens enough time their easy victories and their predilection for plunder might lead them into the error of dispersing their forces. On the other hand, if he waited too long for this to happen his own army was liable to melt away. Strategically it was a matter of perfect timing.

The Saracens did disperse as Charles had anticipated. When Abderame advanced from Bordeaux to Tours a large proportion of his best cavalry was away raiding and looting in Burgundy. Nevertheless it was a formidable host which laid siege to the city of Tours.

Charles judged that the moment was now ripe, and he moved so swiftly that he very nearly caught the Saracens in their lines around the city. They hastily raised the siege and withdrew a few miles to the south. Charles promptly followed them.

The country on which the armies stood is largely rolling meadow land, well suited for the operations of cavalry, but also offering strong positions for infantry. Each army deployed on commanding positions on opposite ridges.

Abderame was now in a difficult position. He could not remain where he was for long because his army had already eaten out the country behind him. If he withdrew at all it would have to be a long retreat, and that would be the end of his career. On the other hand he did not like the look of the steady, disciplined, well-armed array that faced him across the shallow valley.

Thus the two armies faced each other for six days. The Saracens got hungry and the edge went off their morale. The Franks fed well on supplies sent forward from Tours, and their morale went up and up.

On the seventh day Abderame was forced to break the stalemate. Time after time he sent his cavalry in furious charges across the valley.

But the steady, well-posted Frankish infantry stood firm while their horsemen hung on the flanks and harried the stragglers from each receding assault.

The battle raged all day, with neither side gaining an advantage. Late in the afternoon, in the middle of a desperate assault, the rumour spread through the Saracens' ranks that the enemy's cavalry had got behind them and were plundering their camp. Fearful lest they lose some of the enormous spoil collected there, several squadrons rode off the field to rescue the camp. The Frankish riders pressed in upon the Saracens' flanks, the infantry, with their long pikes, dug their way into the front.

Vainly Aberame strove to stem the retreat. When he was surrounded and cut down panic spread throughout his army, the Saracens turned south in headlong retreat.

The Franks were too exhausted to take up the pursuit until the next day. By that time the Saracenic host had collapsed into a leaderless mob. Each group grabbed as much of the plunder as it could carry and headed for Spain independently.

Comments on the Operations.

Details of the Battle of Tours have been obscured by legend and the exaggerated accounts of the chroniclers of both sides. Nevertheless it is possible to draw some useful lessons from the campaign.

In the first place the Saracens, who, since entering Spain had advanced a thousand miles without a defeat, were over-confident. The mood in which they crossed the Pyrenees is well expressed in Southey's *Roderick*—

“Nor were the chiefs
Of victory less assured, by long success
Elate, and proud of that o'erwhelming strength
Which, surely they believed, as it
had rolled
Thus far uncheck'd, would roll victorious on,
Till, like the Orient, the subjected
West
Should bow in reverence at Mahommed's name;
And pilgrims from remotest Arctic shores
Tread with religious feet the burning sands
Of Araby and Mecca's stony soil.”

There is a world of difference between confidence and over-confidence. The latter usually leads one into the error of under-rating one's opponent, nearly always a fatal mistake. In this case it also caused Aberame to violate the principles of Concentration, Security and Administration. Even when he knew that Charles Martel had assembled a large army he took no steps to keep a close watch upon its movements, nor did he call in his troops from their distant raids. Counting on being able to resume his advance within a few days, he failed to collect supplies to sustain his army in the vicinity of Tours.

Charles Martel took full advantage of the characteristics of his adversaries. He gave them time to disperse their forces for the sake of plunder. Then when he did move the speed of his advance, quite unusual for a European army of that period, enabled him to Surprise his opponent and force him to fight on ground of his own choosing. Through strategic manoeuvre he made the best possible use of the

tactical capacity of his troops. His army, consisting chiefly of heavy infantry, was not suited to attack the agile Saracens. But it could be very strong in defence on suitable ground. By careful planning and speed of movement he forced Abderame to attack him at a grave disadvantage, a good example of a strategic offensive designed to culminate in a defensive battle.

Of the battle itself it has been said that Charles was lucky in the disturbing rumour that spread through the Saracens' ranks at a critical moment. The point is that he saw the chance and seized it to launch a shattering counter-attack. Luck will not help a commander unless he has the capacity and the nerve to seize the fleeting opportunity which it presents.

Results of the Battle.

Had Abderame won the Battle of Tours, France would almost certainly have been added to the Islamic Empire. Italy would then have been the only important part of Christendom still resisting. Attacked from the north and the south, it is unlikely that her people could have held out for long. The laws of the Caliph and the culture of Islam would have taken firm root in Europe, and would probably have extinguished for ever the rising flame of Western Civilization.

[This is the seventh article in the series "Decisive Battles of the World." Next month we shall consider the Battle of Hastings in A.D. 1066.—Editor].

Any discussion of the Army must be prefaced with the statement that the individual soldier is still the most important element on the battlefield. There can be no substitute for him. Since our potential enemies have forces in being much larger than we have, our soldiers must have the maximum effectiveness that our superior scientific and industrial power can provide.

—General J. Lawton Collins, US Army.

The Technique of . . .

SOLVING TACTICAL EXERCISES

Lieutenant-Colonel Glenn E. Muggelberg,
and Lieutenant-Colonel Dean M. Benson,
Instructors, Command and General Staff College,
USA.

A LARGE portion of a military officer's life in peacetime is spent in study; either in formal schools, or as a supplement to his normal duties. While the principles of war remain constant, the technique of implementing them varies with technological advances, the resources of his country and those of his potential enemy. If the officer is to be prepared to carry out his assigned duties in a capable and efficient manner, he must constantly keep abreast of these changes. The military school system, to a great degree, fills this need. In most of our military schools, the student learns by doing. The instruction usually is presented in the form of tactical exercises. To derive the most benefit from his schooling, the student officer must know the simple mechanics of solving tactical exercises.

Methods Observed.

Experience at military schools has indicated that students approach the solution of problems in one of three ways:—

1. The **intuitive method**.—This

method is employed by the student who feels rather than thinks through a problem to arrive at a solution.

2. The **memory method**.—Here, the student attempts to relate one situation to another that seems similar, for which a solution has already been obtained. The related situation and solution may have been developed in the classroom or may have been solved by him on the battlefield. In either case, the solution is obtained by remembering previous experiences rather than by analyzing the present situation logically.

3. The **analytical methods**.—This method is followed by the student who analyzes the problem clearly and logically, and reduces it to its simple terms. He applies proved techniques for solving tactical problems and arrives at sound solutions.

The first two methods are generally recognized as inadequate. They produce illogical, incomplete, and often erroneous solutions. They are not based upon logical thinking in relation to the specific factors involved. A serious and far-reaching result of the first two methods is

—From "Military Review," USA.

that the student develops the habit of using unsound procedures. This faulty habit will produce disastrous results if the student ever attains a responsible position in war. Further, by following unsatisfactory procedures, the student does not obtain maximum advantage of the instruction. Instead, he wastes time in unproductive effort and becomes involved in misconceptions which detract from the learning value of the exercises.

Techniques.

A **technique** is defined as being "the method or the details of procedure essential to expertness of execution in any art, science, etc.; hence, manner of performance with reference to such expertness." Those methods or procedures which are essential for solving tactical exercises analytically are as follows:—

- (1) Read the requirement first.
- (2) Read objectively.
- (3) Analyze the problem in terms of the requirement.
- (4) Do not fight the problem.
- (5) Know the basic tactical factors.
- (6) Make a troop-unit check list.
- (7) Apply principles of war and fundamental doctrine.
- (8) Use backward planning.
- (9) Budget your time; answer known questions first.
- (10) Keep the solution simple.
- (11) Make a final check of the solution.

Although this discussion is primarily concerned with techniques of solving tactical exercises, one point must be kept in mind. The mechanical application of techniques is no substitute for knowledge—the knowledge, for example,

of basic principles. Procedural techniques will only facilitate the logical application of such principles and fundamentals.

Read the requirement first. —

Since the final objective of all work done on a problem is its solution, it is apparent that the student should understand initially what he is required to do. He must read **first** that part of the problem which contains the specific requirement(s) to be solved. By reading the requirement(s) first, the student finds the data in the general and special situations more meaningful. In addition, the student will save time, for often, the general and special situations will have to be **re-read** in the light of information desired in the requirement(s).

Read objectively.—The most frequent cause of student errors is a failure to understand thoroughly what is being read. Reasons for this failure to understand are:—

- (1) Adopting illogical assumptions due to the placing of faulty emphasis on elements of a problem.
- (2) Missing salient points in the data by reading too quickly, or when overtired.
- (3) Freezing mentally by failing to concentrate, or as a result of personally engendered anxiety tension. This inhibits the formation of a clear picture from the words being read.

Failure to understand what is being read can be avoided. Normally, the problem is clearly and concisely stated. Ample time is provided to read the problem. The student must learn to relax physically and concentrate on reading the data carefully.

Analyze the problem in terms of the requirement.—This analysis is necessary to ensure a correct solution to the requirement. Two considerations are involved; first, exactly what does the requirement demand of the student; and second, what are the salient factors in the situation presented. These two considerations are interrelated, since the answer to one promotes an understanding of the other.

A **simple** requirement may involve little or no analysis as to what is desired. For example, if the student is required to decide whether or not to use an artillery preparation for an attack, the decision may involve an analysis of only one factor which has been clearly stated, or assumed, in the situation. A **complex** requirement, though simply stated, may require considerable analysis to ensure arriving at the correct solution. For example, the student may be required to prepare the plan of attack for a division. This requirement implies the preliminary solution of many contributing aspects of the over-all plan. The computation of time and space factors for troop movements may be one of such implied aspects of that requirement.

To determine the salient factors in any situation necessitates an analysis of conditions depicted in light of what has to be done. This technique presumes a student knowledge of the basic, influencing factors for any tactical situation which are discussed in a subsequent technique. The analysis will generally reveal that one or more controlling factors are the basis for solving the requirement. For example, the requirement may concern an attack by a unit at a spe-

cific time. The controlling factor may be the time and space considerations in moving the unit to its line of departure. This might be further influenced by the available transportation, or the road net. The student must recognize the influencing factors and their relative importance in the solution to be developed.

Do not fight the problem.—Having analyzed the problem, the student may disagree with conditions portrayed. Instead of concentrating on solving the problem as presented, the student may waste time in trying to devise a better situation. This attempt is wholly irrelevant to the solution of the problem. Personal exceptions to the situation presented must not distract the student from solving a problem. In combat, a soldier accepts the situation as he finds it. In a military school, the student must do likewise. The student participates to solve the problem—not to fight it.

Know the basic tactical factors.—The student must realize that the basic factors in a tactical situation, other than the mission of the unit concerned, are weather, terrain, enemy situation and his own situation. He must habitually ensure that he understands the status of these factors in solving any tactical exercise. Within these basic factors are variables which influence specific situations. These might be relative opposing strengths, reinforcements, morale, time and space, or logistic considerations. If no particular mention is made of any one of these variables in the problem, the student can be certain that they will not influence the solving of the problem.

Make a troop-unit check list. —

A common error in solving tactical problems occurs when students omit certain units in plans and orders. Reliance on memory is a direct cause of these errors. The information required to construct a troop-unit check list usually will be found in the general and special situations. It takes but a few minutes to construct such a check list, which, when prepared at the start of a tactical problem, is of great assistance to the student throughout the exercise. Its use is furthered by listing units in the same sequence in which they are included in orders. It must be realized that omissions are as costly as erroneous solutions.

Apply principles of war and fundamental doctrine.—While practical experience is of tremendous assistance in visualizing a problem, it is, at best, limited in scope. Personal experience alone must not be used, in its restricted and perhaps biased application, to solve problems. It, in itself, does not usually encompass a broad enough field. The student must realize that Army doctrine is based on combined experiences obtained from all theatres of war. It has been revised and evaluated in the light of new developments. The student, therefore, must be wary about substituting his experience for logical conclusions founded on a knowledge of basic principles. He must determine how the principles apply in each specific situation. He should compare each solution with the fundamentals involved. The sum total of many such comparisons constitute military education and experience.

The principles of war offer an excellent check list for the student, in

that knowledge in applying these principles provides him with a firm basis for solving any particular tactical problem. The consideration to be given any principle or group of principles will vary, depending upon the situation. For example, in an approach to contact with the enemy, **security** may be given the greatest weight, whereas after contact has been made **concentration** and **co-operation** may be paramount. The application of set rules and methods must be avoided.

Use backward planning. — This technique focuses student attention on the objective, and facilitates logical planning to attain it. The backward planning procedure is applicable in most tactical exercises. The student must determine the ultimate goal, and then work backward, step by step, to the existing situation. For example, in planning the scheme of manoeuvre for a division attack, the division objective—its mission—must be determined first. To attempt to prescribe boundaries between regiments, or select intermediate objectives prior to knowing where the attacking forces must go, will force an illogical solution.

Budget your time; answer known questions first. — The time to be spent in formulating answers to requirements is of great concern to students. No set rules can be prescribed for this process. As an aid to the student, however, these two generalizations are offered as a guide.

1. Budget your time.—The time spent in answered requirements should be budgeted. Most exercises at military schools are so designed as to permit their solution within the time allotted. The student

should use his time systematically. Periodic check of progress is beneficial.

2. Answer the known questions first.—Some students attempt to solve all requirements in sequence even though they may lose considerable time on difficult requirements. By answering known questions first, that much, at least, will have been accomplished. The remainder of the time can be utilized to think out answers to the more difficult requirements. One precaution must be observed in following this technique. If the requirements are **inter-dependent**, the solutions must be obtained in appropriate sequence.

Keep the solution simple. — The final test of a tactical plan is the result obtained. Even the most simple plan is usually difficult to execute under battlefield conditions. The student must constantly strive for tactical solutions that facilitate simplicity of execution. Unfortunately, academic evaluation of classroom solutions must be made on the basis of principles adhered to or violated, rather than upon a visualization of results to be obtained. The tactical solution which permits simplicity of execution will fare best in the classroom as well as on the battlefield. Sound application of principles and doctrine promotes simplicity.

Make a final check of the solution.—A final check of each solution is usually profitable for the student. The check will reveal any unanswered questions. It also provides an opportunity to correct careless errors. Based on experi-

ence at the Command and General Staff College, it is estimated that in at least **25 per cent.** of the checks, a student will discover a minor error or omission.

In making this final check the student must ask himself the following questions: "Is this paper written so that it cannot possibly be misunderstood?" "Does this paper express accurately what is in my mind?" If both questions can be answered in the affirmative, those who review the paper will have no difficulty in understanding it.

Do not abandon a logical conclusion for a last minute hunch. A hunch predicated on trying to "G2" the solution will usually be incorrect.

Summary.

It is important that the military officer develop clear, logical, thinking and reasoning processes. Habitual use of sound techniques will facilitate such thinking and reasoning. The habits formed in solving tactical exercises in the classroom will instinctively prompt the same reaction in the battlefield. Hence, the military student will find it beneficial to adopt the techniques presented in this discussion when solving tactical exercises. These methods or procedures are based on the experience of students at the Command and General Staff College. Obviously, there are others. As presented, the techniques will bear modification for use to suit individual preferences. They are offered in the spirit once expressed by Bismarck, "Only fools learn by experience. I prefer to learn by the experience of others."

The LANGUAGE of MILITARY SYMBOLS

Directorate of Military Training.

MANY officers who have, literally, "grown up" with the signs and symbols used for sketching and map marking in the British service, may wonder why the system has been changed. The old one served them well through long years of training and through a world war. They did not have to think about it; it was as familiar as the letters of the alphabet. Why exchange it for a system which has to be learnt over again, and which at first sight seems to be pretty complicated?

During the last war co-operation between British and Allied, particularly American, forces was common, and combined staffs worked out many detailed plans for operations. Despite the utmost goodwill they were often delayed and frustrated by the difference between each other's signs and symbols. Staff officers working on these plans had to learn the other army's signs as well as remembering their own. Where, as often happened, a unit or formation was operating under command of an Allied formation the difference between symbols led to much confusion. Similar confusion arose when trying to determine dis-

positions at the junction of Allied formations.

It must be expected that in the future much closer co-operation between the Western Allies will be necessary at all levels. Forces comprising components from several Allies will be the rule rather than the exception. This is actually taking place in Korea, where numerous national contingents are operating together as a United Nations Army. Imagine the confusion that would arise if they all used different signs and symbols.

The military staffs planning the defence of the West have given much attention to standardization, in the field of terminology and procedure as well as in the field of material. British and American terminology, staff and signal procedure have been standardized to the extent that a staff officer of either service can readily understand what his opposite number is talking about. The standardization of symbols is merely an extension, though a very important extension, of the idea. In any case the many new types of units, weapons and equipment would have made some re-

vision of each system necessary. Rather than increase the confusion by adding numerous new symbols to each of the old systems, the British Commonwealth and the United States have devised a common system, which will mean precisely the same thing to the personnel of both services.

In devising a common system three basic requirements had to be met:—

1. The symbols had to be readily translatable into the nomenclature of weapons, units, forma-

tions, and the arms and services of each army.

2. They had to be easily drawn, particularly with a chinagraph pencil on a talc overlay.
3. As far as possible they had to give a pictorial representation of the thing indicated, in order to provide for formations and components speaking a language other than English.

The system is built up logically from a relatively small number of basic symbols, as the following examples will show:—



This is the basic symbol for any body of troops larger than a platoon.



The symbol for infantry added to the basic symbol indicates a body of infantry.



Up to a brigade or its equivalent the size of the body of troops is indicated by placing from one to three strokes above the symbol. The illustration opposite means an infantry company. Two strokes would mean a battalion, three strokes a brigade.

Unit identification may be indicated by adding:—

To the left of the symbol, the letter or number of the sub-unit.

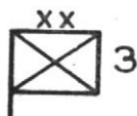
To the right, the abbreviated title of the unit or formation.

The illustration opposite means "A" Company, 1st Battalion, Royal Australian Regiment.



BASIC SYMBOL	LIGHT	MEDIUM	HEAVY	REMARKS
<u>INFANTRY WEAPONS</u>				
 MACHINE GUNS	 LMG	 MMG	 .5 CALIBRE	<i>BASE OF SHAFT INDICATES EXACT POSITION</i>
 MORTAR	 UNDER 3in OR 75 mm	 FROM 3in (inclusive) OR 75mm TO 4in OR 100mm	 OVER 4in OR 100mm	
 ANTI-AIRCRAFT MACHINE GUN				
 INFANTRY ANTI-TANK WEAPON	 BAZOOKA OR PIAT			
<u>ARTILLERY WEAPONS</u>				
 GUN OR GUN-HOW	 UP TO 105 mm (eg. 25 pr)	 106mm TO 155 mm (eg. 5.5 in gun)	 OVER 155 mm (eg. 7.2 in gun)	<i>BASE OF CENTRE SHAFT INDICATES EXACT POSITION OF WEAPON</i>
 HOWITZER				
 ANTI-TANK ARTILLERY	 UNDER 3in OR 75 mm	 75 mm TO 105 mm (eg. 17 pr)	 106 mm AND OVER	
 ANTI-AIRCRAFT GUN	 UNDER 3in OR 75 mm	 3in OR 75 mm TO 5.5 in OR 140 mm	 OVER 5.5 in OR 140 mm	

If the symbol is placed on a flagstaff, the base of the staff represents the exact position of the headquarters. To indicate formations higher than brigade, the strokes above the symbol are replaced by X's, which run from one for a brigade group to five for an army group. The symbol on the right indicates Headquarters, 3 Infantry Division.



The symbols for weapons, obstacles, installations, etc., are all built up from a basic symbol in the same logical and easily remembered sequence. The method of building up is shown in the Table opposite.

Examination of the Table shows that the role in which any weapon is employed can be indicated by adding the basic symbol for the role to the symbol for the weapon. Thus an anti-aircraft role is denoted by drawing a circle around the weapon, while an anti-tank role is shown by attaching an arrow head to the base of the weapon symbol.

From this very brief review it will be apparent that a comprehen-

sive sign language has been built up from quite a small number of basic symbols. It is not necessary to memorize the whole range of symbols. All that is necessary is to remember the basic ones and the method of building them up. A little practice will make it a truly international sign language of very great value to the Allied forces at present operating in Korea, and to Allied forces which may have to operate together in other theatres, perhaps in the not too distant future.

Full details of the new system are given in the recently issued manual, "Staff Duties in the Field."

The longer I live, the more keenly I feel that whatever was good enough for our fathers is not good enough for us.

—Oscar Wilde.

Armoured Infantry Combat



Captain F. von Senger u. Etterlin.



SPEED, mobility and firepower are special characteristics of armoured infantry. Careful judgment of the task and of ground conditions, boldness in action, technical skill and full exploitation of technical possibilities are essential for successful leadership of such units. Armoured infantry are the part of larger armoured teams that are best suited for every sort of combat action, and they are therefore the nucleus of such teams, just as infantry of some sort will always remain an army's nucleus.

The German Panzerdivision of 1942 generally disposed of one battalion of armoured infantry. This battalion comprised one light, two medium and one heavy company.

The light company was composed of 37 light troop carriers (half-track). It was divided up into three rifle platoons and a support platoon. The rifle platoon had eight troop carriers of four tons (half-track), one for the platoon leader, one for a 3.7 cm. anti-tank gun, and two for each of the three rifle sections. Its firepower was based on 14 machine rifles when fighting from the carriers and of six machine rifles when fighting on foot. Unlike the light company the two medium companies were transported by 8-ton troop-carriers (half-track), these carriers being able to transport the

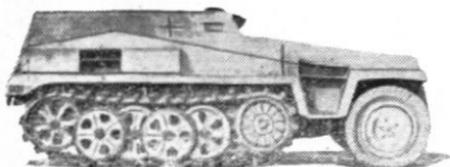
whole, not only one half of a rifle section, amounting to 11 riflemen.

The heavy company comprised further anti-tank guns, 75 mm. infantry guns and engineers.

The 4-ton troop carriers corresponded in armour and mobility to the British Bren carrier, the heavy 8-ton carriers to the USA half-track. Under favourable ground conditions both types were, however, superior to their Anglo-American models. Each carrier was fitted with wireless.

From 1943 onward the Germans had developed within their Panzerdivision complete regiments of armoured infantry.

It was especially during the far-reaching German offensives in the summer of 1942 that the characteristic qualities of armoured infantry units were shown at their best. The scope of this article is to show by some examples how armoured infantry can succeed in situations where neither infantry on foot nor tanks could have won the day.



4-ton Troop Carrier

Example 1.

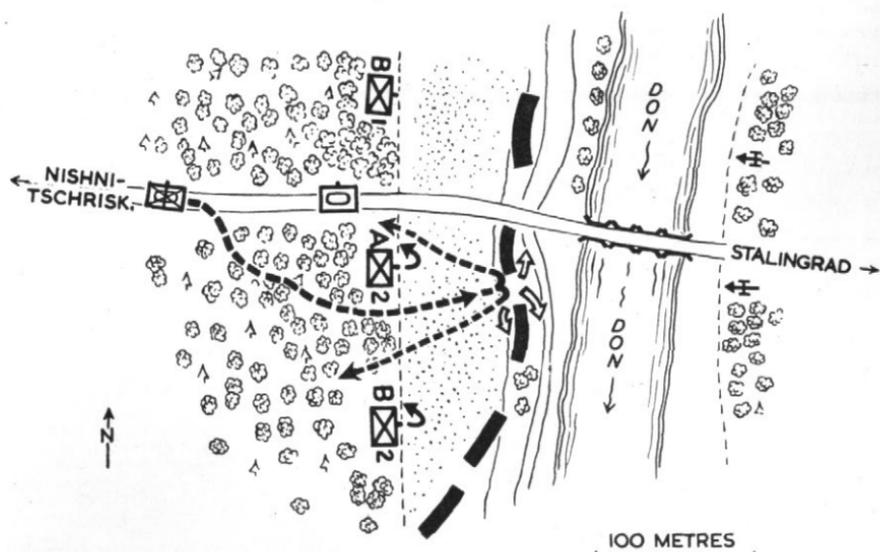
By the end of July, 1942, two armoured corps of the 4th Armoured Army had advanced from Woronesch with their left flank as far downstream on the River Don as the large Don bend. Here strong Russian rear posts held a bridgehead defending the crossings near Nishni-Tschriskaja and Kalatsch on the opposite side to Stalingrad.

The 26th semi-armoured Infantry Regiment was to take the village in a surprise attack by night against an enemy strongly resisting. The regiment was fighting its way on foot towards the Don through a dense forest, and by morning it had reached the other side of the forest. The attack was backed by a tank company, which had crossed the forest at the same time by using a road, the tank company being protected by a light armoured infantry company. This had then become the favourite — because most suc-

cessful—way of combined tank and infantry attack.

Between the edge of the forest and the Don river there stretched a sand plain without any cover, its riverside being abruptly cut up, and thereby affording cover to the defending Russian infantry. Russian positions sited there were strongly occupied and defended. Their fire prevented any movements out of the wood by the 26th Infantry Regiment, and so checked completely their attack. Russian infantry, furthermore, was backed by rocket batteries on the other side of the Don river. A German tank, which tried to advance out of the wood, was hit and put out of action.

This was the situation when the leader of the vanguard platoon of light armoured infantry company (the author) received the order to attack the enemy defending this side of the Don and to take the bridge over the Don. The platoon leader



Sketch 1

judged the problem in this sense—that an attack on foot across the uncovered plain was utterly hopeless. Equally impossible did it seem to deploy the carriers within the wood itself, because the edge of the woods was under constant fire.

The platoon leader therefore decided on a manoeuvre, one that can be carried out only with a troop both well-trained and full of fighting spirit; attack while still in movement and break into the enemy line.

The carrying out of this decision went as follows: There was no chance for breaking out of the wood on to the road because there the enemy had prepared anti-tank fire. A point was therefore reconnoitred where all eight carriers had to break out of the wood in file with maximum speed and without deploying. So by surprise they crossed the open plain firing at the enemy, who, therefore, kept under cover, and when reaching the enemy position they dropped the sections from the carriers while turning round rapidly. The men on foot, in their turn widened and occu-

ped the gap broken by surprise. The empty returning carriers reached the wood safely.

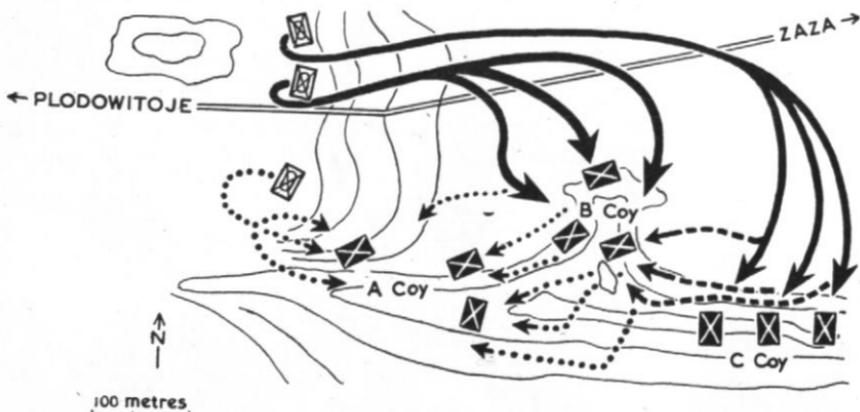
To take the bridge crossing the Don itself, however, was not practicable. Had it been, the way to Stalingrad had lain open.

Example 2.

After having crossed the Don river the 4th Panzer Army was advancing towards Stalingrad from the south.

Parts of the 24th Panzerdivision had reached Plodowitoje. Here a light combat team of 24th Panzerdivision was ordered to reach the east edge of a chain of hills, called Jergeni Chain, near Zaza, and to bar the Zaza-Plodowitoje road. Similar tasks were often given to light teams of armoured infantry, in order to secure safety for the following bulk of a division, and at the same time to provide the backbone of the reconnaissance teams.

On the eve of the 15th August, '42, a light company of an armoured infantry battalion reached the east edge of the chain stretching from north to south. Before them lay the large desert, glimmering and in-



Sketch 2

terspersed with lakes. The company dug in astride the road. Carriers were withdrawn into a valley further back.

During the night the enemy advanced cautiously, and in the morning the outposts reported approach of an enemy battalion along a valley adjoining the road. The enemy could approach right up to the company's positions as he was protected from observation behind the high grass of the steppe.

The company leader (the author) decided to attack with his company mounted on carriers. He considered this the only way to prevent the enemy occupying the important hill, as the company did not have any heavy weapons.

The company leader consequently ordered the carriers to move up to the company's position and ordered two platoons to mount.

When the enemy had approached so far as to be able to charge, No. 1 platoon was ordered to move rapidly towards, and deep behind, the enemy's flank and to attack and annihilate the rear of his forces advancing in great depth.

No. 2 platoon was to protect the movements of Platoon No. 1 and then to attack the advancing enemy's right wing.

The company leader reserved to himself later tasks for these platoons according to changes in the situation.

Attacking at a speed of 30 m.p.h. Platoon No. 1 avoided being hit by the fire of several bazookas, which tried to protect the enemy's companies. The platoon succeeded to deploy for attack by turning right out of the file originally adopted

and overran the rear company of the enemy's battalion.

Platoon No. 2, after a short advance, struck the enemy's right wing company, which had been able to deploy under the steppe grass protection in a little valley stretching northward from the main valley.

The enemy here put up a most strenuous resistance with the bazookas and so-called "Molotov Cocktails." By a combination of alternate mounted combat and combat on foot the platoon succeeded in encircling the enemy company and cutting its line of retreat. The enemy, however, did not give way. He had to be overcome by ordering Platoon No. 1, through wireless, to assist Platoon No. 2 by attacking from the rear. The former platoon, having fulfilled its first mission, was available for this combined attack with Platoon No. 2. The enemy had to be annihilated as he refused to surrender. He left 40 dead, numerous wounded, 6 bazookas, and 3 bomb-throwers.

Finally, both platoons combined in action with Platoon No. 3, which in the meantime had also mounted. The enemy's left wing front line company (A Company in Sketch) was thus encircled from three sides and scattered.

The combat lasted two hours.

Example 3.

When the attack of the 4th Panzer Army towards the south corner of Stalingrad, north of Plodowitoje, had failed, the bulk of that army was transferred by long marches to a region north of Aksai in order to attack the Russian defence system running along the Myszchowa sector. The Army's 24th Panzerdivi-

sion was ordered to break through this sector and to wheel northward to reach the railway line Kalatsch-Stalingrad.

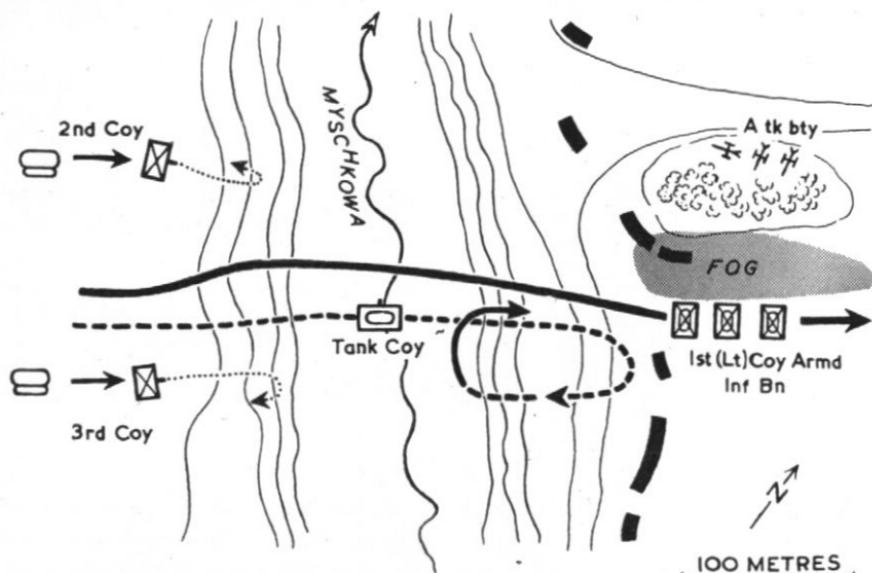
The armoured task force, consisting of 4 tank companies and one battalion armoured infantry, attacked with two infantry companies on foot. These two companies were backed by tanks during their advance towards the sector.

When the battalion commander over-looked the combat area, he found the following situation: On the other side of a ravine about 60-100 metres broad and 15 metres deep, the enemy had a strong defence system. Machine guns cunningly placed covered the bottom of the ravine so that infantry could not move across. Some tanks tried at this moment to climb the opposite slope, which had a gradient of 60 degrees. But only heavy tanks succeeded in reaching the top. When they had done so they were

struck by anti-tank fire from the flanks, evidently by a battery in a concealed position. So the attack was stopped.

The battalion commander could not have opened the way for his tanks by attacking with the two companies on foot, without losing much time. So he decided to engage his light company, still kept in reserve, and gave the order to attack so as to break through in narrow combat formation.

The light company crossed the ravine with all three platoons, one behind the other, in comparatively close order. Because of the very light carriers they easily climbed the opposite slope, which had proved insurmountable to the light tanks. The company, having reached the opposite edge of the ravine, continued its attack without delay. It broke through the enemy's line without engaging in local fighting. The platoon forming the vanguard



Sketch 3

even succeeded in laying a screen of artificial fog across the enemy battery's front, thus blinding it. By this break through the way was opened to the heavy tanks and to the other companies, which, meanwhile, had mounted their carriers. They cleaned up the enemy's still resisting infantry strongpoints and followed the light vanguard company right away for a distance of 60 miles into the suburbs of Stalin-grad.

Conclusions.

In all three examples I have tried to show that there are the following features in combat by armoured infantry: Quick change from combat mounted to combat on foot and vice versa; quick movements under enemy counter-action and under enemy fire; narrow and deep formations while in movement on the battlefield. It must, however, be taken into account that in most cases success of such tactics is dependent on training, and on the particular ability of the light carrier then in use in the Germany Army to accelerate swiftly to highest speed. Without such quality the carriers would not have been able to avoid being hit by enemy anti-tank fire, especially in the situations set out in examples No. 1 and 3.

Following post-war publications of experts, such as Liddell Hart and others, we find that, as a result of the experiences of the last war, the idea has fortunately been given up that we can create a tank model which will fulfil all the requirements usually demanded: Armour that will protect it against the modern anti-tank weapons; increased fire-power and increased mobility

and speed. One of these threefold demands has to be curtailed for the sake of the others. It has generally been agreed that mobility is one of the chief requirements and not to be renounced. The tank of the future will be more mobile, probably smaller, and therefore more numerous on the battlefield than the monsters that were produced towards the end of the war, with the aim of outdoing the enemy technically. These tended then to attract the whole attention of each side, not only technically, but also from the point of view of counter-measures.

Now the infantry carrier fits well into this picture of future trends—one of light vehicles moving in great numbers on the modern battlefield. It seeks protection from fire rather by speed than by armour.

The firepower is much smaller than that of even the lightest tank. But it has the advantage that it is at the same time a means of transporting infantry. Its units, therefore—contrary to the tank—are fit for all forms of combat, attack as well as defence. Armoured infantry are not such an expensive weapon; because the carriers cost much less than tanks they are therefore more easily replaceable, as is necessary for an arm that must be employed in masses. It is fitted to collaborate with tank units, in fact it is indispensable for all tank warfare. It will most likely be the weapon that will be seen most on the battlefield of the future in that phase of combat featuring rapid movement. And it will also be the backbone of any defending army, because infantry will have to take the brunt of the fighting as it has done at all times.

MACHINE GUNS

THEIR HISTORY and DEVELOPMENT

Warrant-Officer J. H. Welch,
Royal Military College.

W EIGHT—Clumsiness—
Difficulty in loading.

These were just a few of the things that prevented hand firearms gaining popularity in the early years of their invention.

Until the end of the fifteenth century cavalry had been considered the principle arm on the battlefield. It was about this time, however, that hand firearms started to become really effective without losing mobility, and were gaining favour with progressive military leaders. A natural advance was to increase firepower by mounting a number of firearms heavier than those used by the foot soldier on a pair of wheels. Thus, at the Battle of Picardini (Picardy) in 1457, the Venetian General Colleoni used "orgues des bombardes" as mobile auxiliaries in connection with his heavy cavalry. Later, at the Battle of Ravenna, in 1512, Pedro Navarro, who commanded the Spanish Army, drew up in front of his infantry 30 carts, on each of which were mounted several large arquebuses. Without a doubt, here were the forerunners of the modern machine-gun starting to evolve.

On the continent of Europe, the "orgue" or organ gun, and the

"ribaudequin" made appearances during the latter half of the fifteenth century. These consisted of a number of muskets or small cannon mounted together on a wheeled cart, with pikes or spears projecting in front as a defence against cavalry.

The earliest instance of the employment of a number of chambers revolving around a central axis, which marks the next stage of development of mechanical firearms, occurs before the advent of the flintlock in the first half of the sixteenth century. A specimen of an arquebus of this period with four chambers and a single barrel, each chamber having a separate flash pan, may be seen to this day in the English "Tower" collection.

In 1718 James Puckle, an Englishman, invented an unusual gun fitted with a tripod mount complete with a rude traversing and elevating mechanism. The gun had a single barrel, around which moved a many-chambered breech rotated by hand. The charges were fired by a match, and either the chambers or the complete breech could be replaced. The breeches held either 6, 7 or 9 chambers. An interesting feature of this weapon was its

ability to fire square bullets at Turks and round ones at Christians by placing on the right shape of chamber. Apparently Mr. Puckle was anti-Turk.

During the eighteenth century a compound weapon was used in France. This consisted of a number of barrels fired by a single flintlock through a common touch hole. These weapons normally had 6 to 10 barrels and were primarily for the defence of fortifications. As late as 1807 weapons of this type were made for the British Government by a London gunsmith named Nock, who also invented the so-called "Knox - Form," really "Nock's," on the SMLE rifle.

The first practical machine gun was the invention, in 1862, of Dr. Richard Gatling, an American. This weapon had a number of barrels around a central axis. By turning a handle on the side the barrels and reloading mechanism revolved, while the barrels were loaded and fired. Because of the number of barrels, at first 4, later 5-10, a rate of fire of anything up to 800 rounds a minute was possible, depending on how fast the handle was turned. There was no provision for cooling, but as each barrel only fired one shot in 4 to 10, fire could be maintained for a considerable period without overheating the gun. This weapon was an outstanding invention of its day, and up to the beginning of World War I was listed as United States Navy equipment. The gun was produced in time for the American Civil War, but the US War Department was not over impressed by it, causing Gatling to hire men to operate it on the battlefield to demonstrate its worth.

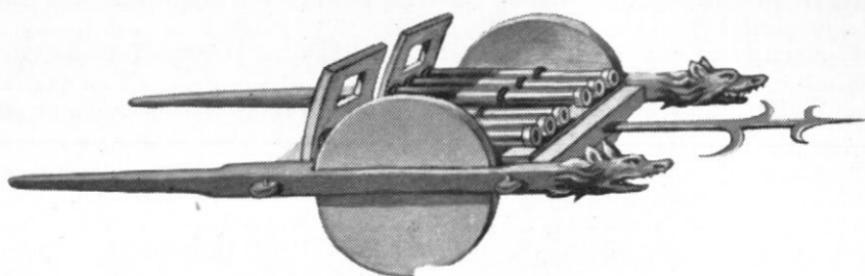
In Europe, the first machine gun

to attract attention was the Montigny Mitrailleuse (mitraille — grapeshot). It was introduced on the eve of the Franco-Prussian War to the French Army, who used it extensively. The gun originated in Belgium about 1851, but was considerably improved by Colonel De Reffre, a French Ordnance expert, before issue in 1869-70. Unfortunately, because of a prevailing lack of knowledge about the tactical use of machine guns, the gun was rarely a success. The normal tendency was to regard a machine gun as a piece of light artillery and to use it as such. An indication of this is the change made in French Artillery Regiments to cater for the mitrailleuse. On mobilization, groups to ten mitrailleuses replaced one of the three 6-gun batteries in each Regiment.

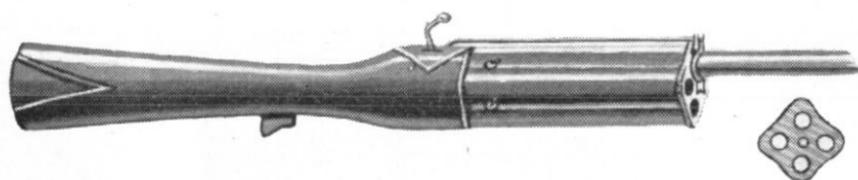
The British Army and Navy ordered several Gatlings in 1871 for trial, while many European countries bought large numbers. Russia adopted the Gatling extensively and used it in the Russo-Turkish War of 1887, although as a defensive weapon. An early instance of the use of night aiming marks occurred in this war at the siege of Plevna, where the guns were used to cover bridges and other lines of approach.

Britain first adopted machine guns for Naval service. This decision was the result of experiments in connection with defence against the newly developed torpedo boat, carried out at Portsmouth in 1880. A variety of weapons were eventually purchased in 1884 for mounting on warships, and included Gatlings, Gardners, and Nordenfeldts.

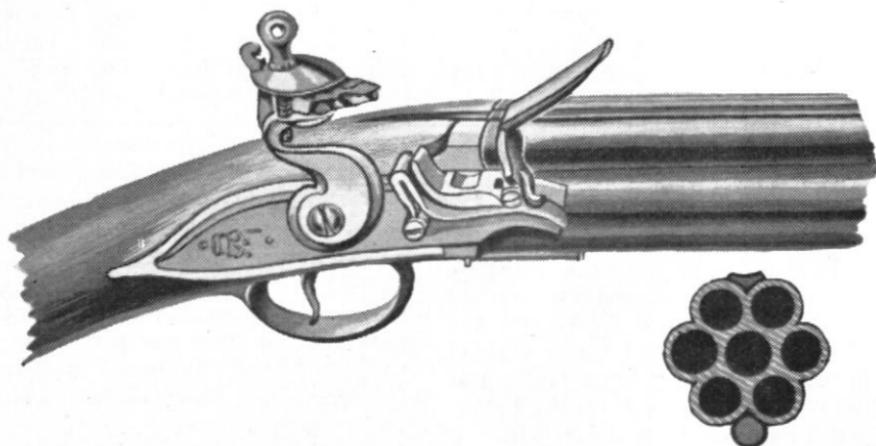
The first important land operations in which the British used ma-



French Orgue des Bombardes



Revolving Arquebus, Tower Collection



Nock's Seven-chambered Carbine

chine guns were those of the Zulu War, in 1879, when a few Naval Gatlings were used. They were invaluable for breaking up or checking a charge by crazed natives, but lacked mobility and were subject to frequent stoppages. Very little was learnt about machine guns in this war, and, although their use as weapons in co-operation with the infantry in attack and defence was foreseen by the British Commander, Lord Chelmsford, the original idea that they were a type of field gun persisted.

In 1885 a gun, the principles of which are still used on many machine guns today, was invented by another American, Hiram Maxim. After many experiments with gas operation, drum feeds, and the use of recoil, Maxim settled for a short recoil action, belt fed, water cooled gun. This weapon was first chambered for .577-450 Martini-Henry cartridges and had a maximum rate of fire of about 600 rounds a minute.

Maxim guns were first adopted by the British Army in 1889 in .303 calibre, and by 1891 had displaced the various other weapons in use. A lighter type appeared around 1900 which was air cooled and normally, because of lightness, was used by cavalry. The gun, prior to the First World War, looked much the same as the present day Vickers, which will be mentioned later. The Maxim proved an outstanding success, but, although its value was seen time and time again against savage attacks from the Matabele, in the Sudan, and against tribesmen on the North-West Frontier, there remained considerable opposition in England against its adoption for civilised warfare.

The Maxim next appeared in the

South African War, where small numbers were on trial. As before, machine gun tactics were far from fully developed, and the gun lacked mobility because of the heavy mountings in use. Perhaps these factors were the reasons why the gun generally finished the latter stages of the war as a defensive weapon in a blockhouse. During this war, the Boers, and later the English, used heavy Maxims known as "Pom Poms." There were the forerunners of the famous "Chicago Planos" used extensively at sea in World War II against aircraft. The Pom Pom was an automatic weapon of 1.457 inch calibre, firing either solid or explosive shells weighing 1 lb, and with a muzzle velocity of 1200-1500 feet per second. This weapon was in common use in World War I as an anti-aircraft gun, and, although its cyclic rate of fire was slow, it was probably one of the most effective weapons available at that time for the purpose.

The first time that machine guns came into their own and were used with marked success was in the Russo-Japanese War in 1904-5. Both sides used large numbers, usually grouped in batteries of 6 or 8 guns. The Russians favoured the Maxim, but the Japanese used a new gun, the Hotchkiss. This gun was developed by Benjamin Hotchkiss in the 1890's from the original invention of Captain Baron A. Odkolek Von Augezd, of Vienna. Although an American, Hotchkiss had his factory at St. Denis, near Paris, and it was from here that the first guns appeared for sale in 1897. This gun was a standard gas operated weapon in which the gas produced went through a hole in the barrel and acted on a piston, driving it to the rear. During the bitter campaigns

of this war both sides suffered enormous casualties as the machine gun was successfully used in attack and defence. It is of interest to note that it was in this war that overhead fire from machine guns was first used.

As a result of the experience gained in the different battles, great interest was shown in Europe in the possibilities of machine guns. The German Army in particular, studied the future of these weapons for many years before the First World War. This was painfully evident in the early days of this war, where the great superiority of firepower held by the Germans necessitated immediate steps by the Allies to increase their machine gun armament. In the British Army, the number of guns of Maxim type was increased as rapidly as possible, but production could not keep up with the demand. As a result a gun which was easier and quicker to produce was introduced, and new units being formed were issued with it instead of the Vickers, as the Maxim, through lapse of patents and certain modifications had now come to be called.

This new gun, the Lewis, was invented by Colonel I. N. Lewis, in the United States, about 1912, and was adopted by the British in 1915. Weighing about 27 lbs. it used normal .303 service ammunition from a drum magazine, mounted flat on top of the gun and holding either 47 or 96 rounds.

The army now possessed two machine guns, both performing similar tasks, but experience proved that the weight of the Vickers was too great to allow it to keep pace with an infantry attack. Therefore it

normally stayed behind in an attack, and the need for lighter automatic weapons, which could be carried and operated by one or two men became evident. As the purpose for which such a weapon would be required did not call for the capacity of the Vickers for sustained fire, nor for the ability to fire over long ranges, the Lewis and also the Hotchkiss, were made section weapons.

The Lewis, being more accurate, was used for the rest of the war by the infantry, while the Hotchkiss LMG, being more robust and better shaped for carrying on a pack saddle, by cavalry.

The Vickers now became the medium machine gun for work over long ranges with sustained fire, while the other two were for shorter ranges and for assaults, etc. This change was common to most armies during the war, and various new types of machine guns were introduced. As the principle of fire and movement evolved, the Lewis was found to be too heavy and subject to frequent stoppages. This problem resulted in many investigations after the war to find a gun to replace the Lewis and Hotchkiss, but it was not for many years that a suitable weapon was found.

In 1922-23 many types, including light models of the Lewis and Hotchkiss, were subjected to severe tests. In the end a modified Browning was considered to be the best offering. During 1925, however, the Vickers Berthier, a gun originally of Belgian design, was submitted, tested, and found to be immeasurably superior to all existing types. It was eventually adopted by the Indian Army and appears to have fulfilled their requirements. How-

ever, it was not until 1929 that Britain's requirements were partially met. In this year the Lehký-Kulomet, or ZB, was submitted for testing. This gun was the invention of an employee of the Czechoslovakian arms factory at Brno, Vaclav, Holek. It was 7.92 mm. calibre, and when first produced was sold to many countries, including China. Trials were commenced in England between it and the Vickers Berthier and continued until 1936. The ZB was considerably modified after much ingenuity had been lavished on it, and was eventually adopted by Britain as the Bren. This name was coined from BR for Brno, and EN for Enfield Arsenal, where it was developed. Issues were made to certain English units in 1937, and by 1939 it was in general use, although many Australian units did not receive it until much later. Four beautifully-made Czech guns were the first received in Australia, arriving in 1937. The Bren Mk 1 was modified in 1942-3 by the removal of superfluous attachments, and today it is a 23 lb. air

cooled, shoulder operated weapon of great simplicity and reliability.

Other countries adopted a variety of LMG's over the years, the chief of which were the Russian Dektyarov, the US Browning Automatic Rifle (not a true LMG type), and the German Solothurn MG 42 and 43.

With the introduction of .280-inch calibre ammunition and semi-automatic rifles in the United Kingdom, the future of current machine guns in the Australian army seems problematical. If this new ammunition is adopted it will mean that existing weapons will either have to be replaced or greatly modified. Again, will LMG's be necessary in an infantry section if every man has a semi-automatic rifle? Some say that the Vickers is too heavy — would a compromise be a gun capable of performing both LMG and MMG tasks, e.g., the German MG 42.

These problems are a few of those to be answered in the future. So development proceeds and history is made.

THE MALAYAN WAR.

An unfortunate transposition of type occurred on page 34 of AAJ 27, August, 1951. The first three lines of the left-hand column should be moved to the foot of the same column. Lines 4 to 9 of the left-hand column should be moved to the top of the right-hand column.—Editor.

What is Tank Country ?

Brigadier William Murphy, CBE, DSO, ED.

IN the early days of the Korean conflict a fact came to light which was surprising, to say the least, to many Canadian tankmen of the last war. The old and hoary question of what is and what is not tank country seems to have reared its ugly head at the time American officers were training the South Korean army against the day when American troops would be withdrawn. It appears, if the reports on the matter can be given credence, that the officers responsible for the organization of the South Korean forces decided that a tank element was not necessary, on the ground that Korea was no place for tanks.

The writer has not had the opportunity of personally surveying the terrain of that distressed country, but from relief maps, photographs and reports of present operations it would appear that a large portion of the peninsula is mountainous. As in most mountainous countries it

has valleys, some broad, some narrow. Communications are fairly primitive, there being a lack of roads and very little in the way of railways. Roads generally follow the valleys. Rice is grown fairly extensively, which suggests a good deal of soggy ground, at least during some parts of the year. Doubtless it was these factors which lead the Americans to decide that tanks would be an expensive luxury rather than a practical weapon of war.

Apparently the Russians, responsible for the organization and training of the North Korean forces, took exactly the opposite view. Tanks were used in the initial stages of the North Korean attack, and, it would appear, spread considerable alarm and despondency among the tankless South Koreans, and later the American infantrymen rushed in to slow up the advance. No one can blame them for their poor view of the situation. Most infantrymen who have been up against tanks, having no tank support themselves and little in the way of effective weapons to meet heavily armoured vehicles, have probably had similar feelings. It turned out that tanks could be used effectively in Korea, and a considerable number of United Nations tanks have been moved to that country.

The author commanded the 1st Canadian Armoured Brigade in Italy and Northwest Europe until the cessation of hostilities. In 1946 he was appointed to command the 22nd Armoured Brigade (Reserve Force), and since July, 1950, has been on the Supplementary Reserve. From Canadian Army Journal.

To return to the opening sentence of this article, it is hard to understand how the initial mistake was ever made. When one remembers the lessons of the war that is past, and contemplates applying them to a war of the future, he must be careful indeed. Future war will usually be fought with many new weapons. New tactics will have to be evolved accordingly. One's thinking must proceed along original lines, and not be hamstrung by something that was proper a few years ago. At the same time there are certain principles evolved during the past war that should be applicable to future operations, and one of these principles, it is suggested, is the answer to the question of what is and what is not tank country.

Many serving and former members of the Royal Canadian Armoured Corps will recollect how eagerly they perused reports from the western desert during the years they sat in England awaiting their turn. They realized that in all probability when they saw action it would be with a better vehicle and in totally different country. But the only reports available, so far as tanks were concerned, dealt with their use in the desert. Such country permitted commanders to exploit the mobility of this particular weapon to the full, and it played a great if not predominant part in every victory won, no matter by which side. In very rocky country, or where the going was too soft, tanks could not operate, but there were always plenty of other portions of the front where the going was good. Thus the question of what was, or what was not, tank country did not receive the early consideration that it otherwise might have.

When Canadian tanks landed in Sicily it was soon realized that this mountainous country called for far different tactics, so far as tanks were concerned, than did a wide open country such as the desert. In almost every case the infantry were the predominant arm and the tank's job was to support them to the best of its ability. Both arms had much to learn in actual warfare in difficult country, and it was hardly surprising that infantry thought tanks should do more than they were prepared to do, and the tanks thought infantry were hopelessly ignorant of the tank's capabilities. To begin with, neither really appreciated what a tank could or could not do to give the infantry a helping hand in the varied country that was fought over. Nor did either realize the tremendous help that infantry could afford tanks in close going.

Italy, with its mountains, valleys, olive groves, vineyards, crops, walled cemeteries, and other detestable features (that is, from a tank point of view) further complicated relations between the two arms. After all, the infantry wore cloth jackets, and the tankmen had several inches of steel to protect them, so why should not the tanks fight where the infantry had to go? But at first the tank men were reluctant. Their steel was not much good against the well-concealed anti-tank gun or the boldly handled infantry anti-tank weapon. In close country they could not see them and therefore could not protect themselves. The gunners' telescope was masked by olive groves and vines, and he was unable to give effective support to the infantry in any event. So the inter-service battle raged, and at times there was considerable feeling between the two arms.

But experience was bearing fruit. The tank men, who had been taught that tank country was that country which afforded the best going, and contained successive features permitting good fields of fire from hull-down positions, and support, tank by tank or troop by troop, began to learn that it was just such country that was the best protected by anti-tank weapons. Few forces can have sufficient tank stoppers to be strong in them at all points. The anti-tank weapons were usually concentrated to cover the best tank approaches. The tank men started to experiment. They found they could climb slopes they thought were impossible. It was just a matter of skilful driving. They found that much rocky ground could be traversed with care and attention. They found that even terraced hills could be topped by driving the terraces until a low point was found and then charging a path to the next terrace, and so on. Sunken roads and other obstacles could be overcome by the use of explosives, so they took along tank sappers, trained in demolition and mine clearance, and carried them in cut-down Honeys moving with squadrons. They used the tank dozer well forward to help clear the way where necessary.

Time and again they found these tactics won them that pearl beyond price—surprise—and soon they were looking not for good going, but the going where only skill and experience could get them through.

The policy was laid down, at least in the writer's formation, that every request of the infantry must be met if it was humanly possible to get the tanks over the ground. The response of the infantry was imme-

diately. As soon as they found the tanks were ready to take on almost anything, their confidence in the tank men firmed, and the two started to work together in a most satisfactory manner. In not one single instance did the writer find that infantry, once assured of the tank men's real desire to help, took unfair advantage of that co-operation.

It was soon realized by all concerned that each arm had its own particular tactics. If tanks stopped to bring fire to bear on a position, the infantry quickly learned that they were not quitters, but that this was the very moment for them to press on under cover of that fire. They soon got to know that regardless of how close the country, the tanks were right behind them, depending on them to winkle the concealed anti-tank weapons, and ready to forge ahead when more open country was reached.

The infantry normally preferred country which gave them the maximum in covered lines of approach, although often this was not the direction of attack the tank men would have chosen. But when the tanks had learned that they could depend on the infantry, and so long as they could get their vehicles forward, they cheerfully accepted the infantry's choice of ground. Infantry and tank co-operation reached a high peak of efficiency, and the results were very gratifying—at least to our side.

Even in the Appennines, where the tanks were wholly road-bound, they were found more than useful. They formed a firm base from which the infantry could fan out into the hills. They brought accurate direct and indirect fire to bear when it

was most needed. And it gave the infantry a comfortable feeling to have them around. And in this last remark lies one of the major points overlooked by the organizers of the South Korean army.

Infantry like to have tanks near them. Possibly the tank is blind in close country, and therefore helpless, or road-bound, or blacked out on a dark night, or otherwise not much of an asset. Nevertheless, the infantry like to have them around. There is a psychological factor here which is most important and should never be overlooked.

The old practice of "rear rally" for reorganization, petrol, rations, etc., was discontinued in Italy by the writers' formation. The tanks stayed with the infantry and supplies were taken forward to them. Even if they couldn't see to fire they could

lay their guns on fixed lines, and the starting up of tank engines, and the sound of their guns at night, were found to have a most satisfactory effect both on our own and the enemy troops.

The close and intimate training of tanks and infantry is essential if the best results are to be obtained. Where the tanks are to fight with well-trained infantry who know and trust them, then we have no difficulty in answering the question which forms the title of this article. Under such circumstances there is only one type of country that is non-tank country, namely, that terrain over which it is physically impossible to move the tanks even with the use of explosives, tank dozers or any other artificial aids that are available or can be improvised.
