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CANADIAN ARMY TRAINING MEMORANDUM

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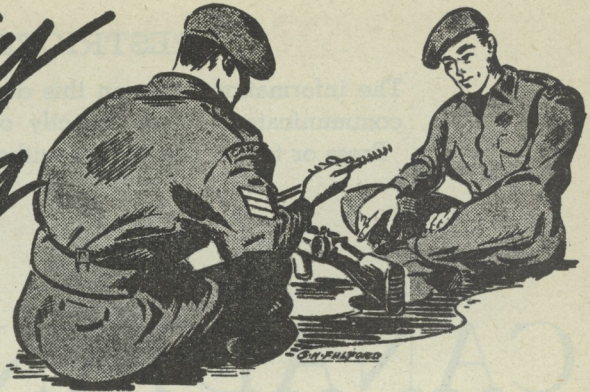
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Military Training



MAKING HORSE SENSE

Under the heading of "How Good is your Unit Security?", an article in the January issue of CATM drew attention to certain regulations which would form the basis of good security at any Headquarters.

All the rules and regulations in the world, however, would be worthless without the understanding, goodwill and true loyalty of all concerned. This is particularly true in the field of security.

It is because we in Canada believe in these principles, that we do not find it necessary to spy on each other, or to have armed guards everywhere, as was the case in Germany before the war.

The responsibility for security rests squarely on the shoulders of the individual service man. Security is his trust, therefore, **YOUR TRUST**.

You have achieved the distinction of being worthy of that trust if, over and above making yourself acquainted with the rules and regulations underlying good security, you have acquired the habit of being sensibly cautious in handling information that has become your stock in trade.

Here's a Test

The following are a few of the questions the individual might ask himself to find out how far beyond the written

order he carries out his duty in safeguarding his country's secret information:

1. Do you check carefully the identity of a visitor and give him just such information as he is entitled to have, or do you give anyone the "run of the place" who gives you a story?

2. Do you arrange the classified papers you are working with in such a manner that the casual visitor or passer-by cannot read them?

3. Are you always sure that everything is locked away in the safest possible place before the office is vacated?

4. When disposing of office waste, is a proper distinction made between ordinary waste and that containing classified information, and are special precautions taken in the disposal of the latter?

5. Do you look for loopholes in the security arrangement and endeavour to correct them by bringing them to the attention of your Security Officer?

Remember, rules and regulations to cover every possible security angle would be well-nigh impossible to draw up—so use horse sense and make your HQ as secure as possible considering what you have and what may be available to do it with.

CO-OPERATIVE TRAINING— INFANTRY AND ARMOUR

Here is a lesson on methods by which co-operation between infantry and armour may be taught. While it was designed for the instruction of the U.S. Army, the lesson contains many valuable pointers for Canadian officers of both the Infantry and Armoured Corps. The article is reprinted from the (U.S.) Armoured Cavalry Journal.—Editor.

Prior to and during World War II, much was written about the needs for co-operative training among the various types of combat arms. It was a generally accepted principle that Infantry, Artillery, Armour and Air Corps should all know how to work together. In spite of this accepted principle, however, units that were insufficiently trained in working with other units frequently entered combat. Practically all reports from the fighting fronts emphasized the necessity for co-operative training of all types of units. In some instances, these reports were specific with regard to the points to be covered; in other instances, the reports were merely

general statements which cited the need for co-operative training.

In the paragraphs which follow, the sentences in italics have been extracted from WD (U.S. War Dept.) Pamphlet . . . "Lessons Learned and Expedients Used in Combat," and bear either directly or indirectly on the subject of co-operative training of Infantry and Armour. By closely examining these statements from combat veterans, it is possible to draw certain definite conclusions as to the value and scope of co-operative training.

"Leadership is based on knowledge. First, every officer and enlisted man must know his job; . . . (This) is obtained in training; . . .

Practical Work

Whereas most military men readily accept the truth of this quotation, the fact is often overlooked that the knowledge itself must necessarily include a great deal of familiarity with the tactics and technique of supporting units, or of units that are acting in a supporting role. This knowledge can be obtained in many ways, but primarily, it is acquired by practical work and training with the different types of units . . .



"Remember, the little things make or break you in battle . . ." By thorough study, the military man learns through the experiences of others, but this study can become of value only by practical application of the principles learned. As the leader studies, he puts his knowledge to a practical test by working in the field, first with his own unit, then with his own unit as part of a larger unit, and finally with his own unit combined with units of other arms. Because of the importance of armour in present-day warfare, it is essential that infantry and armour take part in co-operative training. . .

"False alerts tend to make gun crews skeptical. Some units regard any tracked vehicle as a tank, and promptly report it as such. This destroys the efficiency of the warning system. Front-line troops should be thoroughly familiar with identification of enemy armour."

Although this quotation applies primarily to enemy armour, it is necessary for personnel to learn to identify vehicles of our own units, as well as those of the enemy. The best way to teach troops the difference between a tank and an ordinary tracked vehicle is to show them the actual vehicles. Such a demonstration should be one of the first steps in co-operative training. The armoured unit should furnish vehicles and personnel to train the infantryman, and the subject should be covered in such a way that the infantryman will be able to recognize by sight, sound or silhouette, all of the common types of friendly armour.

By thus becoming familiar with the armoured vehicles of his own Army, the infantryman, to a certain extent, automatically learns to identify enemy armour. Although it is true that he may not be able to differentiate between a German Mark IV or a Mark V, he at least will be able to tell whether the

vehicle in question is an enemy light or heavy tank or an enemy half-track.

While the infantryman is learning to identify armour, the tanker should be given an opportunity to examine infantry weapons and other important items of equipment. He should hear the various infantry weapons fired while he is near the location of the gun, and later while he is near the point of impact of the weapon being fired. In this way the tanker will learn to recognize infantry weapons by sound. . .

"Every soldier should be given a ride in a buttoned-up tank to show him the limited vision and field of fire, and the closed-off feeling of the tankers. It will do much to counteract the dread of a tank attack, and will increase faith in his own ability to resist one."

Although this quotation is specific as to one small point of training, it bears on a subject which is an important part of training—the capabilities and limitations of different weapons and units. . . . Armoured personnel, when used to instruct infantry, have an opportunity to do worthwhile boasting about the strong-points of their equipment; also they have an opportunity to inform the infantryman of their weak points and thus seek from him the co-operation and protection which is often necessary to make an armoured attack successful.

Points To Be Covered

This instruction should cover the ability of tanks to cross various types of terrain, the ability of the tank crew to see and hear, and to aim and fire their armament while at a halt and while moving. It should also cover the difficulties involved in the re-supply and maintenance of tracked vehicles, and the capabilities and limitations of tanks in the daytime and at night. Another point which should be emphasized is the invulnerability of armour to small-arms and time fire.

All the points mentioned above should first be explained to the infantryman. He should then be allowed to examine all of the equipment closely. He should be permitted to fire the weapons and to ride in a tank, and possibly even drive one for a short distance . . .

The Doughboy should be used in the same manner to train the tanker in the capabilities and limitations of infantry. During this period, the infantryman has his opportunity to boast about the many things that he can do well. At the same time he has an opportunity to explain to the tanker the things which the infantryman cannot do, and for the accomplishment of which he needs armour to help him. In this training the tanker is shown the characteristics of the principal infantry weapons. He learns the types of location from which they are fired, the ranges at which they usually fire, and the effect of the various weapons on armour plate. He becomes familiar with the methods which infantry uses to combat armour, and the best ways in which to guard against these methods.

"Infantry should be 'married' to the tanks to an extent that one tank company and one infantry company are blended as a unit . . . The infantry platoons sleep and work with the tank platoons."

This quotation emphasizes the most important part of any co-operative training. In this phase the infantry and armoured units should be employed together in the field as definite teams. If possible, the units should be blended together no higher than the company level. Their problems and exercises should be planned to cover all possible phases of technique. To teach technique, squad problems should be planned which involve the use of a rifle squad and a single tank section for clearing a woods, eliminating a strong-point, or reducing a road-block. These problems should be followed by platoon problems involving the use of a rifle

platoon and a section or platoon of tanks. Infantry and tanks should practice different formations, and should learn when to use each formation . . .

The infantryman will learn that when he has tanks supporting him he must protect those tanks. Likewise, the tank-er will learn that he cannot advance too rapidly without sacrificing the protection furnished him by the slower Doughboy against bazookas and anti-tank guns. There will be times when the infantryman can ride on tanks. There will be other times when infantrymen cannot be too close to the tanks without suffering heavy casualties from artillery and mortar fire. The infantryman will learn to be observant for anti-tank mines, and at the same time he will learn to walk in tank tracks in order to pass safely through an anti-personnel mine field . . .

Real Co-operation

Only by real co-operative training will units be able to render reports such as the following one from the European Theatre of Operations:

"We rode eight men on a medium tank and six on a light tank, all on the rear deck. We first sent out a wave of tanks buttoned up, put time fire from the artillery on them, and followed with the tanks carrying the men. The artillery observer rode with the leading wave and controlled the fire, setting his fuses a little high. To insure control by the Infantry CO and the Tank CO, I put them both in the same tank. The Infantry CO hung his SCR-300 on the outside of the tank, and worked directly with tha' part of his battalion which followed. Infantry company commanders could talk to tank platoon commanders by telephones hung on the back of the tanks.

"We fought this way for eight days and nights, and the foot soldiers loved the scheme. A disadvantage: It fails to use most of the crew-served weapons. We are going to try to utilize the heavy weapons company by riding it on tanks."

SHOULD WE STUDY WORLD WAR II?

" . . . whatever be the destructive power of the weapons we possess, there will always be a necessity for organized forces on land, on the sea, and in the air. Thus, to a soldier, preparation for the future signifies a study of the past." This is the conclusion reached by Colonel Chassin, of the French Army, in the accompanying article, which is a condensation of a review published originally in "Revue de Defense Nationale" (France). The condensation is reprinted from the (U.S.) Military Review.—Editor.

It is not unusual to hear it said today, in certain military circles, that it is absolutely useless to study the history of World War II. This theory is based on the fact that during the six years of fighting, the belligerents made use, almost exclusively, of "classical" matériel: tanks, guns, machine guns, planes, submarines, battleships, carriers. It was only at the very end that "revolutionary" weapons: jet-planes, remote-controlled equipment and, finally, the atomic bomb, appeared.

For various reasons, the belligerents hardly had the opportunity to use these newer weapons. As regards the future, therefore, we are reduced to the expedience of conjectures. The study of war conducted with wholly antiquated matériel would be a waste of time.

Regarded from another point of view, however, there are able theoreticians who contend that the laws of warfare are eternal. Although the weapons employed in various wars may be completely changed, the principles of strategy or tactics are still of value.

As a matter of fact the employment of arms has always required the raising of more or less organized armies whose evolution may be easily traced through



" . . . modernized guerilla warfare . . . "

history. In all the struggles between armies, whatever their importance, the art of war has always been based on a certain number of "principles." Naturally these have been presented in different manners. In the case of Marshal Foch, four of these principles sufficed: economy of forces, freedom

of action, freedom of disposition of forces, and security. Certain modern military writers raise the number to nine: pursuit of a single objective, priority in offensive action, concentration, mobility, surprise, co-operation, economy of forces, security, simplicity. In the case of others everything may be summed up in a single rule which contains all the others: the insuring of maximum forces for the decisive battle.

Whatever the discussion along these lines may be, it is entirely accurate to say that the principles of the art of war are eternal.

As long as armies are required it will be necessary to train army officers who will be fully imbued with these principles, and it is because of this that the study of the last war will be particularly fruitful, even if it is admitted that the weapons that were employed in it were definitely obsolete.

There is another aspect of the problem that is of still greater importance. The main preoccupation of the General Staff, charged with the protection of the nation, is to determine what the form of tomorrow's conflict will be, what weapons will be employed in it, what method of warfare will be followed. In order to be able to see accurately into the future, all we need to do is study the past.

No Revolution

There is never really any revolution in the art of war. It is only necessary for those on whom the responsibility falls to prolong the curve in the proper direction. That made by the French in 1914-18 had led to the defence doctrine as expressed in the Maginot Line, while that made by the Germans led to armoured divisions supported by Stukas. The Germans, in this case, had obtained the correct vision and victory was the reward for their correct estimate of the direction of the curve. The problem presents itself in the same form today. It is absolutely necessary

to study the past carefully in order to discover there the germs of future trends.

Wintringham attempted to deduce the general laws of the evolution of methods of warfare. He calls attention to the fact that three times in a thousand years, armed forces have crossed the Meuse at Sedan. The first time they marched on foot, the second time on horseback, the third time in tanks. His study led him to divide military history into six alternating periods, three of them characterized by the absence of armour, the other three by the presence of armed forces.

"Armoured" Periods

The "armoured" periods are characterized by the creation of a shock instrument: the phalanx, the legion, or the armoured division, striking like a hammer by means of "shock" weapons: poignards, pikes lances, bayonets, or short-range guns. In the face of this irresistible attack, the defence becomes more and more mobile, and assumes greater depth and less density. The armour then seeks greater suppleness and becomes an auxiliary to the other arms.

Little by little these light weapons assumed greater importance and the armoured arm, which had been too cumbersome, its effectiveness gone, disappeared for a time. It reappeared when it found the means, through the acquisition of speed and the perfection of its armour, for passing through the defence network of the hostile weapons.

In the evolution of war we also discover "constants". The increase in the radius of action of weapons is one of them, but it is to be noted that this did not prevent the soldiers of World War I from engaging in hand-to-hand combat. Another "constant" is the continual evolution in the direction of greater mobility on the part of the organized forces. A third is the evolution in the direction of a continual

augmentation of the destructive power of projectiles. A fourth, and one which is much more important, shows us that each new offensive weapon will automatically bring about a new defensive weapon.

The appearance of fire-arms, and that of aviation, certainly constituted turning points in military history and there is no doubt that the advent of the atomic bomb will constitute a third, which is more important still.

Shock Weapons

Other writers have divided history in another manner. General Fuller perceives in it periods characterized by shock weapons, and periods characterized by ballistic weapons. However, he asks whether war is not, after all, mainly a matter of armament, and, convinced of the capital importance of the latter in an era of scientific research such as ours, he declares that where effective weapons are discovered, they constitute ninety-nine per cent of what is required for victory. Strategy, command, courage, discipline, organization, and all the moral and physical accessories of war are nothing alongside great superiority of armament. It is the machine and not the man that will win the war.

We may reply that the "constant tactical factor" will intervene some day or other to neutralize the effects of technical surprise, and that, moreover, no technical surprise (with the exception of the uranium bomb), ever brought about a decisive victory. The human factors are always important. It is true, however, that the industrial period in which we are living is causing a considerable acceleration in the evolution of forms of warfare.

Considered merely as a shock weapon, the German panzer division failed in the first Russian campaign. Secondary weapons reappeared—artillery and aviation above all. In October 1942 at El Alamein, there occurred another

failure on the part of armour, this time because of mines. It was the Infantry which made the hole in the enemy lines in order to permit exploitation by the tanks. Later, in France, we see aviation playing a leading role in the break-through at Avranches and in the stopping of Rommel's counter-offensive as well as at Aachen, on the Sarre, and in the Ardennes.

Though the tank remained one of the dominant weapons of World War II, can it not be declared that the hour of its decline has arrived? Indeed, the advent of the hollow charge and of very high power explosive calls for vehicles with armour of enormous strength which, if built with adequate armament and provided with sufficient personnel, would constitute monsters with neither mobility nor speed, twin brothers of the mail-clad knight, incapable of rising to his feet if he ever fell from his robust steed.

It seems, therefore, that we have arrived at the eve of the end of the third "armoured" period. It is now our task to discover what the secondary weapon is that will dethrone the tank, lord of the last battles. As always, ballistic weapons will follow after shock weapons. These ballistic weapons may be of two sorts: first, bombs dropped from the air by planes with or without pilots; second, missiles in the form of very long range bombs hurled directly from one territory to another, even across oceans.

New Projectiles

The defence principle following in the case of a dangerous weapon (such as aviation), consists in exacting from the attacker so high a toll of losses that the latter will discontinue his action. Now, in the present case, the problem is complicated by the fact that the effects of the new projectiles are incomparably greater than any that we have heretofore known. Hiroshima and Nagasaki are the evident proofs of

it, since they probably saved the Americans an invasion and a year of war. We have here a new fact which will obviously upset all present strategic conceptions of national defence and lead us to a revision of our usual types of conceptions of national defence.

What means of defence can be used against the atomic bomb? Preparation for it, and the dispersion of the population of large cities and of industries should be the first preoccupation of the governments. The Germans had worked a great deal along this line—and they had only conventional bombs of a maximum of ten tons' weight to contend with. The atomic bomb will remain, at least for some time, a costly and relatively scarce weapon. It will not pay except on objectives such as Paris, London, or Moscow. In the case of cities of 30,000 or less, its use would not be warranted.

Going underground, in the case of key industries, is the second necessity. A barrier of a few dozen meters of earth will be, for a long time yet, the best defence against even an atomic explosion. This, again, is a course the Germans had started to follow. We must learn to install all assembly works underground.

Lastly, the employment of uranium requires an extremely reliable intelligence system and the possibility of immediate reprisal. The enemy that is able to act by surprise will possess a very great initial advantage if the measures of dispersion have not been taken with sufficient speed. Now, unless he stakes everything on one play, the enemy will proceed to carry out his own dispersion before launching his attack. This will be the new "mobilization." It must be carried out in time, otherwise it will spell disaster.

Elimination of Armies?

Is the appearance of modern weapons going to lead to the elimination of armies? This is the question which

will solve the problem stated at the beginning of this article, the principles of war being applicable only where there are armies to be led into battle. Let us note that it is not at all certain that future belligerents will make use of the uranium bomb. During the last war they neither made use of chemical nor bacteriological warfare. As soon as each is aware that his enemy is able to make use of the same method, he will think twice before he starts fighting. Hitler did not make use of gas, though he was sure of air superiority in 1940.

The reason there will always be a need for armed forces is that there is little likelihood that the decision can be obtained by the use of new weapons exclusively. Some nations are capable of resisting even after the destruction of their principle cities. Moreover, belligerents without organized forces and in possession only of the new weapons would find themselves in the situation of the two fortresses, each attempting to destroy the other by means of artillery fire. It is finally necessary for one of them to go on foot and end the attack. For—and we arrive here at a second and most important point—no matter what the means may be with which we conquer the enemy, it will always be necessary to occupy his territory, and this thought justifies the argument for the necessity of armed forces.

We should note, finally, that as soon as one occupies enemy territory and the troops of the attacking country are mixed with the population of the attacked country, the employment of guided missiles becomes very hazardous, and we see then the possibility of maintaining for modernized guerrilla warfare an important complementary place in military operations.

It is certain, indeed, that guerrilla warfare has acquired in Russia and China a place of considerable importance. The threat suffered by the

German and Japanese rears, the continual cutting of communications routes, the precious information transmitted to the Russian and Chinese General Staffs, the ambushes and surprise attacks at the moment of their own attacks, accelerated the defeat of the Axis powers. Tomorrow, the development of aerial transportation may still further perfect this guerilla action.

Heavy Matériel

At the present time the transportation of intelligence agents and the dropping of arms and ammunition have been perfected. Already, light tanks can be carried by freight-carrying planes and tomorrow the transportation of entire combat units and heavy matériel will have become commonplace.

Guerrilla operations will have to be conducted by a population which, during the course of its military service, will have been instructed and will have received the necessary training in such operations—the study of camouflage, marching in small groups, dispersion and rapid assembly, employment of the terrain, and close combat methods.

All of these are things found in the military instruction given to "commandos."

In addition to defence, it is necessary to know how to maintain possession of a country in which the entire population is trained in guerrilla methods. It is in the Russian armies that we are able to find the solution to this problem. The Russian army that invaded Germany was, in fact, composed of two very distinct types of units: first, combat units—combinations of Infantry, and sometimes cavalry, supported by powerful aviation—then, innumerable partisan formations charged with the task of carrying on "counter-guerrilla" operations.

Hence, whatever be the destructive power of the weapons we possess, there will always be a necessity for organized forces on land, on the seas, and in the air. Thus, to a soldier, preparation for the future signifies a study of the past. Those who desire to become military leaders should pore over the old texts as well as over the more recent ones, and, finally, of course one should study the last world conflict.

WHAT MIGHT HAVE HAPPENED

There can be no doubt that the greed and the mistakes of the war-making nations, as well as the heroic stands of the British and Soviet peoples, saved the United States a war on her own soil. The crisis had come and passed at Stalingrad and El Alamein before this Nation was able to gather sufficient resources to participate in the fight in a determining manner. Had the U.S.S.R. and the British Army of the Nile been defeated in 1942, as they well might if

the Germans, Japanese and Italians had better co-ordinated their plans and resources and successive operations, we should have stood today in the western hemisphere confronted by enemies who controlled a greater part of the world.

Our close approach to that terrifying situation should have a sobering influence on Americans for generations to come. — *Former General of the Army George C. Marshall.*

ARMOUR

Fourth in a series of articles on tank construction, this instalment deals with Armour. Part 1 of Armour was published in the January issue of CATM. The series, written by H. Harris-Jones, Senior Technical Officer at the School of Tank Technology, England, is reprinted from "The Tank," a British publication. They were submitted for publication in CATM by the Directorate of the Royal Canadian Armoured Corps, Army Headquarters, Ottawa.—Editor.

PART 2

The first article on armour discussed, somewhat broadly, the qualities to be desired in any material to be used for tank protection and the experimental work done to find the best material available: it then indicated the type of information gained from this experimental work—in particular what standards of immunity were to be expected against British projectiles under varying conditions of attack. Given certain essential details about the dimensions of foreign projectiles, there is no difficulty in estimating accurately enough what standards of immunity are to be expected against them.

Armour Distribution: The next stage to be tackled is: how should a given weight of this armour be distributed between hull and turret, and between front, side and rear aspect of each? The shape and size of the vehicle will have largely been predetermined on such considerations as what room is wanted inside, what transport and bridging restrictions exist, etc., so the thicknesses of armour allotted to the various aspects can be related to the weight allotment. The great difficulty about this stage has been that tactical

situations and enemy reactions can never be foreseen, and so no clear-cut armour priority scale has ever emerged. One rather vague principle has always existed: the front must be stronger than any other part—but how much stronger? One answer sometimes put forward is the front and sides must be equally immune to a given gun sited at a given range on a line making 30° with the fore and aft axis of the vehicle (see Fig. 1). Front AB and side AC to be equally immune to gun at P.

In fact, such a balance is quite artificial; it will not necessarily hold for another gun at a different range on the same line; that is, a range can be found at which the gun will just defeat one aspect and not the other.

Power of Attack

The biggest incentive to the more intensive studies of this problem in recent years has been the deterioration of all-round tank protection in relation to the ever-growing power of attack. In spite of its being so large a proportion of the weight of the tank, the armour allowed has, in general, been inadequate, and so guiding principles as to how to make the best use of the allowance are more than ever essential. Moreover, the user must have confidence in the principles, hence this attempt to explain

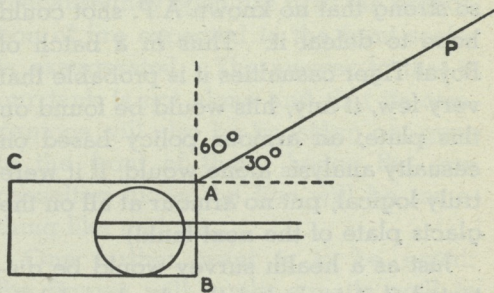


FIG. 1.

as simply as possible how an admittedly difficult problem has been approached.

Battle Casualties Amongst Tanks:

It is often argued that the designer can find answers to all of these questions by studying what has happened to large numbers of tanks which have been knocked out in action, i.e., that the general picture obtained should help the designer to design the best guard against such attacks in future. In fact, though these casualty analyses are of great value in many ways, they are apt to be misleading on this problem of armour distribution, because:

1. From recovered or abandoned vehicles it is impossible to tell the range and difficult to tell the direction from which the shot has come, hence there is great difficulty in determining what the anti-tank defences were really like.

2. Abandoned tanks are often targets for later casual pot-shots.

3. The analyses usually only deal with casualties recovered into workshops or abandoned on the scene of battle; they may fail to record anything about such tanks which were hit but survived to go on fighting somewhere else. It is probably justifiable to say that these survivors are more likely to have survived hits on the strongest part of the tank (the front) than hits anywhere else.

4. There may be occasions—chiefly when the tank is head-on—when the anti-tank gunner does not open fire because he knows it is useless to do so. (The glacis plate of the Royal Tiger was so strong that no known A.P. shot could hope to defeat it. Thus in a batch of Royal Tiger casualties it is probable that very few, if any, hits would be found on this plate; an armour policy based on casualty analysis alone would, if it were truly logical, put no armour at all on the glacis plate of the next tank!)

Just as a health survey would be distorted if it included the dead and hospital patients, but excluded the healthy

and those that got better without treatment, so, according to (3) and (4), must the picture of anti-tank defences be distorted if it is based on tank casualties only.

Essentially what the designer is concerned with is not so much what did or probably will happen, but rather with what can happen to tanks in action; the ideas and policies discussed here derive from attempts to clarify that issue. It is not known whether and how far similar policies in other countries have been influenced by the same concern, but it is significant that design trends everywhere appear to have gone the same way: heavy front armouring and relatively light side armouring. As compared with the Matilda, for instance, the Royal Tiger side armour is only some 30 per cent thicker, while the front armour is at least 100 per cent thicker everywhere and up to 200 per cent thicker in some parts. Why this disproportion?

Density of Fire in Terms of Direction: Let it be imagined that a large circular tank (see plan in Figs. 2 and 3) is pushed forward up to and through positions such as AXB. Lining these positions at regular intervals are anti-tank guns. Fire is not to be opened at any range greater than 1,000 or 1,500 yards; once opened, the fire is to be kept up at a fixed rate. As the tank comes up to, through and beyond the line, fire is progressively to die down so as to simulate anti-tank casualties. The aiming point is 0 and each round is assumed perfectly aimed for line, but to be scattered in elevation. The count of impact holes on the vertical line through P on the surface of the tank will be the measure of the density of fire from direction RO. Such densities will obviously vary with the variations in AXB, but they will not vary greatly from the typical figures shown below. (These were worked out mathematically on similar assumptions.)

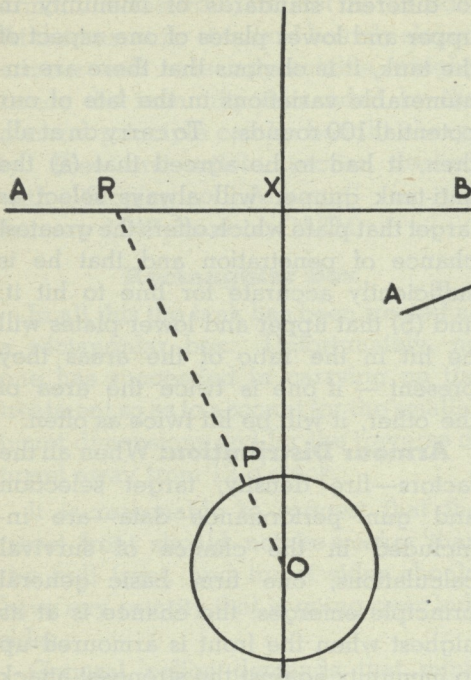


FIG. 2.

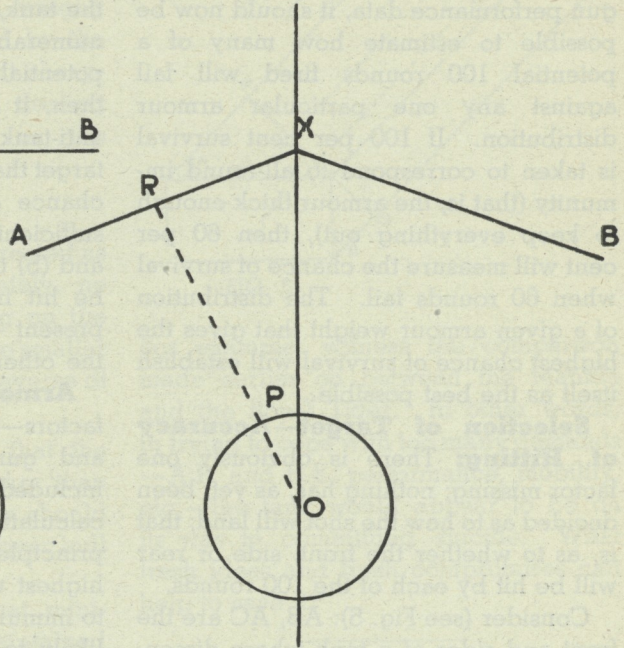


FIG. 3.

$X'OX$ is axis of advance of tank. Figures inside give the number of rounds out of 100 that are expected to fall within the sector. (See Fig. 4).

(NOTE:—Percentages for much smaller sub-divisions of sectors have been worked out and used for calculations.)

These figures are taken to represent the proportions of potential fire from all round the tank.

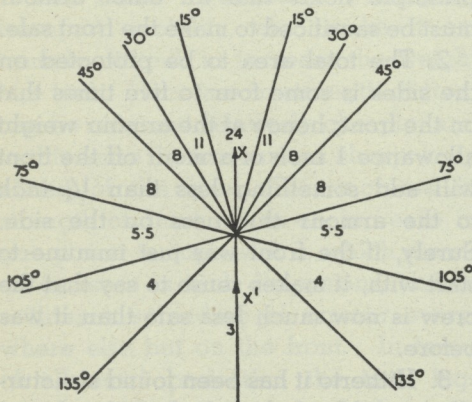


FIG. 4.

The Wind-Break

The only analogy to this that one can suggest is that of the wind-break; if the material available is inadequate for all-round protection, then what is put up should face the prevailing wind. The anti-tank defences envisaged here are considered to be the most adequate conceptions of the "prevailing" or average anti-tank defence. A probable objection is that insufficient or false account is taken of guns knocked out of the line; that as the earliest ones to go are probably the ones directly in front (because they open fire first) the proportion of fire expected in the front sector is exaggerated. The answer to that is our tank is not alone and that its companions will also be knocking out guns to the front of them; hence the gun casualties along the line will be something like uniform.

One further point is to be noted: the figures will apply equally well to our tank on the defensive against an attacking line of enemy tanks.

Chance of Survival: With these density of fire figures and with known gun performance data, it should now be possible to estimate how many of a potential 100 rounds fired will fail against any one particular armour distribution. If 100 per cent survival is taken to correspond to all-round immunity (that is, the armour thick enough to keep everything out), then 60 per cent will measure the chance of survival when 60 rounds fail. The distribution of a given armour weight that gives the highest chance of survival will establish itself as the best possible.

Selection of Target—Accuracy of Hitting: There is obviously one factor missing; nothing has, as yet, been decided as to how the shot will land; that is, as to whether the front, side or rear will be hit by each of the 100 rounds.

Consider (see Fig. 5): AB, AC are the front and sides of a tank whose dimensions are so small compared with the range that CG, AG, BG to the gun may be taken as parallel. Suppose the anti-tank gunner aims at the tank as a whole, I being his aiming point. The number of rounds that hit will depend on the size of PQ (i.e., the angle x°) and on the accuracy of the gun at one particular range. On a tank of normal dimensions, if x° is greater than about $26\frac{1}{2}$ per cent, AP is greater than AQ and more shots will land on AC than on AB; if x° is less than about $26\frac{1}{2}$ per cent., more will land on AB than AC. But suppose the gunner is able to select the side plate and to aim at J, then, if x° is large, all the shots will probably land on AC (perhaps a very few will hit AB). As x° gets smaller more shots will fail to hit; the majority of hits will be on AC, but a bigger proportion than before will fall on AB. If AB is aimed at, the chances of hitting and the number of rounds falling on AB and AC respectively will show a wholly different pattern.

When to these "line" complications are added possible ones in elevation due

to different standards of immunity in upper and lower plates of one aspect of the tank, it is obvious that there are innumerable variations in the fate of our potential 100 rounds. To carry on at all, then, it had to be agreed that (a) the anti-tank gunner will always select as target that plate which offers the greatest chance of penetration and that he is sufficiently accurate for line to hit it; and (b) that upper and lower plates will be hit in the ratio of the areas they present — if one is twice the area of the other, it will be hit twice as often.

Armour Distribution: When all the factors—fire density, target selection and gun performance data—are included in the chance of survival calculations, one firm basic general principle emerges: the chance is at its highest when the front is armoured up to immunity against the strongest attack likely to be met. Further, the chance appears to drop rapidly if the immunity falls below this, but only drops gradually if the front is over-armoured at the expense of the sides and rear. A few comments may help to make these conclusions more acceptable:

1. Selection of target and certainty of hitting have been assumed; on the above principle this would operate most on the side armour. Hence, even on the worst count of vulnerability, i.e., that the enemy should be able to concentrate on the weakest part of the tank, the principle holds that all other armour must be sacrificed to make the front safe.

2. The total area to be protected on the sides is some four to five times that on the front; hence at the armour weight allowance 1 inch of armour off the front will add something less than $\frac{1}{4}$ inch to the armour thickness on the side. Surely, if the front was just immune to start with, it makes sense to say that the crew is now much less safe than it was before.

3. Hitherto it has been found structurally possible to mount heavily sloped

armour on the front, but not on the side. At the immunity standard heavily sloped armour will save appreciable weight; hence the immunity demanded by the general principle can be bought cheaply. (See first article, section dealing with "Sloping of Armour," in the January 1947 issue of CATM).

Rectangular Box

In all this the tank has been treated as a rectangular box. Unfortunately, no one has succeeded in carrying on the treatment so as to account for the smaller turret dimensions and for the traverse of turret away from 12 o'clock.

It is reasonable to suggest that the turret front should not be weaker than the hull front, and turret sides should have any priority that is going over hull sides.

General policy demands that minimum standards of safety be maintained overall; the sides and rear must be safe against ground fire (high-velocity anti-tank rifles) and H.E. blast, the top, sides and rear against air cannon attack, air bursts, etc., the floor plates against mines, the rear strong enough to stand towing stresses. When these have been satisfied, all priority must go to the front. If immunity against the heaviest attack is not feasible, then the chance of survival will be so small as to be negligible; it is probably better then to redistribute against the second heaviest attack.

The Tank "Deadlock": Bridging, transport, mobility, etc., make it extremely difficult to increase the weight of a tank. Increase in strength of front can be obtained relatively cheaply, and in this sense the armour can always keep ahead of the gun. This increase in strength of front forces an increase in gun power to cope with it, which means an increase in tank dimensions, and so a thinner spreading of armour everywhere else but on the front. In terms of all-round protection the tank lags further and further behind the gun.

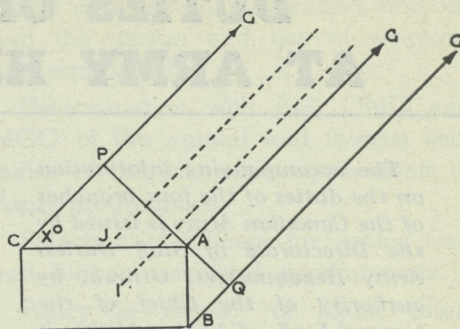


FIG. 5.

For example, witness the comparison made earlier on between the Matilda and the Royal Tiger. In other words, in trying to cope with too many demands —A.P. and H.E. performance, mobility, etc.—the tank would appear to be on its way to committing suicide. What fresh ideas and fresh compromises can help to save it?

THE RECORD SPEAKS

The Army that won the war needs no definition, apology or justification by me or anyone else. Its record speaks for it. It was the finest military organization the world has ever seen. It was perfectly adapted in quantity and quality to the tasks assigned it. In the accomplishment of these tasks it covered itself with everlasting glory. — *General of the Army Dwight D. Eisenhower.*

RAM JET

Hurling airplanes or guided missiles through space at supersonic speeds, a "flying stovepipe" developed by the Navy may power the weapons of a future war. The ram jet, as it is called, is essentially a hollow pipe into which air is scooped and compressed by its own speed; fuel is injected and burned; the exhaust streams out the rear, giving a thrust like a rocket. — (*U.S. Infantry Journal*).

DUTIES OF BRANCHES AT ARMY HEADQUARTERS

The accompanying information on the duties of the four branches of the Canadian Army is issued by the Directorate of Staff Duties, Army Headquarters, Ottawa, by authority of the Chief of the General Staff. CATM publishes it in the belief that it will be of considerable assistance to officers of all Corps.—Editor.

GENERAL STAFF BRANCH

Chief of the General Staff: The Chief of the General Staff is the senior military appointment at Army Headquarters. He is responsible to the Minister of National Defence for the duties performed by the General Staff and he is charged with the coordination of the military duties performed by the Branches of the General Staff, the Adjutant-General, the Quartermaster-General and the Master General of the Ordnance.

Vice Chief of the General Staff: The Vice Chief of the General Staff acts for the Chief of the General Staff in the latter's absence. He directs on behalf of, and is responsible to the Chief of the General Staff for the duties performed by the General Staff Branch as follows:

All questions of military policy concerning the security of the country and the organization and employment of the Army. Military strategy and plans and their integration with those of the Naval and Air Services.

Advice as to the conduct of operations of war and orders in regard to military operations.

Collection and collation of military intelligence; security, ciphers and

measures of military secrecy; military aspects of questions relating to field censorship, and of press, postal and telegraph censorship.

Communication with Chiefs of the General Staffs of the other portions of the Empire and with Canadian Military Attaches and Missions abroad. Control of information released to, and liaison with Foreign and Allied Military Attaches.

Topographical Work

The collection of topographical information of military value, preparation and distribution of all maps required for military purposes and control of survey services. Distribution to the Army of air photographs.

War organization; the composition of the Army and its allocation to theatres and commands; policy in respect of the employment of manpower as it affects the size and efficiency of the Army; questions relating to command and to staff organization and procedure, and channels of communication; policy in respect of mobilization; selection of units for Active Service and their preparation for despatch for service abroad; rates of wastage of personnel; priority of replenishment of units and the determination of the reserves of reinforcements to be held in theatres of war; the examination of unit organization and, in consultation with the Adjutant-General's, Quartermaster-General's and Master-General of the Ordnance Branches, the drafting, submission for approval and distribution of establishments and amendments.

The fighting efficiency of the Army. Analysis of current military developments and the formulation and dissemination of strategical and tactical doctrines; circulation of information on operations and the lessons therefrom.

Military Training

Military and trade training and the determination of standards of qualification; the organization and control of schools of instruction and training establishments, including the Royal Military College; selection of instructional staffs and employment of training cadres; preparation, translation and issue of military training manuals.

Policy in respect of accommodation for and location of field units and training establishments and the determination of priorities in regard thereto.

Education.

Plans for the movement of units at home for operational and training purposes, and for all movements of units to, from and between theatres abroad and the issue of movement warning orders in regard thereto.

Control of such libraries as are maintained for military training purposes.

Organization, supervision and training of the Royal Canadian Army Cadets.

Policy in regard to signal communications; the operation of communications to commands and theatres and of the Army Signal Office at National Defence Headquarters and the North-West Territories and Yukon Radio System.

Weapons, Equipment

Policy in regard to requirements, allocation and priority of issue of weapons and equipment. Coordination of policy concerning development and modification projects of warlike stores and concerning experiments, testing and user trials. Rates of wastage of materials and the determination of the reserves of equipment and ammunition to be held at home and abroad and (with MGO) policy in regard to their disposition, and the disposal of surpluses; the collection and dissemination of technical information.

Operational research including studies of the employment of personnel and equipment to determine improve-

ments in organization, training methods and the design and use of weapons and equipment.

Determination with AG, QMG and MGO of the annual and interim estimates of the financial requirements of Army programmes.

Selection of officers for senior staff and higher command appointments.

Policy in respect of loans, interchanges and attachments of all ranks with other Armies.

Arrangements (with Branches concerned) in connection with visits of foreign or Commonwealth military parties or individuals to the Canadian Army and its establishments.

Collection, scrutiny and custody of war diaries, documents and other records of historical nature; the compilation of historical information and of official histories of the Canadian Army and its operations; direction of Army War Artists.

The duties laid down for the Inspectors-General when such appointments are unfilled.

BRANCH OF THE ADJUTANT-GENERAL

The Adjutant-General is charged with, and is directly responsible to the Minister of National Defence for, the following functions:

He is responsible to the Chief of the General Staff for ensuring that the policy evolved by his branch and the plans developed by it, are consistent with overall military policy and plans, and that matters pertaining to, or arising from, these functions are co-ordinated, as necessary, with the other branches of the staff.

(a) The preparation and issue of mobilization instructions; executive arrangements for the formation and mobilization of units, and their adher-

ence to approved organization and establishments.

(b) The supply of all officers and other ranks to the Army, and their disposal when their services are terminated. This responsibility includes:

(i) The determination of the numbers and types of reinforcements required to make good estimated wastage, in peace and in war; arrangements for the provision of such reinforcements and (with QMG) for their despatch to units in accordance with priorities laid down by the General Staff.

(ii) Statistics, forecasts, records, returns and plans related to manpower requirements; advice to the Chief of the General Staff in respect of manpower problems affecting the size of the Army.

(iii) Recruiting, enlistment or enrolment and discharge of other ranks; selective examination of recruits and their allocation to Corps, and to trades and duties; the organization and control of depots to carry out these functions.

(iv) Demobilization, discharges, and retirements to Pension, and matters affecting the Army in respect of releases to civil life, rehabilitation and re-establishment; liaison with Departments of Veterans Affairs, and National Health and Welfare.

(v) Arrangements, with CGS, QMG and MGO, for the operation of the Selection Committee, and executive duties connected with the selection, appointment, promotion, reclassification, disposal and retirement of officers.

(vi) The preparation and maintenance of the Canadian Army List.

(vii) The preparation, maintenance and custody of the personal records of all officers and other ranks in the Army; organization and control of Records offices.

(viii) Notification of casualties to next-of-kin; statistical records of casualties.

(ix) Medals, Honours and Awards.

(x) Personal questions affecting other ranks as individuals; appeals and complaints.

Personnel Work

(c) The administration of personnel of all Corps of the Army. This responsibility includes:

(i) The discipline of the Army and the administration of military law; organization and control of the Provost Corps.

(ii) Policy regarding leave and furlough.

(iii) The morale and welfare of the Army.

(iv) Claims against the Army, and compensation.

(v) The administration of messes and regimental institutes (except messing which is a QMG responsibility); the auditing, control and administration of mess and regimental funds and of garrison and regimental institutes and their funds.

(vi) Arrangements under the Militia Act in aid of the Civil Power.

(vii) Promulgation of General, Routine and Administrative orders and instructions to the Army (but not including orders dealing with military operations).

(viii) Ceremonial; instructions regarding the orders of dress on special occasions.

(ix) Arrangements for the burial of the dead (including enemy dead); funerals; receipt, custody and delivery to the Director of Estates of the effects of the dead; registration of graves and notification of locations to next-of-kin; arrangements for provision of cemeteries and the concentration of graves.

(x) Plans for unit movement within Canada (other than operational and training movements) and the issue of warning orders in respect of such movements.

BRANCH OF THE QUARTERMASTER- GENERAL

(d) The organization and administration of the medical, hygiene and sanitary, dental and nursing services and of hospitals and associated establishments; hygienic and sanitary or other measures for prevention of disease and preservation of health; the care of the sick and wounded and their evacuation and (with QMG) their repatriation if necessary.

(e) Scales of issue, and provision, inspection, receipt, storage and issue of medical and dental supplies.

(f) The organization and employment of the pay services. The preparation, promulgation and administration of pay and allowance regulations (other than those dealing with QMG matters). In consultation with the Deputy Minister the issue of orders and instructions required in connection with finance.

(g) The organization and employment of the Chaplain Service; the spiritual care of the Army.

(h) The collection, reception, movement (with QMG), custody and disposal of prisoners of war; their welfare administration and discipline. The organization and employment of guards for prisoners of war. Ensuring that the terms of International Conventions relating to prisoners of war are observed and that all questions relating to prisoners of war or enemy dead are resolved in accordance with such conventions.

(i) Arrangements in respect of the employment of military personnel in industry and the organization and employment of industrial labour units; arrangements (with CGS) in respect of the employment of troops on other than military duties.

(j) Advice to CGS in respect of the technical training of personnel of services and corps controlled by the AG.

(k) Preparation and notification of scales of issue of stationery, office equipment and supplies.

The Quartermaster-General is charged with, and is directly responsible to the Minister of National Defence for the following functions:

He is responsible to the Chief of the General Staff for ensuring that the policy evolved by his branch and the plans developed by it, are consistent with overall military policy and plans, and that matters pertaining to, or arising from, these functions are co-ordinated, as necessary, with the other branches of the staff.

(a) Quartering the Army, which includes policy and arrangements as to provision of accommodation by construction, purchase, hire, billeting and, in war or emergency, by requisition.

(b) Acquisition, including requisitioning, care and custody of lands and training areas.

(c) Barrack services, including: allotment and record of accommodation; receipt, issue and accounting of— heating equipment, fuel, water, light, disinfectants for barracks and messes, and paille straw; removal of ashes, rubbish, privy soil and manure; chimney-sweeping and window cleaning; snow-removal; disinfestation of buildings.

(d) Design (to General Staff requirements in the case of ranges and operational works), specification, construction, inspection and maintenance of military buildings, fortifications, ranges and works; supervision of construction work either by civilian contractors or by day labour and the performance of day labour works.

Engineer Materials

(e) Provision, inspection, storage and issue of engineer materials and static equipment required for construction and maintenance of works, buildings, fortifications, ranges and military roads.

(f) Advice to General Staff on accommodation, works, fortifications, movement and supply problems related to conduct of war, and in regard to technical training of personnel engaged in these services.

(g) Movement of troops, animals, supplies and stores by sea, land and air; transportation questions at home and overseas; inland water transport; railway survey, construction and operation; port construction, development, operation and repair; loading and unloading, embarkation and disembarkation operations (except when controlled by the General Staff by reason of possible hostile action); arrangements to ensure the best possible conditions for the health and comfort of personnel and animals during long-distance movement; military security (with GS) in regard to movements and in dock areas.

(h) Design, specification and procurement of Army vessels and their operation, maintenance and repair.

Transport

(i) Road, animal and water transport. Inspection, upkeep, maintenance and operation of all vehicles on the establishment of RCASC units or driven by RCASC personnel, and repairs thereof to the extent of the facilities provided in RCASC unit workshops. Advice as to the administrative transport requirements of units of all corps.

(j) Control of employment (subject to requirement of the GS) of all load-carrying vehicles, both regimental and administrative, including lorries, cars, buses, ambulances and animal transport, in order to ensure the most economical use of Army transport.

(k) Specifications, forecast, provision, receipt, storage, inspection, distribution and scales of rations, forage, disinfectants, insecticides, light, water, solid fuels and petroleum products, and accounting therefor; catering and messing, collection and disposal of kitchen by-products, and miscellaneous salvage

resulting from supply services; Army agriculture.

(l) Fire protection and prevention.

(m) Control and operation of the Canadian Postal Services for the Navy, Army and Air Force through the medium of the Canadian Postal Corps.

Veterinary Stores

(n) Provision, storage, maintenance and issue of veterinary stores; provision, custody and distribution of animals for transport purposes.

(o) Policy and administration of travelling, lodging, fuel, light, stable, ration and forage allowances.

(p) Forestry, woodcutting and the production of lumber and fuelwood.

(q) Questions relating to claims and compensation for injury to animals and damage to buildings, lands and vehicles.

(r) Advice to CGS and AG in regard to the organization and mobilization of services controlled by the QMG's Branch.

(s) The employment of RCE works services and of the RCASC, CPC and CFC units, and of the pioneer, movement, fire, barracks, veterinary and remount services; advice to the AG on personnel matters affecting services controlled by the QMG.

MASTER-GENERAL OF THE ORDNANCE

The Master-General of the Ordnance is charged with, and is directly responsible to the Minister of National Defence for the following functions:

He is responsible to the Chief of the General Staff for ensuring that the policy evolved by his branch and the plans developed by it, are consistent with overall military policy and plans, and that matters pertaining to, or arising from, these functions are co-ordinated, as necessary, with the other branches of the staff.

(a) Provision, storage and issue of Ordnance stores, including guns, carriages, tracked, semi-tracked and wheeled vehicles, small arms, machine guns, ammunition and explosives, grenades, bicycles, chemical warfare appliances and materials, position and range finders, optical and electrical instruments, Radar equipment, Artillery and Signal equipment and stores, Engineer equipment (other than static equipment for the construction and maintenance of Engineer works), general stores, clothing and necessaries, barrack and camp (movable) equipment, tools and equipment for workshops.

(b) Establishment of the standard of inspection and maintenance and the repair and modification of the above equipment (excluding repair and modification of MT vehicles on the establishment of RCASC units to the extent of the facilities provided in RCASC unit workshops).

(c) The scientific development of, and research design and experiment pertaining to, the stores and equipment referred to in sub-para (a).

(d) Questions regarding inventions, patents, royalties and rewards.

(e) Inspection, while in stores or in possession of troops, of the stores referred to in sub-para (a).

(f) Ensuring that stores and equipment accepted by the Army are to the required standard of quality and specification.

(g) Determination (in conjunction with General Staff) of the quantities of ammunition, explosives and other Ordnance stores to be retained as reserves; and arrangements in regard to magazines including the guarding and technical care of, and safety precautions in relation to, explosives and ammunition contained therein.

(h) Advice to the General Staff on equipment problems related to the conduct of war.

(i) The preparation and notification of scales of issue of arms, ammunition, stores and equipment to units in peace and war; recording and notifying changes in war material.

(j) Salvage, and arrangements for the disposal of obsolete, surplus and condemned stores.

(k) Advice to the General Staff in regard to the technical training of RCOG and RCEME personnel.

(l) Dress regulations, clothing regulations, design and provision of badges and buttons.

(m) Advice to CGS and AG in regard to the organization and mobilization of services controlled by the MGO.

(n) The employment of the RCOG, RCEME, their Storage Depots and workshops, military manufacturing and research establishments, and caretakers of Armouries.

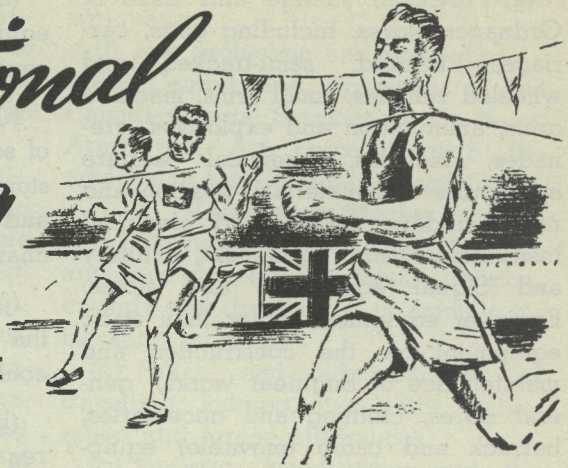
(o) Advice to the Adjutant-General on personnel matters affecting RCOG and RCEME.

(p) Plans for mobilization of civil manufacturing establishments.

OBEDIENCE ABOVE ALL

When valour runs counter to obedience and concurs in prejudicing the effects of a clearly expressed superior will, it must then be regarded as a dangerous evil, not in itself, but because of the disobedience involved. All things in war must give way to obedience.—*A Defesa Nacional (Brazil)*.

Recreational Training



INTERNATIONAL SKI RACES FOR MILITARY PATROLS

While Canada will not be competing, regulations governing the international ski races for military patrols scheduled to be held in February at Charmonix, France, will be of interest to military personnel who have taken ski training.

While lack of space precludes the publication of all the regulations, the more important ones are mentioned here. They were issued by Col. Faure, Director of Training for the French Army.

The races will be over a distance of 25 kilometres (approximately 15½ miles), and each patrol will be led and commanded by an officer and will consist of three ORs, i.e., one NCO and two privates or, alternatively, three privates. Officer candidates will be considered as NCOs, while lance-sergeants and corporals will be considered as privates.

Age Limit

While there is no age limit for officers, NCOs in the patrol must not be more than 30 years and privates not more than 25 years.

One officer and one private will be detailed as substitutes.

The question of travelling expenses of competing patrols must be agreed upon by the inviting nation and the guest nations.

The military patrol race with firing

is a sporting event open to military teams.

If possible, one-third of the course will be over flat or slightly undulated country, one-third uphill leading to a col and one-third downhill. The course will not include "traps" nor dangerous passages where contestants might lose the trail or sustain injuries.

Patrols will wear winter dress. The head-dress will be that of the unit to which the patrol belongs, i.e., field service cap, beret or forage cap, excluding steel helmets. The wearing of belts is compulsory, and each competitor will wear, on his left arm, an arm band bearing his national colours.

Weapons

Officers will carry a pistol or revolver in its holster and binoculars in their case. Each NCO or private will carry his own weapon, carbine or rifle, provided with a muzzle-cover. The weapon will rest on the pack, and the pack, including the weapon, should weigh at least eight kilograms (approximately 17½ pounds). Weight of the pack will be checked before the start and after the finish of the race. If it is found at the start that the pack weighs less than prescribed, it will be immediately added to. On the other hand, if, at the finish the weight of a pack is



Canadian Army Photo

Soldiers are seen here on a ski patrol.

found to be less than that prescribed, the whole patrol will be disqualified.

Three rounds will be fired by each of the three other ranks of the patrol, and the firing point will be approximately at the finish of the second lap of the course. Targets will be balloons placed at a distance of 150 metres

(approximately 164 yards) from the firing point. Targets will be 30 centimetres (approximately 13 inches) in diameter.

A number of awards consisting of diplomas, plaquettes, medals or prizes in kind will be offered by the inviting nation, exclusive of all prize money.



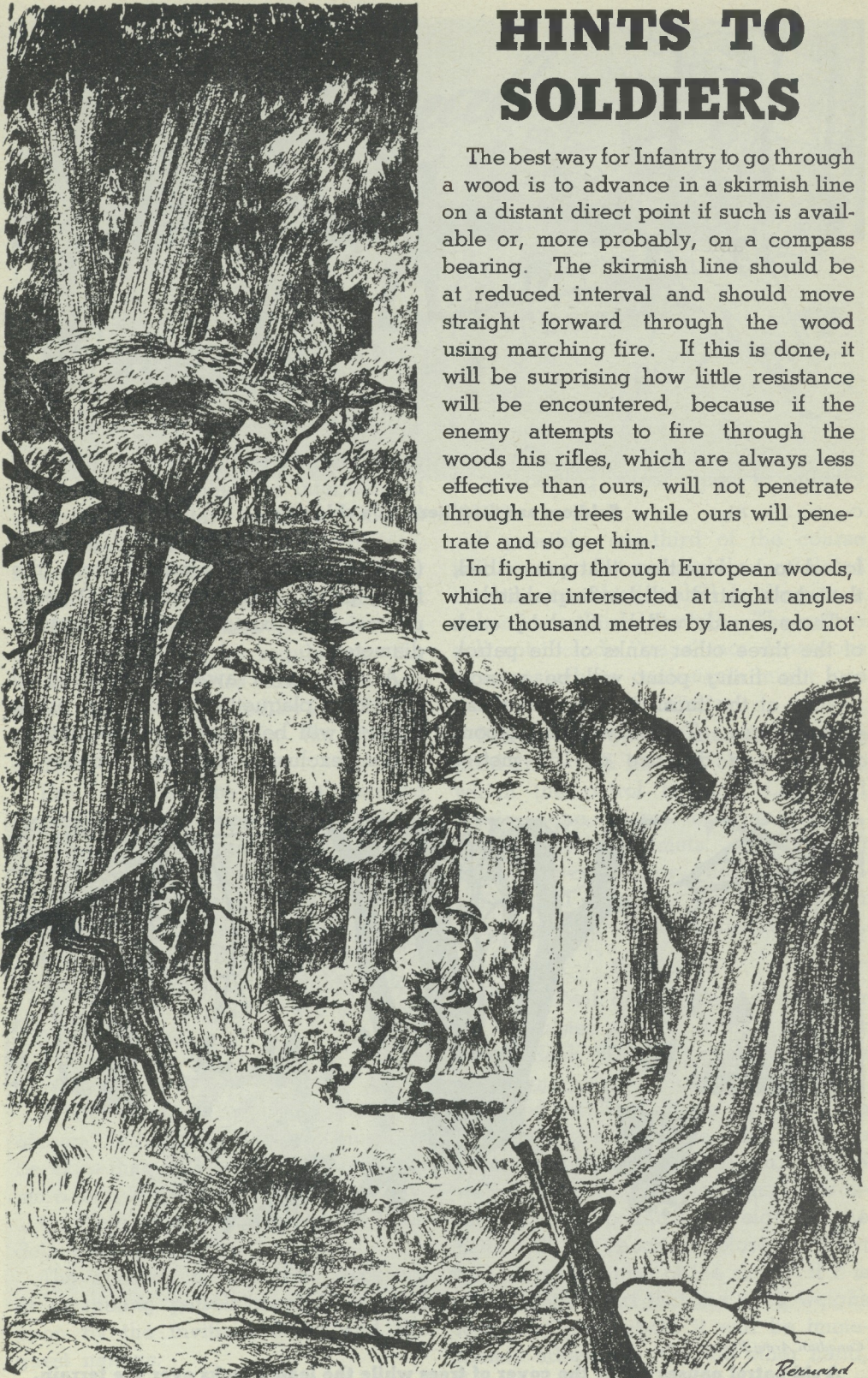
Canadian Army Photo

A ski patrol pauses under the cover of trees while the leader looks over the terrain.

HINTS TO SOLDIERS

The best way for Infantry to go through a wood is to advance in a skirmish line on a distant direct point if such is available or, more probably, on a compass bearing. The skirmish line should be at reduced interval and should move straight forward through the wood using marching fire. If this is done, it will be surprising how little resistance will be encountered, because if the enemy attempts to fire through the woods his rifles, which are always less effective than ours, will not penetrate through the trees while ours will penetrate and so get him.

In fighting through European woods, which are intersected at right angles every thousand metres by lanes, do not



walk down the lanes and be careful how you cross them—that is, cross them fast—because the enemy usually has them swept with machine guns.

Squads should seldom be split. However, if it is necessary to split a squad, be sure that the unit separated is at least capable of mutual support. This means that the unit separated from the squad should not be fewer than three men. The squad possesses in itself the weapons necessary for a base of fire and a manoeuvring element. This should be its invariable method of attack, but the squad leader should not spend so much time thinking which way he is going to envelop that he suffers casualties which would have been avoided had he attacked at once.

In small operations, as in large, speed is the essential element of success. If the difference between the two possible flanks for envelopment is so small that it requires thought, the time wasted in thought is not well used. Remember that the life of the Infantry squad depends on its capacity to fire. It must fire.

When a small unit disposes both 60mm and 81mm mortars in an attack, the 60mm mortars should fire on the front line of the resistance while the 81mm fire for depth and to hit the supports and heavy weapons.

Tanks and Infantry: The question of whether Infantry or tanks lead in attacking is determined by the character of the ground and of the enemy resistance. Whenever the ground permits tanks to advance rapidly, even with the certainty of a loss from minefields, they should lead. Through dense woods or against prepared positions or unlocated anti-tank guns, Infantry leads, followed closely by the tanks who act as close supporting artillery. But, irrespective of the foregoing, some tanks must accompany the Infantry when they reach the objective. These tanks are

This month CATM publishes the second instalment of an article extracted from a pamphlet called "Helpful Hints to Hopeful Heroes" written by the late General Patton, U.S. Army. The first instalment was published in the January issue of CATM. The article is reprinted from The (British) War Office Infantry Bulletin.—Editor.

for the purpose of removing enemy weapons which emerge after the passage of the leading tanks.

Pillboxes: Pillboxes are best attacked by the use of pre-arranged groups. A satisfactory group consists of two BARs (Browning Automatic Rifles), a bazooka, a light machine gun, two to four riflemen and two men with the demolition charge. Sixty pounds of TNT are ample. Before initiating an attack on a pillbox area a reconnaissance should be made to determine which boxes are mutually supporting. Those in such a group must be attacked simultaneously. The best results are obtained by a silent night attack which places the assault groups in position close to their respective pillboxes at dawn.

Apertures First

The apertures are immediately taken under fire and silenced. When this is achieved the demolition charge, covered by riflemen and light machine guns, is placed against the door at the rear of the pillbox, the fuse is lit and the men withdraw around the corner of the building. As soon as the charge is exploded riflemen throw in grenades—preferably phosphorous. Any enemy emerging are killed or captured, according to the frame of mind of the enemy.

When circumstances prevent a night operation, similar but more expensive results are obtained by advancing close in the wake of an artillery concentration.

Another adjunct to the attack on pillboxes is a self-propelled 155 gun where conditions permit its use. At short range the effects are very satisfactory.

Street Fighting: Street fighting is simply a variation of pillbox fighting. A similar group but reinforced with more riflemen is effective. The additional riflemen are split on opposite sides of the street so as to take under fire enemy personnel appearing in the upper stories on the side across from them. When a house offers resistance the windows are silenced by fire, as in the case of pillboxes, and under cover of this immunity a bazooka crew fires one or two rounds at the corner of the house about three feet from the ground. When a hole has been made by this means, phosphorous or HE grenades are thrown into the lower floor and cellar to discourage those operating there. The demolition essential in pillboxes is really not needed in street fighting.

In street fighting is is very essential to avoid hurrying. One group above described can usually clear a city block in twelve hours. When tanks are available they replace the bazookas in blowing holes in the walls of the lower floor. However, they must be buttoned up to avoid grenades from the upper floors, and should be further protected by riflemen to keep the enemy from the windows. Self-propelled 155mm guns are extremely useful in cities against moderate masonry construction. One round with delayed fuse will breach all the houses on one side of a city block if fired at a very obtuse angle.

Two-Way Attack: Wherever possible, beginning with the squad, use a base of fire and a manoeuvring element. The manoeuvring element should be the larger of the two forces and should start its attack well back from the point of contact of the base of fire. The manoeuvring force must proceed suf-

ficiently far beyond the hostile flank to attack from the rear. As soon as the enveloping attack or, better, the rear attack has progressed sufficiently to cause the enemy to react, the base of fire transforms itself into a direct attack along the original axis of advance.

River Crossings: In river crossings or assault landings there is a high probability that the boats containing a company or even a platoon will not all land at the same point. Therefore, each boat should be organized on a boat team basis and contain means for producing a base of fire and an encirclement. These boat teams should practise as such before embarking and each boat team in the assault wave must be informed of the geographical feature to which the assault wave is supposed to penetrate. This geographical feature, preferably a road or railway, should be far enough from the water's edge to prevent small-arms fire bearing on the beach. No beach head can be considered at all sure until it has advanced to a perimeter at least 8,000 yards from the beach and/or occupies the controlling terrain features. In a night landing, desperate efforts must be made to gain this distance before daylight.

Hill Fighting: During fighting in hilly or rolling country, platoons get widely separated. The best practice is for the support and reserve squads of an attacking platoon to envelop on the up-hill side. When you have once gained a ridge or a hogback, do not lose altitude.

Never attack along the bottom of a valley unless you have the heights on both sides in your possession. In all valleys there are geographical features which form obstacles to a direct advance and subject those on the valley floor to observed fire from the heights.

Fire On Infested Areas: Due to the pernicious traditions of our known

distance rifle marksmanship, we are prone to hold our fire until we see targets. In battle these are seldom visible. When any group of soldiers is under small-arms fire it is evident that the enemy can see them; therefore, men should be able to see the enemy but seldom are. When this situation arises, they must fire at the portions of the hostile terrain which probably conceal enemy small-arms weapons. I know for a fact that such procedure invariably produces an effect and generally stops hostile fire. Always remember that it is much better to waste ammunition than lives. It takes at least eighteen years to produce a soldier and only a few months to produce ammunition.

Surrender: Any soldier who surrenders with arms in his hands is not doing his duty to his country and is selling himself short, because the living conditions of the Prisoner-of-War are extremely bad. Also, the Prisoner-of-War is apt to become the unintended victim of our own air and artillery bombardment.

If the enemy indicates a desire to surrender, make him come to you with his hands up. Don't advance towards him and do not stop shooting until he does so surrender himself. When the enemy has surrendered he must be treated in accordance with the rules of land warfare.

Bridges: In river crossings all bridges must be one way—towards the enemy—until the situation has steadied. Prior to that time wounded and empty transportation come back in ferries.

In building an assault bridge over rapid water, put the anchor cable as high as possible—at least ten feet above the water. This will prevent the floats from submerging.

Mines and Wire: Do not use mines or wire on the defensive except in the form of booby traps to give warning of enemy prowlers. Mining and wiring a position has a very bad effect on the

morale of our troops. As a feint, however, mining and wiring may be useful. For example, we could put light wire in a dummy minefield across a section of the front over which we intend to attack and ostentatiously leave other sections of the front unwired, then when the attack starts we need not bother about the dummy minefield and the wire can be got rid of rapidly.

Methods of Attack: If, in a unit the size of a division, the attack is not going well four hours after it starts it is necessary to make a careful personal reconnaissance and see if it may not be necessary to change the emphasis, because four hours of fighting should produce substantial effects. This does not mean that a man should be wobbly about continuing in the fact of uncertain victory, but it does mean that after four hours one should know whether the thing is going to be a go or not, and if it is not he should slow up his attack on the old line while implementing it in a new direction.

Frontal Attacks: Do not try a sneak frontal attack at night or in the daytime against a dug-in enemy who has been facing you for some time. He will have ultimate bands of fire arranged. Therefore, he must be pounded by air and guns before you attack. This does not apply to a pillbox line. If the enemy is occupying the pillboxes and not the trenches outside them, a sneak attack is quite alright with the purpose of getting the troops in the immediate vicinity of the pillboxes just at dawn. If the enemy is occupying trenches outside the pillboxes he must be pounded consistently to make him take shelter in the pillboxes where he is much less dangerous than outside.

Night Attack In Woods: It is not necessary or advisable to attack through woods at night. In the first place, the woods themselves give the cover which the darkness does in the open. In the second place, it is almost impossible to

move through woods at night except in column on roads.

Open Country: In open country with isolated groups of trees, avoid occupying the trees because they will invariably be attacked by the enemy artillery and air. In this type of country use dispersal in open fields. You may be able to use the woods as a decoy to draw enemy fire by the emplacement of bad camouflage along the edge, but do not get in the woods yourself.

By the same token, do not occupy as a Command Post the only house on a hill, as I have seen done, and do not put your Command Post, as I have also seen done, in the immediate vicinity of a monument located on the map and which could be seen for several kilometres.

Large radio sets should not be in the immediate vicinity of a Command Post or of each other. They should be separated, camouflaged and communicated with by telephone. Otherwise the enemy air will home on them and get the Command Post.

Use of Wire: In all attacks, make the maximum use of wire lines and use every effort to keep it up with the advancing units. Radio, while theoretically efficient, is not as good as wire and should be considered as a secondary means of communication. On one occasion we actually launched a tank attack by quite a large number of tanks at the end of 17 miles of wire.

Time Fire: Either proximity or normal time fire is very efficient as a means of covering a tank attack and will frequently prevent the enemy from manning his anti-tank guns. Tanks can move with perfect impunity under time fire provided by either 105mm or 155mm projectiles. Proximity fuses in woods are wasteful, because the projectile explodes above the top of the tallest trees and fragments are absorbed in the woods before they get down to where they will have much effect on the enemy.

In shelling woods to produce casualties, use slight-delay fuses so they will not burst until they hit a reasonable size limb or tree trunk.

Envelopments: Vertical or horizontal envelopment for tactical effect should not go too deep or be too large. The best results are attained when the envelopment arrives in or just back of the enemy's artillery positions. Here you disrupt his supply and signal communications and his guns and are close enough to the troops advancing along the axis to be sure of making contact in reasonable time.

Cemeteries: Do not place military cemeteries where they can be seen by replacements marching to the front. This has a very bad effect on morale even if it adds to the pride of the Graves Registration Service.

Haste and Speed: There is a great difference between these two words. Haste exists when troops are committed without proper reconnaissance, without the arrangement for proper supporting fire, and before every available man has been brought up. The result of such an attack will be to get the troops into action early but to complete the action very slowly.

Speed is required by making the necessary reconnaissance, providing the proper artillery and other tactical support (including air support), bringing up every man and then launching the attack with a predetermined plan so that the time under fire will be reduced to a minimum. At the Battalion level, four hours spent in preparation for an attack will probably insure the time under fire not exceeding thirty minutes. One hour spent in the preparation of an attack will almost certainly insure time under fire lasting many hours with bloody casualties.

Place To Attack: Never attack where the enemy expects you to come. It is much better to go over difficult ground where you are not expected than

it is over good ground where you are expected. This remark applies to units to include the division. For corps and larger units, an exception is necessary, in that such units must take ground where roads and railways permit the establishment of lines of supply. These roads and railways will probably be defended. The point is that the division must secure them by attacking over hard ground and not by going up the railway or road.

Fire and Movement: The policy of holding the enemy by the nose with fire and kicking him in the pants with movement is just as true as when I wrote it some twenty years ago, and at that time it had been true since the beginning of war. Any operation, reduced to its primary characteristics, consists in moving down the road until you bump into the enemy. It may be one road or it may be several roads. When you have bumped, hold him at the point of contact with fire with about a third of your command. Move the rest in wide envelopment so you can attack him from his rear flank. The envelop-

ing attack should start first. The initial nose attack starts to move forward only when the enemy has properly reacted to the enveloping attack. Then the direct attack can go in easily and fast.

Covering Detachments: Make the maximum use of mechanized and armoured reconnaissance and covering detachments. In actual war, these merge into each other. In general, they should consist of a reconnaissance troop reinforced by at least a platoon of medium tanks with Infantry riding on them.

Maximum Use of Vehicles: In a modern Infantry Division, if every available vehicle—tanks, armoured cars, gun carriages, AA guns and trucks—is utilized, no soldier need or should walk until he actually enters battle. While the sight of a division moving under this system is abhorrent to the best instincts of a Frederickian soldier, it results in rapid advance with minimum fatigue. Units so mounted are dismounted by placing a sign or even a guidon on the side of the road indicating the dismounting point.

LIQUIDATION OF THE LUFTWAFFE

The two main tasks of the RAF in Germany are the disbandment of the *Luftwaffe* and the destruction or disposal of its equipment and factories. Both tasks are expected to be completed within the next few months.

One interesting feature of the disarming of the *Luftwaffe* is the great quantity of poison-gas bombs and shells found. It is estimated at about 400,000 tons in the British sector alone. Thousands of rockets and flying bombs have been discovered, a great many of the latter adapted to be flown by a "suicide" pilot.

The RAF disarmament section has

discovered 6,589 dumps of various kinds of weapons and equipment, besides factories and workshops which had worked for the *Luftwaffe*. The armament disposal section has destroyed or made harmless over 93,000 tons of explosives, ranging from V-weapons to anti-personnel bombs, 84,000 tons of small arms and machine guns, tens of thousands of rounds of ammunition, and 1,200 tons of miscellaneous equipment. From this total some 32,000 items of equipment have been sent to England for intelligence and experimental purposes.—*The Times Weekly Edition, Great Britain.*

HISTORY OF THE UNIVERSITY CONTINGENTS CANADIAN OFFICERS TRAINING CORPS

LAVAL UNIVERSITY CONTINGENT

Histories of three more University Contingents of the Canadian Officers Training Corps are published in this month's issue of CATM. They are the Laval University, University of Saskatchewan and St. Thomas University Contingents.—Editor.

Authority for the formation of a Canadian Officers Training Corps Contingent at Laval University, Montreal, Que., was granted in March 1914, Lt. Col. (then Major) E. T. Paquet, m.s.c., being appointed Commanding Officer. The Unit consisted of two companies, No. 1 Company under command of Capt. J. S. Tousignant, formerly of the 80th Infantry Regiment, and No. 2 under Lieut. G. O. McLean, who had served with the 61st Infantry Regiment.

No one could be better suited to command the Unit than Maj. Paquet, who had already been responsible for the organization and training of the various Cadet Corps of the 5th Military Division (Quebec). His ability to initiate students into military life was soon to be proven when, shortly after the outbreak of the First Great War, the greater part of the Contingent, which then numbered approximately 100, went to form the nucleus of the 41st Infantry Regiment. The remainder of the original Contingent was to follow Maj. Paquet himself when he organized the 57th Infantry Regiment early in 1916. This Unit, however, was soon to be disbanded to provide reinforcements to Units already overseas, and consequent-

ly, Maj. Paquet was not allowed to proceed overseas until early in 1918.

Increased To Two Companies

The next event of importance in the life of the Contingent was the formation of a company composed exclusively of members of the COTC who were to proceed abroad as a single Unit. Again, through Maj. Paquet's efforts, the response far exceeded what had been anticipated, and authority had to be obtained to form two companies instead of the one originally authorized.

From a total of 900 applicants, 460 were selected, and one of the two companies soon left Canada for England under command of Maj. Paquet. There the Cadets completed their training before being posted to the various Units already in action.

Shortly after the departure of the first company, a further group of 35 members of the Contingent were sent overseas. At the conclusion of the war, the Contingent provided another detachment which proceeded to Siberia

with the Canadian Expeditionary Force. Altogether, the Contingent trained close to 1,000 officers from the date of its organization to the cessation of hostilities.

On the reorganization of the Canadian Militia in 1920, Maj. Paquet was succeeded by Maj. Charles Fontaine, M.C., a former member of the Contingent who had served with the 22nd Battalion, CEF, during the war. Shortly after the reorganization, however, the authorized strength of the Contingent was reduced from two companies to one with a total of 126 all ranks. A further decrease in



Lt. Col. E. T. Paquet, m.s.c., first Commanding Officer of the Laval Contingent.

strength took place in the succeeding years, and the inevitable result was that no extensive training was carried out for some time.

In 1926, Maj. E. Légaré, E.D., was given command of the Contingent, which had a strength of five officers and 59 ORs. Maj. Légaré, who was soon to be promoted to the rank of Lieutenant-Colonel, retained command of the Unit until October 1943. It was during the first year of his term as CO that the Contingent, which had hitherto had its quarters at the Grand-Allée Drill Hall, moved to the University where it was to remain until the latter part of the Second Great War. This move did much towards making the Contingent an integral part of the University.

Fresh Enthusiasm

Although operating with greatly reduced strength, the new CO wasted no time in bringing a fresh enthusiasm to the Unit, and the marked increase in the number of Cadets attending the War Office examinations for their "A" or "B" certificates came as a well deserved reward and brought the Contingent to a much higher degree of efficiency. It was also under his command that, for the first time, the Contingent took part in the Armistice Day observances, and from that time on the Armistice Day parade

was to be a regular parade of the Contingent each year.

On April 1, 1934, a General Order once more authorized the Contingent to function on the basis of a two-company battalion with a total strength of 187. From then on the strength increased until the outbreak of the Second Great War, when it reached a total of more than 1,600.

In May 1937, the Contingent was represented at the Coronation of King George VI and Queen Elizabeth, along with other Canadian Units. The next outstanding event was the participation of the Unit in the celebrations which took place on the occasion of the visit of the King and Queen to Quebec in May 1939. This was the longest parade ever attended by the Contingent, lasting from 0700 to 1800 hours. The same year the Contingent had the distinction of numbering amongst its Cadets the winner of the third prize in the annual competition of the Infantry and Machine Gun Association—Cadet Yves Dupuis, who later served with the RCA.

At the outbreak of war, more than 100 members of the Contingent were qualified officers and five had already joined the Permanent Force. The advent of war had brought a considerable increase in the activities of the Con-



Members of the Laval University Contingent of the COTC are seen here taking ski training during the war years.

tingent and, by Oct. 28, 1940, its strength had increased from two to seven companies—three Infantry, two Artillery and two Medical. The Contingent then became responsible for the training of more than 1,650 Cadets.

By 1942, more than 300 men from the Contingent had joined the Active Forces, and this number increased steadily each year until the end of the war.

New Commanding Officer

In October 1943, the Contingent lost Lt. Col. Légaré. He had served for more than 17 years, and the part he played in developing the Unit will be long remembered. He was temporarily succeeded by Maj. J. A. R. Gravel, and in February 1944 Lt. Col. R. Garneau, E.D., took over the command. Lt. Col. Garneau was a member of the original Contingent and served with the 22nd Battalion, CEF, during 1914-18.

The Contingent is at present being reorganized under the new COTC Training Programme, which offers students far greater advantages than they formerly received. Lt. Col. A. F. Cannon, who served with the Royal 22nd Regiment during the Second



Lt. Col. E. Légaré, E.D., Commanding Officer of the Laval Contingent from 1926 to 1943.

Great War, has been given command of the Unit, and there is no doubt that, as the new programme becomes better known to the students, the Contingent will continue to play a vital role in the production of officers for the Canadian Army, both Active and Reserve Forces.

UNIVERSITY OF SASKATCHEWAN CONTINGENT, COTC

At the outbreak of the First Great War in August 1914 the University of Saskatchewan was preparing to open its sixth academic session. The University was still very young, and there were only some 400 students. Despite the paucity of numbers, however, no time was lost in drilling professors and undergraduates who were answering the call to the colours. Such was the birth of the University of Saskatchewan Contingent of the Canadian Officers Training Corps.

In December 1915, this volunteer group took more official shape under command of C. J. Mackenzie, a young lecturer in Civil Engineering, who later became a Major and was decorated with the Military Cross for gallantry in the field. The embryo Contingent developed into the most gratuitous of military formations—a draft-finding unit. And so the Saskatchewan men reinforced the McGill University Contingent the Princess Patricia's Canadian Light

Infantry and the 28th and 46th Battalions.

67 Gave Lives

The First Great War, striking the young University so early in its history, made a profound and permanent impression. Memorial Gates at the entrance to the grounds remind the passing undergraduates of the 67 men who gave their lives in the struggle, while the stairways and corridors of the building where the first platoon "formed fours" are surrounded by the names and exploits of professors and students who went from its halls to serve. The Chair of English bears the name of Reginald Bateman, the first young occupant who fell in France.

When the war was over, the effect of these early experiences passed from sentiment to activity. A keen young professor of dairying—Arthur Potts—reorganized the Contingent in 1920, and the work of training undergraduates to qualify for "A" and "B" certificates was commenced.

The size of the Contingent expanded and contracted in response to the varying moods of the student body concerning national defence. At one time a group left to join the RCAF, and among them was Wing Commander E. Macnab, who was later to lead the First Canadian Fighter Squadron in the Battle of Britain. A steady stream of men qualified for commissions in the Infantry, Engineers, Artillery and Medical Corps, and the records show that without the contribution of the COTC, Canada could never have made her swift and decisive contribution to the call for action in 1939.

Early Contribution

By 1939, at the outbreak of the Second Great War, the University of Saskatchewan had developed into a vigorous institution with a student body of 2,400. From the very first weeks of the conflict the Contingent began to make its contribution. The Commanding Offi-



Dr. J. S. Thomson, M.A., D.D., LL.D., F.R.S.C., President of the University of Saskatchewan and Honorary Lieutenant-Colonel of the University's Contingent, COTC. Dr. Thomson wrote the accompanying article on the Contingent's history.

cer, now Col. Arthur Potts, took off a pip and marched away at the head of the Saskatoon Light Infantry with the first Canadian Contingent to proceed overseas, and his battalion was officered almost entirely by men who had qualified in the COTC. This distinguished officer afterwards led the expedition to Spitzbergen, and was finally promoted to the rank of Major-General.

The first Commanding Officer of the Contingent, now Dean Mackenzie, was summoned to replace Lt. Gen. A. G. L. McNaughton as Acting President of the National Research Council; the present Commanding Officer, Lt. Col. J. H. Thompson, then Second-in-Command, took over the duties of DAAG at District Headquarters. These are only two examples of the type of men produced by the Contingent for an hour of emergency.

From the very outset of the second world conflict it was realized that the weapons of war had undergone great



Lt. Col. J. H. Thompson, E.D., Commanding Officer of the University of Saskatchewan Contingent, COTC.

changes, mainly through scientific and technical developments. This conviction was sharpened by the terrific onslaught of the German armies in their drive first into Poland and then into France and the Low Countries. Air power, mechanized movement on land and the need for an expanded navy all combined to compel swift and thorough planning. The Universities entered the picture as the sole source of fresh highly-skilled and well-trained leadership for the making of munitions, for scientific research; for technical officers in navy, army and air force; for doctors and dentists; for men to teach navigation, to operate radar equipment; for engineers to man corvettes, to construct maps, to build railways and manage machines.

Men had to remain at the Univer-

sities until they were ready for action. Meanwhile, they must also be trained in the rudiments of military discipline and prepared to meet the emergencies of war. Under these conditions the COTC entered a new phase of rapid expansion. An Auxiliary Battalion was formed, and by 1940-41, 1,100 men were mustered on parade. The Acting Dean of Engineering, Maj. R. A. Spencer M.C., assumed command, and he was joined by a number of academic colleagues, not a few of whom put up their campaign ribbons and revived their early years in the First Great War as they exercised their platoons and companies in the Rutherford Rink.

From the ranks of the Contingent a steady stream of young men went out into the forces—791 into various branches of the army, at least as many into the RCAF, and not a few to the navy. Morale was high and an excellent spirit prevailed as the Contingent became an integral part of University life. In 1941, Lt. Col. Thompson returned to take over command, an appointment which he still retains.

One of the happiest aspects of the Contingent's history has been the leadership provided by the academic staff. All the Commanding Officers have been outstanding professors, and, especially during the war, the Contingent was led almost entirely by members of the faculty or senior students.

The Contingent now enters a new phase of its contribution to national defence, but the continuous history of the Unit from the earliest days of its inception is one on which ideals of unselfish service, combined with fine comradeship, have written a shining page into the life-story of a young prairie University.

ST. THOMAS UNIVERSITY CONTINGENT, COTC

St. Thomas University Contingent of the Canadian Officers Training Corps was the first COTC Unit to be organized in MD 7 after declaration of war in 1939; two other universities had Corps functioning before the war.

Organized in February 1941, the St. Thomas Unit consisted of Company HQ and two Infantry platoons. The Commanding Officer was 2/Lt. (later Lieut.) H. R. Hay of Chatham, N.B., who was attached from the local Company of the North Shore (N.B.) Regiment, 2nd (Reserve) Battalion. He was at the same time Acting CO of the latter Company.

Lieut. Hay, who was killed in action in Italy, served the Corps with enthusiasm and a great capacity for work, and considerable credit must be given to him for enlistments, exceeding 340 all ranks, from the unit to the Active Army.

Much credit is also due to Capt. the Rev. James Hill, then President of St. Thomas University and now Bishop of Victoria, B.C., who was instrumental in obtaining authority for the formation of a Contingent at the University. His efforts also resulted in the same authority being granted for Contingents at the Universities of St. Joseph and Sacred Heart.

All Gained Commissions

All the officers and NCOs appointed in 1941 later gained commissions in the Active Army, two of them attaining their majority.

When Lieut. Hay enlisted for Active Service the following year, Capt. the Rev. Dunn of the University faculty was appointed Commanding Officer. Capt. Dunn had seen service in the First Great War. He continued as CO of the Corps until the autumn of 1945, when Capt. Donald Moar, a former member of the Contingent, returned from service

overseas and was given command. With the help of his student officers and NCOs, Capt. Moar spent considerable time and effort in the training of the Unit.

The Contingent had the only Drum Corps and Bugle Band at the annual COTC training camp for the first three years, and it took part in all ceremonial parades and military funerals in St. Thomas. The Unit also supplied the guard for the Cenotaph at Remembrance Day observances.

A High School Cadet Corps, organized by Rev. T. McKendy, a member of the faculty, was affiliated with and served as a "feeder" for the Contingent.

When the Training Film Library was organized at Military District HQ, Rev. G. Harrington loaned his personal movie equipment to the Unit and also trained several COTC members as projectionists.

In 1943, Saturday morning classes at the University were changed to Wednesday afternoon in order to give the COTC the full use of Saturdays for training purposes. The Saturday syllabus, which provided periods of training from 0600 to 1800 hours, also included inspection of rooms and beds by the Orderly Officer and the regular army bugle calls.

Assistance Given

The local Reserve Battalion, the North Shore (N.B.) Regiment, under Lt. Col. A. Leger, gave assistance whenever requested and supplied the Contingent with equipment and courses for officers and NCOs. Maj. A. H. Clark, Second-in-Command of the Regiment before he was posted to Active Service at Camp Utopia, gave the Contingent all possible help, particularly with respect to courses. "A" Company of the Regiment also took part in several training schemes

A BRIEF REVIEW OF PERSONNEL SELECTION IN THE CANADIAN ARMY

By Capt. C. M. Mooney, Directorate of Organization, Army Headquarters, Ottawa.

The Canadian Army—in two world wars—has been, despite its small size, the most potent of striking forces. It has consistently aimed at maximum operational efficiency by utilizing the most modern and scientific of technological and administrative techniques. In the field of personnel management it has been without peer. It has made intensive use of psychology, social science, psychiatry and medicine in order to develop and use individual abilities to the full and to promote and maintain health and morale at the highest level. In this, major evidence of success lies in such facts as the low incidence of physical and emotional break-down in the Canadian Army in battle; the smooth and successful civilian rehabilitation of its half-million veterans; the outright adoption by the Royal Canadian Mounted Police of the Army system of Personnel Selection; the adoption by the British Army of the PULHEMS System; the employment by the Departments of Veterans Affairs and Labour of Army personnel counsellors and administrators; and the employment by various large industrial organizations of trained Army personnel officers and psychologists. Obviously, many interesting articles could be written on Army personnel work alone. The one that follows is descriptive of one major phase.—Editor.

Canada's entry into the war in September 1939 required an immediate pyramiding of arms and materials and a concentration of manpower to use them and manpower to produce them. As a country rich in material resources and productive power, Canada undertook on the one hand to field and equip an Army, Air Force and Navy and on the other hand to equip the manpower of her Allies. The result was apparent by 1941—namely, Canadian manpower was at a premium and had to be utilized with greatest possible efficiency.

This meant, so far as the Army was concerned, that each soldier must be used at his optimum ability. The untrained man had to be trained to the top of his bent. The man possessing a civilian skill adaptable to Army uses had to be placed according to his skill and further trained to even higher skills. It was clear, too, by 1941 that a modern Army must be diverse, technically specialized and complex in its parts, its final form and components blue-printed far in advance. There

could be nothing haphazard about its creation.

Quick development of a technical Army in which manpower should be used at its optimum required, therefore, adoption of techniques and procedures designed for:

1. Elimination of the militarily unfit and untrainable at point of reception and their deflection into useful industrial production.

2. Early assessment of both potential and actual educability and technical ability of recruits with a view to early slanting of adequate numbers and types towards various specialist Corps.

3. Review of personnel at later training stages to ensure satisfactory progress and to adjust numbers between Corps in accordance with changing military requirements.

The Plan in 1942

Accordingly, by 1942, the Army had evolved the following tools and agents to realize the above objectives:

1. Corps Training Centres—to train specifically according to the arm

(RCAMC, RCASC, RCOC, etc.)

2. Master Quotas—to provide, first, at Reception Centres, the proper apportioning of total intake to the various Corps and, second, within Corps, to assign personnel to the various types of trades and specialist training.

3. Personnel Selection—a body of officers whose function was to employ psychological and scientific methods in assessing and assigning manpower according to the governing quotas.

4. The PULHEMS System — refined medical assessment couched in language understood by administrative officers and indicating the optimum physical, mental and emotional assets of the individual soldier. (Not taken into use until October 1943).

It is clear from the foregoing that Personnel Selection was an inevitable and essential tool to effect those paramount goals envisaged by Army heads and to realize that economy of man-

power which was, for the nation, imperative.

At the end of 1941 the Adjutant-General's Directorate of Personnel Selection came into being, headed by Col. G. Brock Chisholm (later succeeded by Col. W. Line). The official terms of reference specified: "the evaluation of personality and the testing, psychologically, of personnel entering into and already enlisted in the Canadian Army, with a view to guiding personnel into the positions for which they are best suited, as well as advising in the selection of officers and other ranks to fill the varied types of appointments in the Canadian Army . . . also . . . liaison with RCAMC in advising Commanding Officers in the handling of personality problems which arise and which may adversely affect training, discipline, morale, efficiency and advancement at military establishments throughout Canada".

(Continued on next page)

ST. THOMAS CONTINGENT

(Continued from page 35)

with the University's COTC, which provided the Unit with considerable training experience.

The Contingent was provided with an A & T sergeant in 1943, and the strength was increased to four platoons in 1944. The unit was given as much weapon training as possible, particular attention being paid to the Bren, and before long every Cadet was considered a competent instructor for this light machine gun. The Unit had no firing range, but made use of a 30-yard range at the Chatham airport whenever possible.

In 1944 Capt. Dunn offered a shield for inter-platoon competition for General Efficiency. With Lt. Col. Leger as judge, the competition was recorded on a movie film which is still in possession of the Unit.

A Training Officer was posted to the Unit in 1945.

While training equipment and facilities were not all that could be desired, interest in training was maintained at a high pitch. This was reflected in the good records of former members of the Contingent who proceeded to other Universities.

Of the more than 340 all ranks who joined the Active Army, 42 were officers. They included Maj. E. Gorman, former Second-in-Command of the Contingent; Capt. J. B. Brown, who was killed in action in Europe; and Lieut. P. Smith, who was trapped in enemy territory but who evaded capture by the enemy for several months.

A COTC column in the University's newspaper helped to maintain interest in the Contingent.

Field Staff was immediately required. Officers possessing the most desirable qualifications (i.e. psychological training and skill, plus army training and regimental experience) were not available, being urgently needed as reinforcement and training officers. Accordingly, the Personnel Selection Staff had to be drawn largely from the civilian field—Universities and schools—personnel for the most part too old, or of too low category for combatant role. The original staff so created consisted of 43 officers, 54 other ranks and 56 stenographers—152 in all. The first disposition was 5 Army Examiners responsible respectively for these groups of MDs—(1, 2, 3), (4 and 5), (6 and 7), (10, 12, 13), (11 and Pacific). Assistant Army Examiners were located at District Depots and Basic Training Centres.

At CMHQ a Field Staff of 75 officers (Selection of Personnel Officers—SPOs) had been assembled by Feb 1942 and was soon at work interviewing personnel and assessing and recording their special abilities for future training and employment.

(By the latter part of 1945—three years later—these strengths had grown to, in Canada, 670 officers, and in UK and on the continent, 200 officers).

In the following years the work of Personnel Selection followed a simple and clear-cut pattern throughout. It was evident at each stage of the great assembly line by which raw recruits were taken from Depots and delivered to their overseas units as fully-trained soldiers—and of the reverse chain by which veterans returned to Canada and to civilian life. Let us note these various stages.

At each District Depot, Army Examiners assisted recruiting officers and medical officers in weeding out aliens, illiterates and untrainable personnel. Thereafter, they were solely charged with the responsibility of interviewing accepted personnel to assess individual abilities and skills and, having ascertained these factors, assigning personnel appropriately to the various Corps in strict accordance with the Adjutant-General's Corps quotas.

Army Examiners stationed at Basic Training Centres worked closely with



Men returned to Depot are being briefed on rehabilitation.



This sergeant is having a personal interview with a Personnel Selection Officer.

training officers and medical officers to ensure smooth initiation of recruits to military life, to avoid training losses and to re-assign personnel to other corps than those towards which they were first directed—whenever this was found to be in the interests of the service or was required by a change in category. These Army Examiners were also alert to note, from training progress, evidences of suitability for later specialized technical training.

Examiners' Duties

At Advanced or Corps Training Centres, Army Examiners' duties were similar to those at Basic Training Centres. In addition, however, they assisted Commanding Officers in determining which reinforcement personnel should be further trained as tradesmen and specialists for the Corps. Percentage of personnel selected for such training was strictly governed by AG Tradesmen and Specialists Quotas; individuals selected were those possessing the prescribed prerequisites in terms of education, learning ability, aptitudes

and interest. Proper selection at this stage by training officers and Army Examiners kept trade training wastage of time and personnel to a minimum and enabled maximum numbers of non-trades reinforcements to go forward without delay.

Overseas, SPOs (counterparts of Army Examiners) assisted other officers in ensuring that soldiers were posted to those duties for which they had been specifically trained and in reallocating personnel found unsuitable for or made unfit for their duties or who, through military exigencies, had to be transferred to other Corps.

Generally, as time passed and Personnel Selection became integrated into and known throughout the Army, Commanding Officers became increasingly confident of the abilities of Army Examiners and SPOs to "call their shots" in assessing and appraising individual soldiers. They increasingly relied upon them for advice in the matter of promotions, selection of officer candidates, disposal and appropriate

re-employment of personnel who proved to be miscast in their particular military roles.

Common-Sense Methods

It is not difficult to account for this. The higher incidence of successful prediction attained by Personnel Selection is explained by the use of simple common-sense methods which could not fail to prove superior to unscientific "random", "capricious", "rule-of-thumb" methods of appraisal and selection which were the only alternatives. Briefly, the methods of Personnel Selection were these:

1. The individual interview. At all times Army Examiners dealt with soldiers on a friendly "man to man" basis and thoroughly acquainted themselves with all aspects of the soldier's background, circumstances, training and experience. There was no magic in this; skill resulted naturally from the use of good sense and much practice in interviewing.

2. The single, cumulative record. The personnel document (MFM 196)

was initiated at the time a man joined the Army. Thereafter, all interviews, appraisals, observations and recommendations (by the various Army Examiners and SPOs along the line) were entered as "follow-ups" on this one original document.

3. Supplementary Aids. Tested measuring devices were used to supplement information concerning abilities and interests elicited by personal interview and observation and to modify or verify personal impressions of Army Examiners and other officers. The equipment comprised:

- (a) The "M" Test (indicative of learning ability).

- (b) Specifications for the Selection of Tradesmen and Specialists (established by a permanent Committee on Standards of Selection containing representatives of the AG, CGS, Medical Corps and Other Corps as required) comprising minimum prerequisites in terms of age, health, education, civilian experience, etc., for each trade and definable type of army employment.



A lecture on rehabilitation. The lecturer uses a blackboard to put his points across.

(c) Table of minimum PULHEMS profiles (Sec IV, P.S. & I.) essential for the proper performance of each type of employment in the Army, with a profile for each service area (i.e. Static, Base, Line of Communication, Operational).

While Personnel Selection Officers possessed no administrative authority and functioned within the "A" Branch solely as specialist advisors their duties nevertheless required such detailed knowledge of all administrative instructions affecting handling of personnel that in many instances approval of their recommendations by Commanding Officers and administrative officers became routine and automatic. In effect, many Army Examiners functioned like Assistant Adjutants responsible for the best employment, selection and disposal of all personnel within the unit.

Planning For Future

By the end of 1944 the time had clearly arrived to afford to our soldiers while in the service and particularly at points of discharge personalized and specific assistance in planning their civilian future. It was felt that the Army itself could best testify to each soldier's assets and abilities, as demonstrated during his years of military service. Since, moreover, an exceedingly flexible and far-sighted program of government rehabilitation aids and provisions had been provided, it was imperative that individual plans be unfolded with full knowledge of the rehabilitation provisions. It was agreed that the Army should fully acquaint soldiers with the rehabilitation program, assist them in maturing wise plans for their civilian re-establishment and write that recommendation (or letter of reference, or testimonial) which would secure for them all necessary assistance from the rehabilitation authorities.

This new undertaking, known as "In-service Counselling", was assigned

to the Director of Personnel Selection in December 1944. The decision was logical in view of many factors in the new work which were common to the work hitherto done by Personnel Selection. Counselling required the individual, "man to man" meeting and discussion which was a major feature of the technique of Personnel Selection. It required thorough review of the soldier's whole background (experience, training, age, personal circumstances, health, etc.)—and this was chronicled in detail on the Personnel Selection card (MFM 196). It required a good knowledge of trade skills, worker qualities, trainability, potentialities for further training—all of which was a great part of the working experience of each Army Examiner. Above all, it required a profound concern for the soldier as an individual and as a "citizen to be", and it was this concern which had characterized Army Examiners throughout their military careers.

At this point the goals and needs of all the Services were identical. All agreed on the necessity of preparing rehabilitation counsellors for their work by providing them with a thorough appreciation of the philosophy behind the rehabilitation program and an expert knowledge of the content and application of every detail of the complex enabling acts and orders.

Throughout 1945 hundreds of Counsellors (from the three Services and from the Depts. of Veterans Affairs and Labour) were trained in special monthly courses. For two weeks they received lectures by officials of the Depts. of Veterans Affairs and Labour on the philosophy and detailed facts of rehabilitation. Thereafter the Services provided a further two weeks practical counselling training in discharge centres.

By this means Personnel Selection developed a trained counselling staff numbering some 600 officers in Canada

and 300 overseas by January 1946. Some of these officers had formerly been Army Examiners but many more were regimental officers of field and overseas experience who were trained solely as Counsellors. Those working in units, training centres and field formations performed chiefly an informational role; those working in discharge centres did not only this but as well met every soldier, answered his questions, ensured his knowledge of rehabilitation was complete, assisted him in planning his future and prepared the Veterans Affairs document (WD 12) which introduced him and his plans to the officers of that Department who authorize and administer the particular rehabilitation provisions invoked on his behalf.

The Methods Used

It is of interest to note the methods used in this latter phase of the work of Personnel Selection:

1. Lectures and group discussions within units and in Depots prior to discharge. These served to tell the facts of rehabilitation and to initiate realistic planning by the soldier.

2. The individual interview permitted counsellor and soldier to review together the soldier's assets, limitations, skills, civilian opportunities and his wishes in the light of these to arrive at practical plans. They afforded opportunity, too, for the healthy airing of grievances and personal problems by the soldier; also, for a final personal expression to the soldier of the Army's appreciation of his service.

3. A written summary (WD 12) of the soldier's service, of his plans, and of the personal assets which indicated how the soldier could best rehabilitate himself.

4. The use of certain supplementary aids, as:

- (a) Current information about Canadian labour and industrial develop-

ments provided weekly by the Dept. of Labour and its regional offices.

- (b) Statistical information, social and psychological in origin, concerning the plans and attitudes of returning servicemen.

- (c) "Occupational Outlines"—a handbook descriptive of Canadian (civilian) occupations—prepared jointly by Personnel Selection Officers at NDHQ and occupational experts of the Dept. of Labour.

- (d) "Army Employment — Civilian Jobs"—a reference manual indicating for each Army trade the related civilian occupations—prepared jointly by the Army and the Dept. of Labour.

The foregoing is necessarily an oversimplification of the actual story. While the initial goals appear simple and reasonable, and their attainment comparatively straightforward, in fact, the development was difficult and often misunderstood. Nevertheless, as it was understood it was approved and its considerable success was of course due to the soundness of methods and techniques used and to the general approval, acceptance and co-operation given by all branches of the Army.

System Admired

Of undoubted significance is the fact that the Canadian Army has been widely admired for its compactness, administrative, technical and fighting efficiency; and among the major factors admitted as accomplishing this have been those briefly touched on above—the AG Quota system of providing reinforcements, the unique PULHEMS system of functional assessment and the technique of Personnel Selection—all designed to realize the most efficient employment of manpower.

The implications for a future Army seem inescapable. In the event of another war, and if it is postulated that such a war would be launched with great speed and characterized by an

TRAINING A CITIZEN ARMY

Memory (instinctive and unconscious) of a certain sequence of motions to be gone through whenever certain signs present themselves, is an important part of a soldier's training, according to the author of this article. Conditioned reflexes can be brought about by a simple drill which every instructor must be able to carry out before he teaches others. The writer is Maj. E. A. Runacres, Royal Engineers, and this material is a digest of an article originally published in the "Journal of the Royal United Service Institution" (Great Britain). CATM reprints the digest from the Military Review, a U.S. publication.—Editor.

Traditionally we do not like wearing uniform, and the only tocsin that can normally stir us to put it on is the sound of the enemy's first shot. Yet in two wars we have had to raise a large army—vast in comparison with the total population—and the possibility of having to do so again in the future cannot yet be entirely dismissed. The problems that arise in training a civilian

rather than a professional army have therefore a peculiar interest to us; any help that experience and science can give us in speeding and simplifying such a task must not be overlooked here.

In Britain it is certainly more necessary than in some countries for public explanations to be given of courses of action, especially those which affect the individual's freedom; but unless they take the form of a direct propaganda blast directed on him for civilian political ends, I do not believe that politics have a great deal of effect on the British soldier once at war and in uniform. He does not fight bravely because he believes that the object of the war is to turn the world into a better place, with refrigerators for all and a minimum weekly wage. His courage drives its piles down to rest on much more solid and primitive strata—determination not to draw back from a job, however tough, once he has put his hand to it, and his traditional pride as a member of an undefeated nation.

These feelings of his are usually too integral a part of his make-up to be

PERSONNEL

(Continued from previous page)

unparalleled use of novel technical weapons and tactics, then it seems undeniable that a Canadian fighting machine would have to come into being with almost instantaneous speed manned by personnel specially selected and trained in the efficient operation of the highly technical and specialized weapons and arms which would be used. The characteristics of this last war which compelled intensive concentration on selective employment of manpower could be expected to operate again but with

greatly increased intensity. It seems imperative that no part of the experience and methods of personnel selection be lost; that, indeed, the most zealous review, research, and refinement of methods be devoted to that science hereafter and to those related sciences (industrial, statistical, social, psychiatric, medical, educational, psychological) bearing on the efficient handling and employment of men for military purposes.

expressed or even be conscious of. It is dangerous to proceed from an entirely mistaken interpretation of the part of the so-called "agitators" played in the army, to asserting that when training the citizen soldier in war it is essential to explain the reason for everything that is done in its relation to the whole objective of the war. Field Marshal Montgomery's talks to his troops before battle had nothing to do with politics; they were severely technical, keeping strictly to the matter in hand—how the coming battle would be won. . .

I am far from suggesting that there is no need to bring home to every soldier from time to time the unpleasant object of war—the most rapid killing or reduction to powerlessness of members of the opposing side. But it is required far less than some well-meaning but ignorant admirers of continental systems think and, in any event with British soldiers, the introduction of semi-political matter into training is not the best means of achieving that object

A more subtle error may proceed from a knowledge of the psychological principles of civilian education, if unbalanced by military experience. It is true that the best type of education in normal life depends on awakening the desire for knowledge; once the spark is kindled it is only a question of feeding the fuel.

Unfortunately, in the wartime army we are not dealing with the more brilliant type of child or adolescent. In fact, it comes as a definite shock to many officers (especially non-Regulars, perhaps straight from a university), to find when once the volunteer cream has been skimmed off, how low is the mental level of the general population from which the average army conscript is drawn. That level naturally goes on falling, as the vacuum-cleaner of intake searches ever deeper into the pile.

When setting out to train such men, the sail must be drawn in considerably and the object severely limited. The method which aims at teaching the learner gradually to see for himself why something is done, or done in a certain way, is too much of a long-term project. Training, like every other phase of war, can allow itself no circumlocutions; it must be brief and to the point.

Discipline

As war becomes increasingly technological, it is the rapid inculcation of skills that becomes the main object of training. These could all be classed conveniently under the heading of discipline—the unhesitating, instinctive carrying out of an order at a certain level of efficiency, however strained or fatigued the man may be and in whatever danger.

Discipline is a conditioned reflex, which every moment of life in the army works to build up from the time when the new recruit is first called to attention; such a reflex is easily inhibited, and that is why—as civilians and the press always fail to grasp—any actions tending to do so, even apparently trivial ones committed in peacetime, are marked down for severe punishment in the Army Act. The grim shadows that stand before the court-martial president's eyes are those of the battlefield.

Discipline in the narrower sense would receive considerable reinforcement from the general method of training suggested here. Based on the realization that most men are not at any time, let alone in the heat and stress of battle, capable of coherent thought, it attempts to build up a much wider system of conditioned reflexes, whether attuned to a word of command or certain other signs presenting themselves to the senses. When training men, for example, in putting right faults arising in some mechanical appliance,

there seem to be three grades of ability that one might try to give:

(a) Power to look at the fault, and work out logically how to deal with it.

(b) Experience, which—although it could not always give a logical account of how it was done—could reach a high measure of success merely by having seen a large number of examples.

(c) Memory (instinctive and unconscious) of a certain sequence of motions to be gone through whenever certain signs present themselves.

These are arranged in descending order of difficulty and, as can be seen, shade into one another; in addition, each stage is a sound basis for the next higher. The final level to which one intends to bring any soldier must be largely dependent on the time allotted and his ability. I suggest, however, that it will be safest to make sure that the training method employed can bring everyone at least as far as (c)—the level which I have referred to in an earlier paragraph as a "skill"—before more ambitious projects are taken in hand.

Importance of Reflexes

An objection may be made that such training will produce mere automatons. It may be answered by saying that the object of all training is to get every soldier to *at least* this level; at present, by aiming too high or not aiming at all, we get results *below* it. Further, it is only after some reflection that one realizes how big a part the conditioned reflex plays in everyday life. By constant practice, the successive impressions which a ball makes on the retina as it travels towards us will set in motion, without any conscious thought, a complicated series of co-ordinated actions which bring the bat into connection with it.

The "thought" behind action may quite well make no difference at all; for example, a man can cause a car

engine to fire by turning the crank, even though he believes himself to be winding up a spring. Similarly, he can put right a breakdown by going through a series of trained movements in response to certain signs. If his truck stops, he has a set sequence of action:

(a) He looks in the gasoline tank. If empty, he refills it.

(b) Are any of the spark plugs disconnected? He reconnects them; and so on. Knowledge of the principles of internal combustion or current induction are as little necessary for the production of quite a competent driver as is that of the theory of ballistics for a gunner. It is stressed again that this is the level which a soldier must attain unless he is to be a menace to himself and his comrades; if time and ability permit, there is nothing to prevent additions to any limit. Before this is attempted, however, the foundations must be absolutely sound.

Simple Drill Needed

The army needs . . . a simple drill which every instructor must be able to carry out before he is allowed to undertake the teaching of others. The inculcation of a skill (or, in other words, the formation of a conditioned reflex) can be made a matter for scientific study, and this would be reflected in a rationalization of textbooks and training methods.

Perhaps better than any human instructor would be a machine like the Synchrophone, already used with considerable success in training RAF pilots. It consists of a screen on which a picture of any part of the object being taught can be lighted up at the touch of a button, and a radiogram which plays records of the commentary. The lesson can be repeated identically any indefinite number of times, with speed and pauses completely under control; visual and aural appeal can be accu-

rately balanced. Such a method would, however, only be suitable in a fixed training establishment where the necessary capital outlay was justified.

I do not propose here to go into the technical details of the instructional methods which would be used, and which any competent psychologist could devise. It may be worth mentioning, however, that as our object is to teach the soldier not to think, but to act—to move his body in a certain required manner—the method of training must be based on a logical consideration of that object and of the way in which mental processes work.

It would, for example, relegate verbal matter to a comparatively unimportant place, and give much more weight to the visual and imitative faculties. This is of particular importance with reference to a point already mentioned—the mental level that may be expected in a large percentage of conscripts during a war. The ability to work with words and mental images rather than with bodily action is a highly developed one which many men never acquire. To understand this fact is to have grasped the main factor in all training.

Time, Motion Study

A necessary pre-requisite to the use of such instructional methods would be a time and motion study, scientifically conducted, of every section of individual training and such parts of group, platoon and larger unit training as proved amenable. The relevant training pamphlet would show the motions to be taught in each lesson; the pamphlet on instruction (detailing the drill by which such motions were to be taught)

would, of course, apply to all. The method of instruction could be taught as easily as parade-ground drill. . .

Speed and mechanization are the two main trends of modern war. If we are to take a realistic view of the problems involved in training a citizen army for such war, we must overhaul completely our present so-called system and get to work on organized, scientific lines. Training has for too long been a recalcitrant child, noticeable for its wayward conduct; it is high time that it was brought into line.

NEW CAMERA PLANE

Based on its war-famous *Black Widow*, Northrop Aircraft has developed the F-15 *Reporter*, versatile camera plane with a speed of more than 400 miles per hour. Designed during the closing phases of the conflict and war-late in production, the plane showed so much promise in high and low-altitude photography that a \$7,500,000 contract for 175 units was given and now is being filled.

The basic design mounts six cameras, and alternate arrangements will permit the mounting of 11 different types of cameras. What is said to be the largest piece of plexiglass ever blown gives the *Reporter* a massive, bubble canopy providing the plane's two-man crew 360 degrees vision. The plane has a range exceeding 4,000 miles, and a ceiling in excess of 35,000 feet. It is powered by two Pratt & Whitney R-2800-C engines equipped with turbo-superchargers.—*Aviation News*.

SELFLESSNESS AND THE END OF WAR

(General of the Army Dwight D. Eisenhower in the U.S. Infantry Journal.)

Once in Europe during the war, when I was talking to two great soldiers, Generals George Marshall and Omar Bradley, I asked them what special quality they would look for in a man to be given a big job.

We talked it over for some time, deciding that the greatest quality wasn't willingness to accept responsibility—or boldness—or brilliance of conception—or even ability already proven.

In the end, the three of us agreed that what we would look for was selflessness.

The man who is selfless tackles the job you give him with all his heart and courage and interest. He thinks only of what he can get done for his country, his commander, and his troops.

He doesn't begin to think about himself until his job is about finished, if he does so then. He is too busy, too intent on selfless service.

It is selfless men who are the hope that this world can be without war. It will take their utmost selfless efforts to prevent the complete loss of civil-

ization, or the destruction of physical life itself, which I am completely convinced is probable if another war should come.

Selfless men of our own country and such men among our Allies, working together, have contributed most of all to the war we have won. Men from our schools, men from science and industry, men of all civilian occupations as well as soldiers have done great things without thought of themselves to win the war. I believe we must be strong, stay strong, if we are to succeed with the rest of the world in the greater and utterly necessary work of eliminating war.

We must count on the same selflessness, the same selfless men to find the way we can do it. I want to do everything I can in the military sphere to help these same men preserve the strength of our country and help the world to reach the final solution. I would see the end of my work as a soldier come most gladly when the answer to war is found.

AUTOMATIC "BAIL-OUT" DEVICE

Supposing the pilot of a jet plane decides that he must bail out although travelling at 400 miles per hour. With the new Martin-Baker device, he pulls a canvas screen over his face by means of two rubber toggles. This action instantaneously puts his body and limbs in the best position for ejection, as already he is fully strapped to the seat. It also fires the cartridges and the charge pushes a piston, attached to the rear of the seat, straight up an expansion tube and thus the seat shoots out of the cockpit complete with occupant. An

automatic means of firing off the hood first is part of the complete apparatus.

When in the open air, the seat rolls over on its back, but by this time it, with its occupant, is well clear of the tail and some hundreds of feet behind the aircraft.

The whole process is roughly equivalent to entering in an instant a solid wall of air, and the release of the pilot parachute or drogue had to be carefully studied. Automatic means have also been devised for this release.—
"The Aeroplane," *Great Britain*.

LETTERS TO THE EDITOR

CAN YOU HELP?

Editor, CATM: I am attempting to clear up a mystery surrounding the whereabouts of three beer mugs, and am writing this with the hope that I may be able to trace them through the columns of CATM. Here are the facts:

In July 1941 the then 1st Canadian Army Tank Brigade arrived in England and took up residence in tents on West Lavington Down near Saslisbury. The three Staff Officers of the Brigade, namely, Johnny Andrews (B.M.), Bob Moncel (G-3) and myself (S.C.) each purchased a pewter stein with a glass bottom. We each had our rank, name, appointment and the dates of our tenure of office engraved on the respective steins. We also agreed that they should become the property of our successors while they held the appointments, and be similarly engraved by them. At the end of the war each stein was to be returned to its original owner as a keepsake.

The 1st Armoured Brigade (as it was called later) has a long and enviable record of achievements, fighting with British, American, Canadian, Indian and Australian Divisions, and naturally had many changes in its Brigade Staff; therefore, each stein should have a most impressive list of illustrious staff officers. I am most anxious to recover mine, and I know Col. Moncel feels the same way. Johnny Andrews was killed at Dieppe while leading the 14th Canadian Armoured Regiment, but his daughter would be very proud to possess this memento of her brave and gallant father.

I trust that any officer of the 1st Armoured Brigade who reads this

column will help to locate these steins. If anyone has any knowledge of them, will they please write to me in care of the Editor, CATM.—Col. E. F. Schmidlin, Director, Royal Canadian Armoured Corps.

HAWKER FURY

Designed to meet the most exacting military and naval specifications, the new *Hawker Fury*, now being built in quantities for the fighting services, is an outstanding addition to the long line of its famous forbears.

The pilot's position has been raised to give improved views both forward and downward. The special high-speed section developed by *Hawkers* gives excellent characteristics over the whole speed range, and the *Fury* has no vices near the stall, though it was primarily designed for high-speed conditions. Because there are no sharp changes in pressure gradients, the onset of compressibility effects are delayed and very high speeds may be attained without any adverse effect on stability or control.

The slightly upswept top line of the fuselage, which provides the good view for the pilot, combined with the facility with which the *Fury* handles in the air, renders flying near the ground easy at all speeds, so that a steady and straight approach can be maintained. Handling characteristics near the stall are good, enabling full lateral and longitudinal control to be retained. The new fighter is one of the fastest in the low to medium altitude range, while its cleanness of line promotes wide radius of action at high cruising speeds.—“*The Aeroplane.*” *Great Britain.*

OTTAWA
EDMOND CLOUTIER
Printer to the King's Most Excellent Majesty
1947

