

To cope with improved anti-armour weapons, NATO tanks are therefore becoming heavier, with the latest generation; Abrams, Leopard II and Challenger creeping up to the 55 - 65 ton range. These tanks imply a reduction in operational mobility in a future conflict. The mounting of an external gun can offer a decrease in weight for the MBT given similar armour protection levels to conventionally turreted tanks.

CREW PROTECTION

An external gun incorporating an autoloader can allow the complete separation of ammunition from the crew, thus protecting the crew from the effects of an ammunition explosion. This positioning would also allow improved NBC protection which would not be jeopardized while firing the main armament.

The emergence of top attack weapons has emphasized the protection afforded the crew in an overhead gun mount. Proponents of the external gun suggest that it would make an ideal platform for the fitting of a second vehicle roof, providing spaced armour protection.

PART 3 - FIREPOWER

REQUIREMENT

NATO countries agree about the requirement that future MBTs be equipped with a high velocity gun of at least 120mm calibre which fires both KE and multi-purpose rounds. The tank gun must be capable of 360° traverse and firing on the move.

STABILITY

A conventional tank turret carries the main armament on front mounted trunnions. This together with thick frontal armour, causes an imbalance which can result in traversing problems particularly on side slopes. Western tanks compensate by the addition of a heavy bustle to the turret rear, while the Russians accept the traverse limitations.

The concentration of the mantlet, gun and bustle weights along the circumference of the turret ring away from the centre of rotation results in high rotational inertia of the complete turret. This instability necessitates the expenditure of large amounts of power in order to traverse the turret quickly during engagements. Adopting an external gun, mounted centrally above a smaller traverse ring, would solve these rotational inertia and balance problems. In addition by eliminating the turret the centre of gravity can be lowered increasing the vehicle's stability

The conventional mounting of the gun on forward trunnions results in considerable projection of the barrel. When coupled with the large overhang of the bustle in the three and nine o'clock positions severe traverse problems can result, especially in confined spaces. External gun designs like UDES 19, featuring a gun mounted towards the rear balanced by the power pack in the front, minimize frontal overhang.

Finally, externally mounted guns can provide a longer recoil distance, which will decrease the trunnion pull generated. This will allow the mounting of a large calibre gun on a lighter platform.



Model of UDES 19

AUTOLOADERS

Much controversy has been generated recently due to the radical design proposal that an autoloader replace the human loader in MBTs. The incorporation of autoloaders in the latest Soviet tanks has prompted the West to intensify its research in this area. As an autoloader is necessary equipment for an externally mounted gun, it is included for discussion in this paper.

Autoloader designs can be conveniently separated into three major types: carousel, bustle and backdeck. In the carousel system the ammunition is stored in either a horizontal or vertical fashion on the floor of the turret. Ammunition may be separated as in the T-72 autoloader where the projectile and charge are stored horizontally as a cassette. This system requires a complicated procedure for sequentially lifting and ramming in the breech. Fixed ammunition is usually stored vertically in the carousel, however, again a complicated system must be devised to change the round to the horizontal plane before ramming. Carousel systems have the advantage of storing the ammunition below the turret ring for survivability purposes, however, it is slow to replenish, requires a lot of power, and the ammunition is difficult to reach should the mechanism break down.

A bustle autoloader as mounted in the prototype French EPC tank and proposed for M1 and Leopard II, stores the ammunition behind the gun in the turret bustle. The rounds are in the correct plane for loading. This system requires less power and can use fixed ammunition. It will house comparatively few rounds however and will have to be recharged more often. The ammunition is stored above the turret ring, increasing the risk of ammunition explosions affecting the crew. This can be minimized with sliding bulkheads and a magazine designed to channel the blast outwards away from the crew compartment.

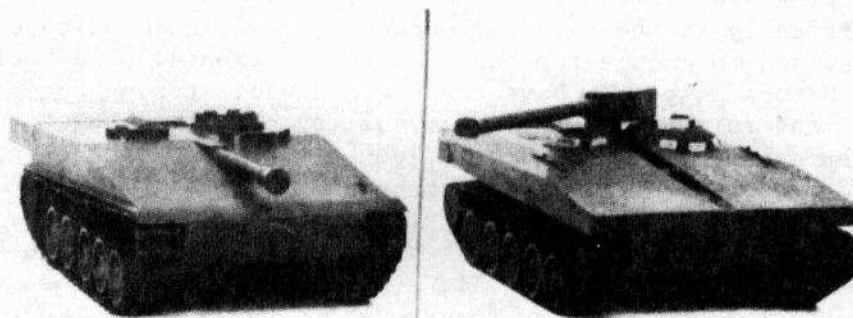
The backdeck autoloader is the one typically proposed for an external gun. The ammunition is stored in pods, located on the backdeck. A chaser arm lifts the round from the pod and loads it directly into the breech as in the proposed Swedish UDES 19 vehicle. In this system the gun does not have to return to a datum point for reloading.

The main advantage offered by all autoloaders is that they allow the volume within the crew compartment to be decreased. Additionally, autoloaders should offer a higher rate of fire. They are not without fault however.

The majority of autoloaders require the gun to be elevated to a datum position to facilitate ramming. This could expose a hot muzzle to the enemy's view and disclose the tank's position, especially if the observer possesses thermal imaging detectors.

Autoloaders as fitted in otherwise conventionally turreted tanks allow a crew member to handle the system should it breakdown. However, the more complex system required for an external gun, because it does not allow crew accessibility in the event of a failure, must be more reliable. Reversionary systems are difficult to fit, bulky and expensive. A raisable gun system such as that employed on UDES 17 offers the advantages of an external gun while allowing crew intervention in the event of loader breakdown, because the gun lowers to the stowed position for reloading.

An external gun (autoloader) requires enhanced protection. Nevertheless, it will be inevitably more vulnerable than one mounted in a turret. Fixed ammunition and cartridge cases can be used for the external gun as disposal is not a problem. The lack of accessibility to this system will require an extremely reliable breech and firing mechanism.



Model of UDES 17

PART 4 - FIGHTABILITY

The fightability of any future MBT is of paramount importance and is the subject that generates the most opposition within the armour community to the adoption of an external gun.

SURVEILLANCE

In a conventionally turreted tank the crew sights are located at the highest point of the vehicle offering the commander an unrestricted view of the battlefield around him. Progression to an in-turret autoloader would place the gunner's station at the same level as the commander's separated by the gun mechanism. Duplicate sighting arrangements could be provided, thereby increasing the crew's ability to detect targets.

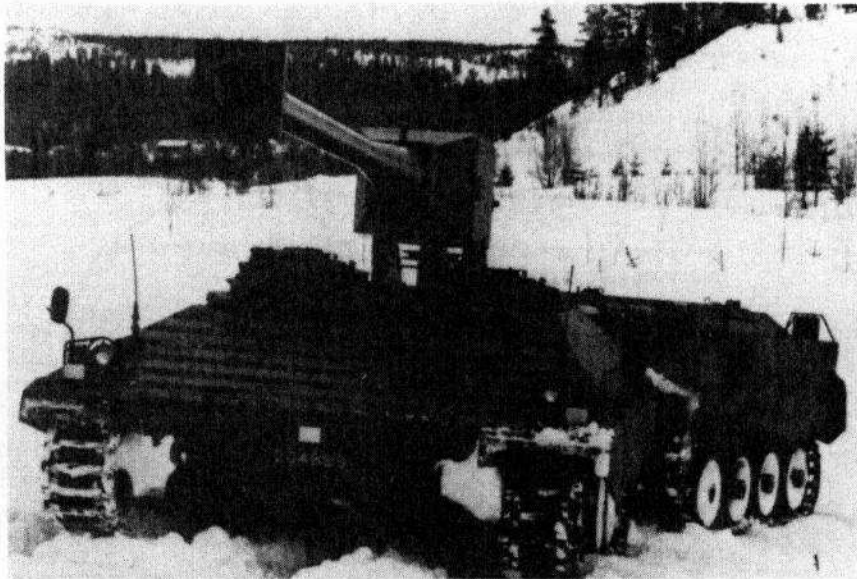
The sighting arrangements for an external gun MBT are considerably different. The sights are not mounted well above the axis of the gun so the crew must sacrifice direct top vision. For a cleft turret gun in maximum depression the commander may be forced to restrict his view frontally along the line of the gun and depend on the gunner to observe the other side. With the crew mounted below the ordnance and especially if the commander and gunner are unable to rotate with the gun, these sighting problems are compounded due to disorientation.

The American Surrogate Research Vehicle (SRV) has been built to examine these problems. It incorporates surveillance sights, an externally mounted laser main gun simulator and modular crew stations in a M1 hull. Research has shown that although sighting sensors can be placed on top of the vehicle, standard optical sights are difficult to link with the hull. Nevertheless, a television sighting system incorporating a panoramic surveillance head, feeding information to a visual display unit offers a solution. Duplicating these systems would eliminate blind spots and allow the gunner to assist in surveillance.

It is doubtful however, whether these modern electronic sighting systems will have the resolution capabilities that simple optical equipment offers and they will be less reliable and more costly. These sights will also be extremely vulnerable and back up systems would be required. Should the crew be seated in a rotatable basket under the external gun, it would be possible to employ a periscope mechanically linked to the gun as a reversionary sight. Sighting and observation problems might be overcome by utilizing modern optronics, however, the all round surveillance problem would remain.

It is interesting to note that the Swedish UDES XX-20 vehicle mounting an external gun on an articulated chassis, allows the commander to elevate his armoured cupola to gun level, thus permitting top vision for surveillance. This vehicle indicates that they are not convinced as to the effectiveness of optronic methods.

Finally, the introduction of laser damage weapons on the future battlefield may eventually dictate that remote viewing systems become universally accepted.



UDES XX-20

CREWING

Studies have been conducted to decide on the optimum number of men that are required to crew a MBT. The four man crew has proven the most acceptable over the years, primarily because it offers maximum flexibility in spreading crew workload. The introduction of TI provides a true night vision capability and a consequent extension of the battlefield day. Many users contend that any decrease now in crew size could result in a degradation of performance.

A three man crew incorporating an autoloader was chosen for the latest Russian tanks and the Swedish S-tank. The British Army trial EXERCISE DAWDLE compared the fatigue aspects between Chieftain and S-tank and concluded that the Swedish tank was no more tiring to operate.

A two man crew has been proposed for future MBTs allowing them to operate in battle for extended periods by providing replacement crews. This would cause obvious problems such as: transport for the spare crew, arranging handovers during periods of intense activity and finding the time necessary for the new crew to familiarize themselves with the situation. Studies have revealed that a two man crew would experience difficulty operating a MBT on a prolonged basis.

Demographically, declining birth rates may affect future manning levels and therefore any move toward smaller crews might prove beneficial. Decreasing the crew size enables the designer to create a smaller tank. The crewmen can be positioned in a small pod ending the psychologically harmful isolation of the driver. This concept has been demonstrated with the American Tank Test Bed which, like the SRV, positions the three crew members in the hull under heavy armour protection. The command and control aspects are enhanced with the positioning of the crew in a separate crew pod allowing close proximity and mutual assistance. With the commander located in the hull, however, he is still not optimally positioned for all round surveillance and this is considered a major drawback.

An MBT equipped with an external gun would probably be crewed by three men. Although this manning level should be sufficient, a degree of flexibility will be sacrificed when compared with a conventional tank.



Model of the American Tank Test Bed

REALIABILITY

Reversionary modes are difficult to build-in to an external gun. The sighting systems could incorporate an optical direct fire sight. If the gunner cannot rotate with the gun however, this can only be accomplished with the gun indexed. Gun control equipment can offer a spare manual traverse, but it is difficult to allow for a manual elevation link. Should the loading system fail, it could only be rectified by exposing the crew. Firing circuits must have built in redundancy, especially considering how relatively exposed the breech is to dust and moisture. The lack of reversionary modes for the external gun dictates a need for equipment that is extremely reliable.

The complexity involved in an external gun design, especially in the areas of autoloaders and sights infers that the system will be in fact, less reliable.

MAINTAINABILITY

An external gun design will be easier to maintain providing the vehicle is not in action, since the barrel and turret ring are more accessible. Repair required while in contact will be difficult to effect without exposing a crewman.

COST

As manpower costs are a primary item in defence budgets, any move to decrease crew levels following the adoption of an external gun, would result in cost savings.

The price of electronics comprise between 40 and 60% of the overall cost of an MBT. To build in a high level of reliability will require even greater expense. An external gun needs more of these costly items than a conventional tank and can therefore be presumed to be more expensive.

TACTICS

Current NATO tactical doctrine is born of the US Army's Air Land Battle 2000. It emphasizes a shift in reliance on firepower in simple direct confrontations along the FEBA to one stressing long range strikes into the enemy's rear. This doctrine calls for highly mobile forces employing speed, violence and above all flexibility.

We can expect that infantry will be equipped with better short and medium range anti-armour weapons and this will allow tanks to be released to highly mobile offensive operations. The external gun design for an MBT has severe limitations when employed in such a role, especially in the key areas of all round surveillance and command and control for sub-unit commanders.

PART 5 - CONCLUSION

An external gun allows for a smaller vehicle frontal aspect and considerable volumetric savings, greatly enhancing the survivability of the MBT. It can offer the crew better protection against the effects of ammunition fires, NBC warfare, and top attack. An external gun can be mounted on a lighter vehicle chassis and will provide an inherently stable configuration. Autoloaders will be required equipment. Recent advances in autoloader design, improving their reliability, make this a workable solution.

Although studies have shown that a three man crew, serving an external gun MBT, can be operationally effective, it is felt that a four man crew provides greater flexibility. The sighting arrangements dictated by an external gun design force the crew to sacrifice direct top vision. Modern optronics can overcome the sighting and observation problems, however, the lack of all round surveillance remains. It is difficult to include reversionary modes in a MBT equipped with an external gun. This requires that all equipment be highly reliable. This will be difficult to achieve given the complexity of such a system. These considerations also imply that an external gun configuration will be more expensive than a conventional design. In addition, the tactical employment of an external gun MBT, especially in offensive operations, will cause considerable problems.

It is concluded that an external gun design for a future MBT is not yet a feasible proposition, primarily due to its limited offensive capabilities. Nevertheless, as an intermediate solution, NATO armies could benefit by incorporating bustle autoloaders in their otherwise conventional turrets in an effort to improve the MBT's survivability.

THE FIRST TANK ATTACK

by John F. Wallace

Introduction

Although much has been written about the 1916 Somme Campaign of the First World War, it is the September Battle of Flers-Courcelette which should interest Canadians. Yet British and Canadian sources are rather sparse about the Canadian share in that battle, particularly as it applied to the first use of tanks in war.* It is noteworthy because one section of six tanks supported the 2nd Canadian Division in its assault on the area in front of Courcelette. So strange were those first tanks, Canadian records for the day referred to them as Caterpillar, cars, landships, caterpillar forts and even armoured cars.¹

During July and August of 1916 despite objections from London about a premature disclosure of the raw war machine called the Tank, Field Marshal Sir Douglas Haig had pressed for its use. He was certain that it would ensure the success of the proposed September offensive². The main effort in the attack was to be carried out by General Rawlinson's Fourth Army operating over a seven mile stretch between Combles and Martinpuich. Between Martinpuich and Thiepval the British Reserve Army which included the Canadian Corps was to provide flank support. Of the 49 tanks then available 42 were assigned to Fourth Army and the remaining seven went to the Canadian Corps.

The 2nd Division which was to deliver the main Canadian assault was allocated six while the seventh was held in reserve and never entered the picture. A good deal has been recorded about the success or failure of the tanks supporting Fourth Army. The story of those assigned to the Canadians has received perfunctory attention at best. The purpose of this article is to reveal how the six with the Canadians were used in that first infantry-cum-tank attack by the 2nd Canadian Division and No. 1 Section "C" Company, Heavy Branch, Machine Gun Corps.

*Although not germane to this story it was in this particular battle that the 1st Canadian Motor Machine Gun Brigade (Canada's first armoured unit) used machine guns en masse for the first time during an offensive operation.

Tanks Assigned to the Canadian Corps

The first intimation to Canadians of the use of tanks was on September 8th, "One Section of the Heavy Section Armoured Corps will be placed at the disposal of the GOC Canadian Corps³. Lieut.-Col. R. Brutinel DSO, Commander 1st CMMG Brigade and machine gun adviser to the Corps Commander was asked "to organize the first test of tanks in action on the battlefield--these tanks", he said, "were lumbering, slow, noisy and difficult to control over the most disturbed ground in the vicinity of Pozieres"⁴. That recollection is confirmed by the actual message from GS Canadian Corps at 7:00 pm on September 8th, that tanks would be attached to Brutinel's Brigade for tactical purposes and rations⁵.

The tanks used were the Mark I's of which there were two versions--a female which mounted five machine guns and the male which mounted two Hotchkiss six-pounder naval and four machine guns. No information is available as to how many of each type were with No. 1 Section. At the rear of each tank was a "hydraulic stabilizer" as part of an "extraordinarily clumsy and labourious" steering arrangement. Four men acted as brakesmen, gearmen or drivers*. Three others were gunners and one was the crew commander (until 1918 always an officer)⁶. The machine was 26 feet long (32 with the Tail), 14 feet wide, eight feet high, with the track operating on rollers and sprockets surrounding both sides of the cab (there was no turret as are common today). Total weight was about 28 tons and speed on the straight-away was about three to four miles per hour. The power source was a six cylinder Daimler engine producing 105 horsepower. Because of its length it could cross a trench 10 feet wide. Its armour was proof against small arms fire and shrapnel but not against direct artillery hits⁷.

The two tank companies ("C" and "D") which made up the complement to man the allotted 49 tanks had, until assigned their tanks in France, never operated as tank crews. According to Sir E Swinton, the man credited with inventing the tank, "C" Company comprised 30 officers and 250 other ranks. They had been concentrated at Yvrench where there was an improved training centre with trenches and where machine gun and six-pounder practice could be carried out"⁸. The crews had little time to become familiar with the weapons or to correct minor (or major) ailments which are inevitable. It was also claimed that some crews did not see their tanks "until the 13th, two days before the attack"⁹. Only one half of "C" Company got in any firing.

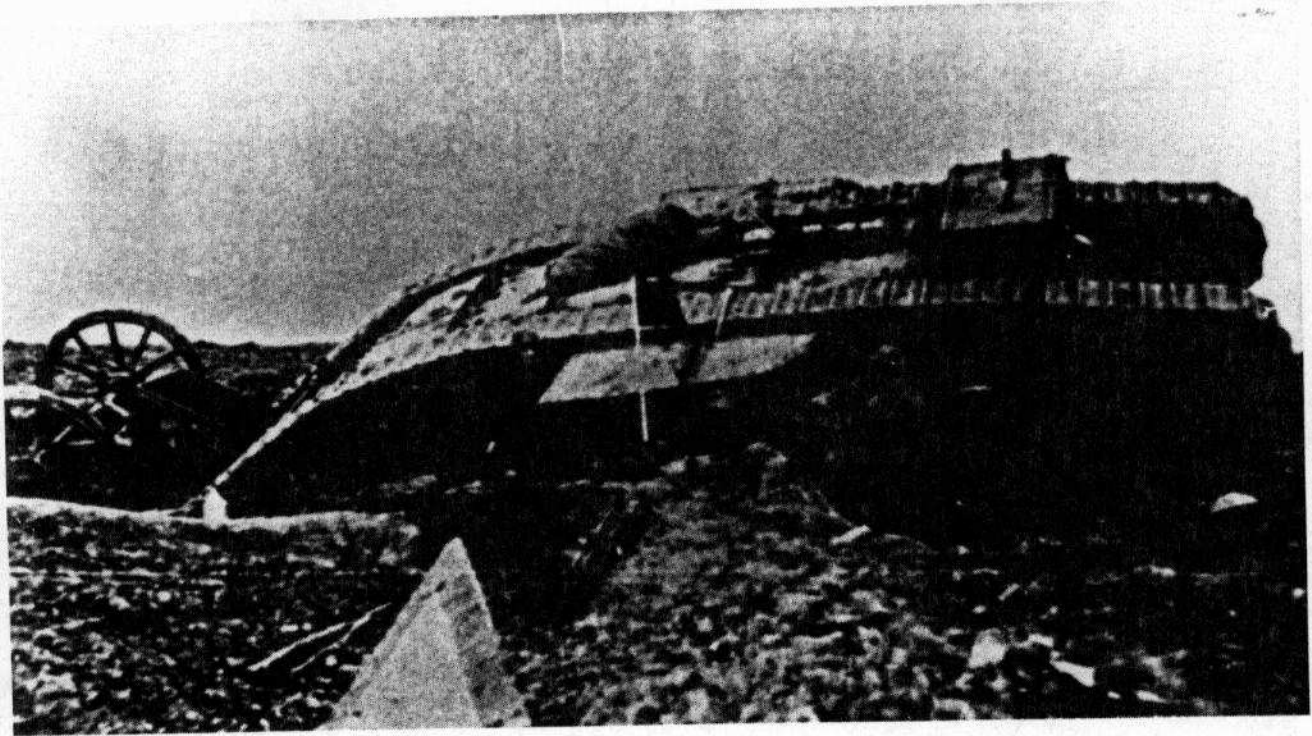
The Make-up of No. 1 Section

For their first action the six tanks were divided into right and left detachments as follows:

Right Detachment

Tank No. 721 C5 Champagne commanded by Capt. A. Mc. Inglis
Tank No. 503 C4 Chablis commanded by 2/Lieut. GO Campbell
Tank No. 701 C3 Cognac commanded by 2/Lieut. SDH Clark

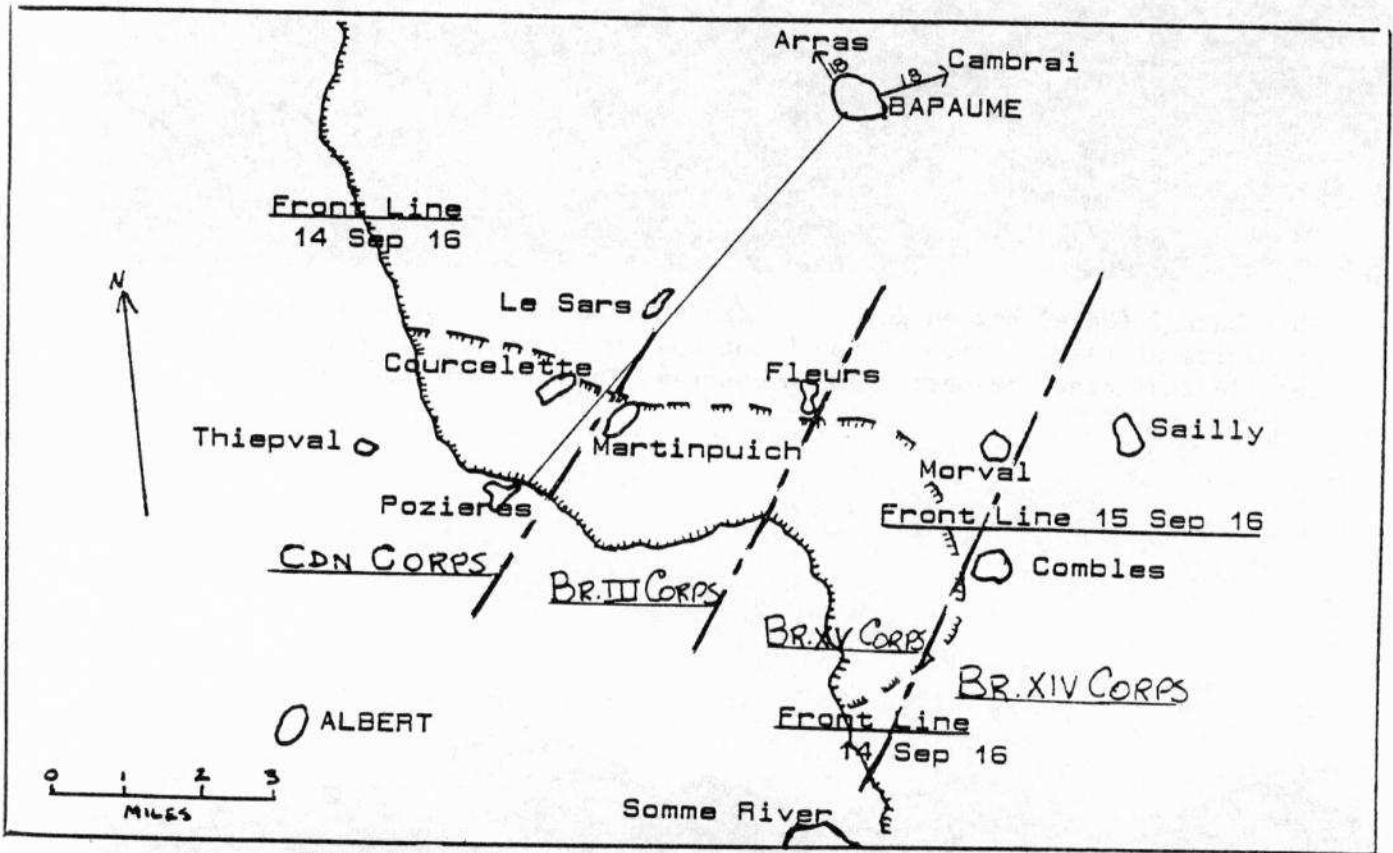
*At the time drivers were not members of the Tank Corps but were assigned from the Royal Army Service Corps.



This Mark I (Male) bogged down in a trench. Note cumbersome steering mechanism at rear. Hatch on top front has two periscopes. Crew members wore leather crash helmets. Photo courtesy Tank Museum, Bovington.



Mark I Tanks preparing for the September debut. Second tank from left is a Male (6 pdr), the others females (MGs). Screen above them was to deflect grenades. Photo courtesy Tank Museum, Bovington.



THE GENERAL AREA OF THE SOMME OFFENSIVE
15 SEP 1916

Left Detachment

Tank No. 504 C6 Chartreuse Commanded by 2/Lieut. J. Allen
Tank No. 709 C1 Creme de Menthe commanded by Lieut. AJC Wheeler
Tank No. 522 C2 Cordon Blue commanded by Lieut. FW Bluemel

Apparently most of the tank corps officers and men of "C" Company had come from a battalion of the Argyll and Sutherland Highlanders and being of Scottish descent their propensity for alcoholic beverages carried on to the names they gave their tanks!

One tank commander has left a rather interesting picture of the crews' equipment. "The officer and each man carried two gas helmets and one pair of goggles, and in addition to their ordinary service caps, a leather 'anti-bruise' helmet; we also had a large field dressing as well as an ordinary first aid dressing. The usual equipment consisted of revolver, haversack, water bottles and iron rations. There are eight people in a Tank, and as soon as they get in they naturally take off all those things, which lay about on the floor, unless you devise some method of packing all your equipment.....We carried, in addition to iron rations, sixteen loaves of bread and about thirty tins of food, cheese, tea, sugar and milk. These took up a lot of room. We also had one spare drum of engine oil and one of gear oil, two small drums of grease, three water cans and two boxes of revolver ammunition.....four spare Vickers barrels, one spare Vickers gun, a spare barrel for the Hotchkiss and two wire cutters. We also had three flags for signalling purposes, which unfortunately proved to have been lost when they were really wanted¹⁰. Further each tank carried 33,000 rounds of ammunition for the machine guns (and if a male version shells for the six-pounders), two carrier pigeons, a lamp signalling device, maps and written operation orders.

The Pre-Battle Reconnaissance

On September 11th the 1st CMMG Brigade received a wireless message from Capt. Inglis advising that the tanks were not ready for movement to Albert but that he and his officers proposed to carry out a

reconnaissance¹¹. There is some confusion from a reading of the records just what sort of reconnaissance was to be carried out on that day because the record does show that it was not until the 14th of September that the actual battlefield area was visited. The GHQ Machine Gun Advisor, Col. Baker-Carr (who later was to command the 1st Tank Brigade) commented in his Memoirs that "the failure of the tanks on 15 September was really attributable to the absence of reconnaissance" referring of course to the 42 supporting the Fourth Army. He also said that "several tank commanders were not quite clear in their minds as to what they were to do". Brutinel claimed that he and Inglis had studied the ground in front of Poziers and both had agreed the ground ahead of the jumping off place was not particularly suitable for tanks¹³. It seems certain that if the tanks were attached to Brutinel's Brigade for "tactical purposes" that he would have insisted on a very close look at the ground and would have even suggested what should be done. It is a matter of record that in planning machine gun operations he was most meticulous in covering all manner of detail which might have some impact on an operation.

Cleaning Up the Final Plans

On September 13th a Conference was held at British GHQ where the final plans and tactics were discussed. There was considerable uncertainty among those present on how the new weapon should be used¹⁴. If tanks were shown too early they might draw enemy fire, if too late they might not be of any use to the infantry. According to Liddell Hart "it was decided that the tanks should be employed in sub-sections of two or three tanks, widely scattered, against strong points in the enemy defences. Their start time was to be timed on the basis of reaching the first objectives five minutes before the infantry¹⁵. That certainly was not the mode of employment on the Canadian sector.

The 2nd Division's objectives consisted of the enemy Candy trench system which extended from just west of Martinpuich, to the north of the Sugar Factory and then along Sugar Trench where it joined the 3rd Canadian Division's objective¹⁶. In the operation order* there were several instructions for No. 1 Section. In summary they were:

Left Detachment (operating with 6th Infantry Brigade)

Three tanks will cross the front line at Zero and move down the German Sugar Trench system to the Sugar Factory--keeping in rear of the artillery barrage. This detachment will cover the left flank of the advancing infantry (28th Battalion) and assist in mopping up. On arrival at the Sugar Factory the tanks will attack any machine guns there or in Courcelette that they can deal with.

Right Detachment (operating with 4th Infantry Brigade)

Three tanks will cross our front line at Zero and move as rapidly as possible down the main Bapaume Road to the right of the forward edge of the Sugar Factory property. A lane in the barrage will be kept free of 50 yards on either of the road for this Detachment.

As soon as the barrage lifts off the final objective at Zero plus 43 minutes two tanks will move by the Bapaume Road just beyond the Sugar Factory and work down the Candy Trench to the right with the object of neutralizing machine guns in Martinpuich; the other will assist in dealing with the Sugar Factory. When the infantry have reached their final objective the tanks will return to our own line and concentrate south of Pozieres where they will replenish fuel and ammunition.

Final Stage of Preparation

Starting points for the tanks were chosen so that they would remain covered from view as long as possible consistent with crossing the front line at Zero. Their speed was calculated at 15 yards per minute. In its own operation order the 2nd Division offered a few more suggestions

*Brutinel would have been responsible for either writing or vetting the instructions relating to his own machine guns and the tanks.

about the tanks. Because the tanks were not to move into position until after dark each of the infantry brigades were to send 15 men to meet the tanks at the assembly area at 9 pm, ¹⁷ From there with the tanks they would move along a taped route, having been laid earlier by scouts, to the points of departure. Each tank during the attack was to be accompanied by five men whose task it was "to remove wounded men from their tracks". At 1 am the tanks were to move from their rendezvous south of Pozieres to actual positions of deployment reaching them around 4 am*. The right detachment with 4CIB was to be in the vicinity of the Windmill, and the left detachment with 6CIB just behind the jumping off trench near centreway communication trench in the 28th Battalion front. The infantry were advised that a red flag hoist outside a tank meant "am out of action" --a green flag meant "on objective".

The Advance

According to the inventor of the tank, on September 15th the tanks of the Heavy Section "sallied forth" in an attempt "to revive the momentum of the Somme Offensive which had already lasted for ten weeks" ¹⁸. Before reading the report of Inglis and others, the following selection from message logs and war diaries present a note of realism coming as they do from men on the ground as well as illustrating some of the confusion as to what was really taking place.

6.27	am	6CIB	one caterpillar going well
6.30	am	20th Bn	tanks went forward
6.50	am	5CIB	3 landships across
6.55	am	6CIB	infantry attack started well and tanks moving forward well
7.10	am	27th Bn	one caterpillar going well. One seems stuck
7.15	am	4CIB	three of tanks have gone over well
7.15	am	6CIB	confirmation that one tank is stuck and one moving very slowly
7.40	am	Contact	Map dropped by aeroplane on 2 Div HQ signed by Lieut. MO Leighton advising on locations of 4 tanks--"one at starting point.....one S.E. of Pozieres--one Pozieres-Martinpuich road--one marked on map". (This latter tank would have been about 700 700 yards to the NE of the Sugar Factory on the road at the outskirts of Courcelette).

(Note: The infantry by 7 am had succeeded in occupying all the initial objectives--the first to do so across the whole British front that day)

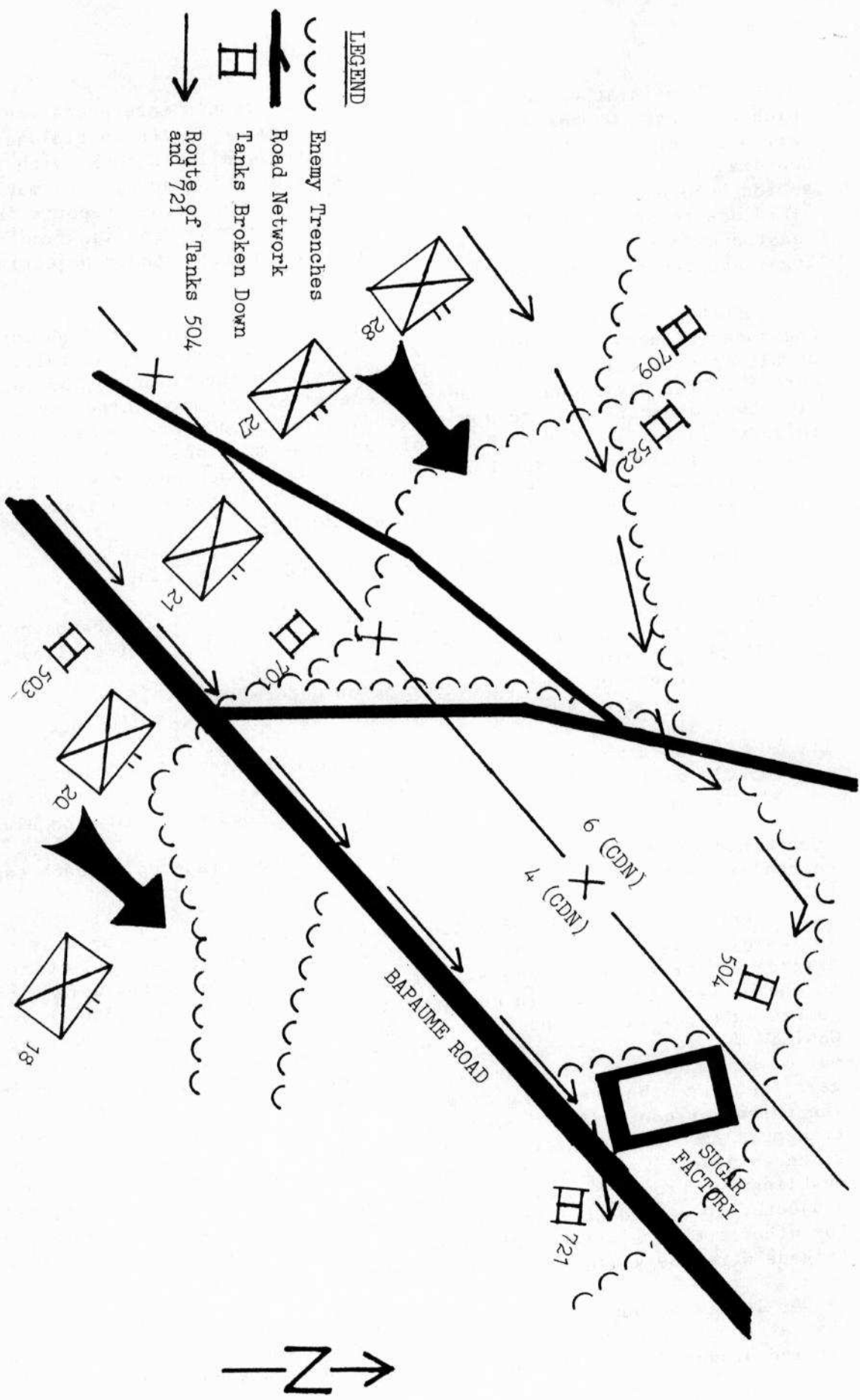
*The 24 hour clock system did not come into usage until late in 1918.

- 7.50 am 20th Bn At about 7.50 am one of our tanks passes the Sugar Factory on the right and circled round North and East. This, prisoner stated had a terrifying effect, and they reported that their fire had no effect on it.
- 8.10 am 27th Bn Caterpillar went over our front line at same time.
- 10.10 am 6CIB Capt Inglis reports "two tanks on 4th Brigade front got to Sugar Factory and returned. About 100 Germans threw up their hands and walked out on approach of tanks. Third tank damaged. Our front (6CIB) reported one tank reached objective doing good work knocking out machine gun which was holding up centre of attack. Other two damaged waiting details.
- Heavy MG Battery has reported at Divisional Headquarters and reports that No. 1 Section have two machines returned to the assembly point S. of Pozieres, one of which has steering gear damaged".
- 10.50 am 2 Div Log Report from Inglis, "At present I have three tanks near the forward dressing station. I regret that none of them can be put into running order quickly. There are two tanks unaccounted for which went up the left flank (with 6CIB). Perhaps it would be possible to ascertain if they were in the vicinity of Courcelette, where one was last seen making for (this would have been the one reported by Leighton). I would add all my men are very much done up."
- 11.40 am 2 Div Log (a message re location of tanks allocated to 6CIB which replied) "one tank was damaged by shell fire at rendezvous last night and did not start. Second tank got stuck near head of Yarra Bend and the third got through to objective."
- 3.25 pm 2 Div "Prisoners opinion of tanks say that it was not war but bloody butchery. One tank got astride their front trenches and enfiladed it both ways.

The Post Mortem

Later in the day the Canadian Corps Intelligence Summary contained a report that Inglis had stated "that all six tanks were accounted for and had returned. There had been only one casualty.....(Driver of Chartreuse killed while outside tank). Creme de Menthe had penetrated Sugar Refinery and had given great assistance....The tanks are scarred with shrapnel. The steering gear had proved a vulnerable part. The shelled area was unexpectedly difficult".

From the above reports and messages which were logged it would appear that certainly two and possibly three of the six tanks made it to their respective objectives--one on 6 CIB front and two on the 4 CIB



The Canadian Infantry-Cum-Tank Attack
 15 September 1916

front. This is at variance with Col. LW Nicholson's interpretation¹⁹ which was that "On the whole, however, the armour in its initial action failed to carry out the tasks assigned to it....all six tanks with the Canadians, either through becoming stuck or breaking down, were put out of action before or during the attack.....". If the actual reports from the field are to be believed it would appear that on the Canadian front at least one third and possibly 50% of the tanks reached their objective, the Sugar Factory south of Courcelette.

Let us now look at the post attack reports. The Canadian Corps Commander, General Sir Julian Byng stated "Tanks were very useful.....good morale effect...tanks are a useful accessory to the infantry, but nothing more"²⁰. The Divisional Commander, General Sir Richard Turner stated "The two, who were able to advance....did very good work in assisting the infantry to mop up....the chief role of these machines". Turner did suggest that a portion of the tanks should be held back and be sent forward to the objective to strengthen the hold on it.....not safe to assume that more than 33% will reach assigned objective"²¹.

Inglis' own report was quite brief and to the point:

Rt. 721 C5	went to SF and then returned	(Champagne)
503 C4	track off at point of deployment	(Chablis)
701 C3	got stuck in a shell hole (it is not clear whether that took place before or after getting to the Objective)	(Cognac)
Lt. 504 C6	went to SF and then returned to Camp	(Chartreuse)
709 C1	bellied after leaving SL	(Creme de Menthe)
522 C2	into a Comms Trench ahead of Yarra Bend	(Cordon Blue)

(Contained in the reports are the individual ones prepared by each tank commander).

Brigadier-General HOB Kitchen's 6th CIB War Diary²³ contains the following entry which is the clearest account of the three tanks with his Brigade. "Three cars of the Heavy Section Machine Gun Corps were allotted to the Brigade to assist in the attack. On the night 14th/15th they were guided into position about 400 yards behind the front line at head of CENTREWAY C.T.. At Zero hour the "tanks" moved forward, but two were put out of action almost immediately, one through trouble with its steering gear, and the other becoming stranded in NO MAN'S LAND near YARRA BEND. The third car continued to move forward and advanced along the German trench as far as the Sugar Factory.....During its course it fired on and silenced several machine guns, and thus proved of much assistance in enabling our troops to advance towards their objective. This car, although subjected to severe shelling, returned safely to its assembly point; and the other two were afterwards salvaged". Casualties up to noon for Kitchen's Brigade were 169 killed, 649 wounded and 211 missing.

In his account of the action Brigadier-General MVO Rennie stated that at about 7.50 am one of the tanks passed the S.F. on the right and circled around North and East. This, prisoners stated, "had terrifying

effect.....The tanks used for the first time proved their value.....a machine gun officer captured in the S.F. declared he had directed fire on them, but without effect.....".

Conclusion

The part played by Canadians in getting this first tank operation underway has always been underplayed or simply ignored. The infantry portion of the battle has been well told but not so well known was the part played by Brutinel and his 1st CMMG Brigade whose machine gunners were a major force in the assault and who in the sense of the instructions had the tanks under their command. The supply service sustained these first tankers while they were attached to the Canadians. And when the battle was over it was the recovery service of the Canadian Army Service Corps which extricated the disabled tanks²⁵. Although only two or possibly three of the tanks made it to the objective they made a favourable impression on the troops they were supporting and created something of a psychological shock to the enemy. It would be fair to say that their presence strengthened the Canadian hold on the objective. Just how effective the tanks were near the start line cannot be determined from any of the reports. The question of using tanks in penny packets has received considerable comment from many writers. For those who adhered to the idealistic school their use was short of scandalous. But battlefields after the 1916 inauguration are replete with accounts of the so-called penny packets being used with great effect, and so it was when they were used in that first infantry-cum-tank attack. Battles, large and small, will always call for the use of tanks in a variety of situations, and so they should, but the packet should be of team size where each component has a mutual supporting task.

When new equipment, especially in 1916, is brought into use there is always the problem of just how it will operate. Its mechanical capability which in 1916 would not have been exceptional could be further compromised if crews were inexperienced. There were mechanical failures of all kinds, and it was not long before the somewhat useless and vulnerable steering encumbrance at the rear of the tank was removed. The gravity fuel system required special attention especially when the tank nosed in or was tail down in a shell hole. Tanks if they had been used initially in the large numbers the critics wanted might well have failed mechanically in such high percentages that the tank idea might have been jettisoned especially if the assault had failed with heavy loss of life to the infantry. Then again as has been mentioned the condition of the ground was really inconceivable to many of the men who made up the draws. The battlefield was full of man-made hazards. Certainly no chance had been given to try out even elementary tactics. Communication among the crew inside the tank was most difficult because of the tremendous heat generated by the engine and the noise and clanking of parts. There were no satisfactory means of communicating with the infantry. Each of these points and more would not have been learned without that battle in September 1916. The Flers-Courcelette Battle was a good testing ground for the tanks. The results of that experience were to form an important segment in a revitalized realistic and no longer theoretical program for tank crews at the new Tank School to be established at Bovington, near Wool, in Dorset, England. Within 18 months Canada's 1st Canadian Tank Battalion would be in Bovington using the much improved Mark V Tank in its tactical training.

CTC TRIALS AND EVALUATIONS SECTION

ARMOUR EQUIPMENT TRIALS UPDATE

By Capt D.W. Kitchen

Renewed interest in capital acquisitions during 1985 provided the opportunity to evaluate a wide variety of armour equipment. Aply supported by the resources of C Sqn, RCD, and the Armour School, the Trials and Evaluations (T&E) section processed several important items which could impact significantly on Armoured Corps operations and training in the near term.

While security considerations prevent the disclosure of specific results, the intention of this article is to summarize briefly those trials conducted and to apprise the reader of applications which affect our future capabilities.

Major trials conducted over the past year include:

- a. Leopard Improved Sight Linkage;
- b. Clear Lane Marking System (CLAMS);
- c. Tactical Engagement and Precision Gunnery Simulators (TEPGS); and
- d. Leopard Modifications.

LEOPARD IMPROVED SIGHT LINKAGE

In conjunction with the Leopard accuracy investigation, DREV has developed an improved version of the gun resolver parallel linkage. The new mechanical linkage between the cradle and resolver was designed to reduce the relatively large aiming error caused by thermal distortion of the turret. The problem with the existing system is most obviously seen with the loss of alignment of the primary sight to the relatively stable secondary sight, through the warming and cooling of the turret during the course of a day. The improved linkage arm should minimize this error, and decrease the number of occasions that the gunner must converge his IFCS.

CLAMS

Trials conducted on the Leopard minefield breaching rollers and ploughs (Bulletin Volumes 16 and 17), indicated that although these attachments will permit the breaching tank to safely traverse a minefield, it will be difficult for following vehicles to remain in the safe areas of the breached path. It was realized that a simple marking system would assist the follow-on vehicles and likely reduce battle casualties. The CLAMS was produced as a candidate system. It mounts a dispenser box centrally on the rear of the tank from which glow stick markers are automatically dropped at specific intervals. The follow-on vehicles center themselves over the markers and thereby track the cleared lane.



CLAMS mounted on an Israeli Centurion
(shown dropping a marker)

TEPGS

A requirement has been identified for training equipment that can provide objective, real time simulation of the effects of direct fire during field exercises. To this end, four companies: MILES (US), TALISSI (FRG), SAAB (SWEDEN) and SIMFIRE (UK) were contracted to provide their equipment for evaluation. Each candidate supplied systems for Leopard, Cougar, Tow and M113. The basic principle of operation involved an eye safe laser transmitter which simulated the characteristics of the appropriate weapon system and triggered a flash/bang pyrotechnic generator. Detector/reflector units mounted on the target vehicles in conjunction with a microprocessor, determined the results of fire. Should the engagement result in a Kill, an orange smoke cannister is set off, a flashing light operates continuously and the "dead" vehicle's laser is deactivated. Most of the tank fire kits, interface directly with the Leopards' fire control systems and it is proposed that they be used as precision gunnery simulators.

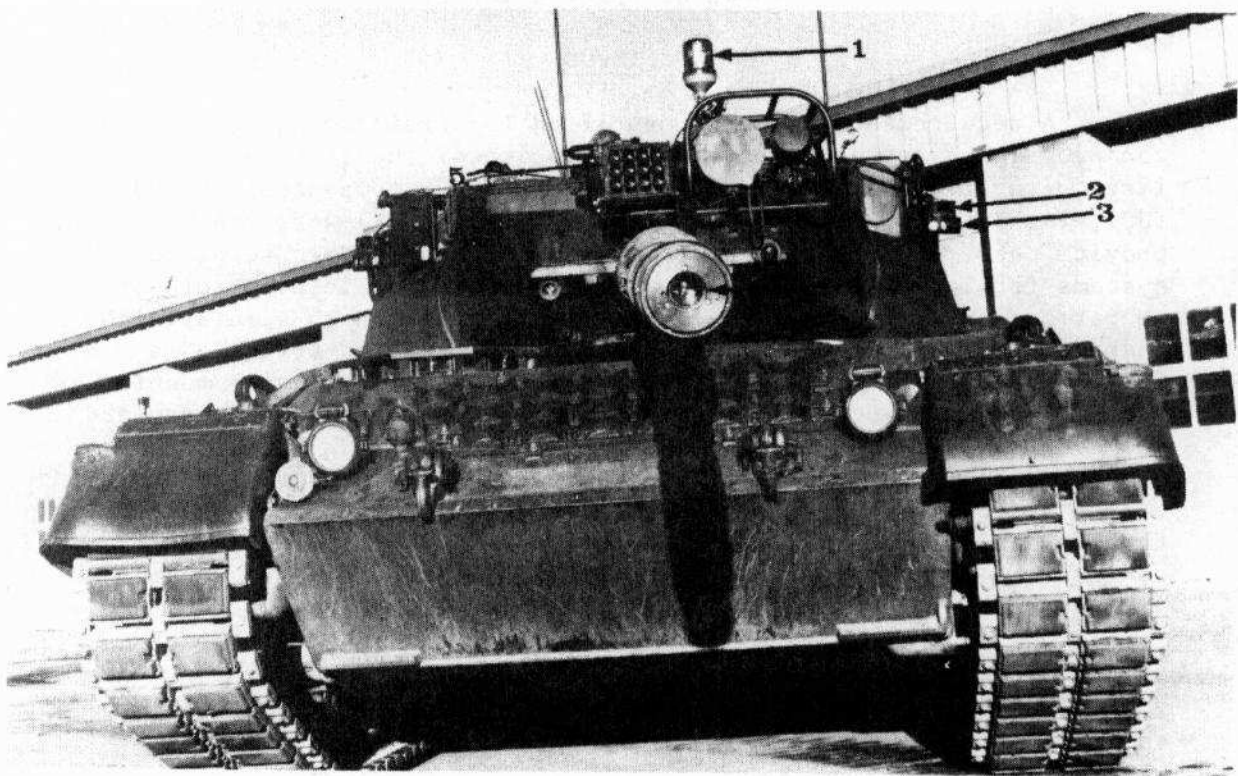
LEOPARD MODIFICATIONS

The following have been evaluated:

- a. modified Wegmann boxes incorporating a fail-safe mechanism that will not allow the "gun loaded" button to be activated should a closed trigger circuit condition exist;
- b. modified graticule illumination controls will allow the IFCS sight to vary the brightness of the graticule from "very bright" to an "off" position;
- c. modified TRP2A drive cables and redesigned right angle drives should eliminate the excessive looping and cable binding that exists in the present configuration;

- d. modified cant and output printed circuit boards for the IFCS computer will allow the coax to be zeroed at 600 meters;
- e. a new anti-slip exterior paint that is sufficiently heat resistant to withstand the temperature extremes at the heater exhaust outlet; and
- f. an external stowage rack designed to prevent stowed tarps and cam nets from extending below the turret line.

Other trials are currently ongoing, however, of note, are plans to trial a muzzle reference system for the Leopard, and in the longer term to investigate a new thermal sight which features an integral CO2 laser rangefinder. With luck our update in the next issue will be able to report more specific details.



SIMFIRE (UK) TANK EQUIPMENT

- 1 - Flashing Light
- 2 - Detector
- 3 - Reflectors
- 4 - Laser
- 5 - Pyro unit

REARMING THE COUGAR
FOR THE SPECIAL SERVICE FORCE

by Capt J.R. Gredley

The Cougar was originally introduced as a tank trainer and its 76mm gun was intended to provide crews with basic gunnery skills that would be transferable to a Main Battle Tank (MBT). Despite the original plan, the establishment of the Special Service Force (SSF) and the coincidental presence of Cougar in it has given Cougar an operational role. It will be expected to perform as a direct fire support vehicle in a low or mid-intensity environment such as might be encountered in an SSF task in defence of Canadian sovereignty.

The mobility of Cougar is as good as a 6x6 wheeled vehicle can be and its armour protection, although barely adequate, cannot be significantly improved without degrading already limited mobility. The usefulness of Cougar in support of the SSF and its flexibility as a general purpose armoured fighting vehicle (AFV) could be improved however by changing the weapon system.

The aim of this paper is to show that Cougar can be made more useful to the SSF by replacing the present gun by a light automatic cannon (LAC).

DIRECT FIRE WEAPON EFFECTIVENESS

There are three main characteristics of direct fire effectiveness:

- a. Accuracy of Fire - dependent on the consistency of the gun and ammunition, the accuracy of the fire control system and the skill of the gunner;
- b. Lethality of Terminal Effect - dependent on the size and type of projectile and the characteristics of the target; and
- c. Speed of Reaction - the time required to acquire and kill a target.

Equally important in the SSF is the logistic support needed to keep the weapon on the battlefield.

THE PRESENT SYSTEM

Accuracy of Fire. Because of the short gun barrel and low muzzle velocity of the ammunition, present 76 mm gunnery drills require a multiple round technique for each engagement. The crude fire control system does little to improve the situation because it does not have an integrated range finder. A high degree of crew skill is required. Severe platform rock caused by recoil makes it difficult for the gunner to retain his sight picture. These factors combine to make hitting an uncooperative mover difficult.

Lethality. It is widely held that the 76 mm High Explosive Squash Head (HESH) round is ineffective against tanks and it produces insufficient fragmentation to be useful against dug-in troops. It is devastating against light AFVs and soft vehicles at any range, if a hit can be obtained. The High Explosive (HE) round is useful against soft targets but it is ineffective against any AFV. The 76 mm system is of limited value in combat capability against helicopters.

Speed of Reaction. The speed of reaction of the Cougar weapon system is hampered by three factors:

- a. poor accuracy necessitating multiple shots to hit a target;
- b. time of flight of the projectile; and
- c. the crew commander has to load every round, hampering him in acquiring new targets.

Logistic Support. The Cougar carries approximately 40 rounds, each of which is relatively heavy and bulky. Using multiple rounds per engagement, Cougar can only engage a limited number of targets without replenishment. Providing ammunition in the field will strain the SSF's logistic capability particularly on "light scales".

Firing Cougar effectively requires a lot of training and experience from both the gunner and crew commander, both of whom must be present to fire at all. Any casualty among the three crew members means the vehicle can only fire or move, but not both, and if the crewman is not replaced immediately, the vehicle must be taken out of battle. This is a serious limitation because of the restricted reinforcement capability of any air mobile force.

LIGHT AUTOMATIC CANNON

Accuracy. LACs will be discussed generally as weapons of 20 - 40 mm. They fire high velocity, flat trajectory projectiles that are insensitive to small range assessment errors and crosswinds. First round hit probability is high, even with simple sights.

Lethality. Generally, LACs are effective against all light AFVs to 1200 m and can engage softer targets out to 2000 m. They can fire a wide variety of ammunition. The following are representative examples:

- a. Armour Piercing Discarding Sabot (APDS). Capable of killing all known light AFVs.
- b. Armour Piercing Special Effects (APSE). Capable of killing most light AFVs. It is useful against structures.
- c. High Explosive (HE). Effective against transport and soft targets.

LAC can be effective against helicopters, using the accuracy of APDS or proximity fuzed HE.

Speed of Reaction. Quick reaction is possible with an LAC because of the following:

- a. high rate of accurate fire;
- b. minimal platform rock allowing the gunner to retain his sight picture; and
- c. the crew commander has time to acquire new targets because he is not loading every round.

Logistic Support. The Alvis Scorpion and Scimitar will be used to illustrate a possible logistic saving. The Scorpion carries the same number of rounds as the Cougar. The Alvis Scimitar, mounting a 30 mm Rarden LAC on the same hull as Scorpion carries four times as many rounds. Rarden gunnery also uses a multiple round technique to assure a hit although first round hits are frequent. Because of greater ammunition capacity, and better firing techniques, Scimitar is capable of many more engagements than its Scorpion sibling without requiring replenishment. A similar advantage could be gained by an LAC equipped Cougar over the present 76 mm version.

When replenishment is necessary, the small size of the individual rounds allow worthwhile quantities of ammunition to be carried by light trucks, snowmobiles, toboggans or even manpack.

Because of the inherent accuracy of an LAC, the crew does not require as much training to achieve an acceptable proficiency, compared to the present 76mm gun. Furthermore, an LAC equipped vehicle could operate for a short time without one of the crew, because the gun would not require a full time loader.

CONCLUSIONS

An LAC would be more accurate than the present 76 mm system.

Both the 76 mm and the LAC are incapable of killing tanks, but they are effective against the likely ground targets. The 76 mm has a longer effective range, but the LAC has an anti-helicopter capability.

An LAC Cougar would have a faster reaction time because of a high rate of accurate fire and because the crew commander would be left free to acquire targets.

An LAC version of Cougar would impose less of a logistic load on the SSF for ammunition and reinforcements.

In summary, replacement of the present 76mm gun on Cougar by an LAC would provide a faster reacting, more economical AFV with equivalent lethality. It would have the added advantage of an anti-helicopter capability.

THE 4 CMBG RECONNAISSANCE SQUADRON
AN ASSESSMENT OF CURRENT DIFFICULTIES

by Maj D.C. Wilkinson
and Capt J.M. Donnelly

INTRODUCTION

In recent years there has been increasing concern in the Army, and particularly in the Armoured Corps, about the decline of armoured recce expertise and capability. This concern has been reflected in such documents as:

- a. Armour 81-85. This study recognized that each brigade required an independent recce squadron, but that manning/establishment ceilings and inadequate specialty training restricted progress in that direction. The document also pointed out the turmoil caused within the RCD recce squadron during annual rotation and cross-posting cycles. The resulting loss of operational capability within the recce sqn was severe, and was scarcely restored before the infrastructure was shattered once more;
- b. Basic Recce Crewman Draft CTS Feb 81. This document detailed standards for a course "intended to prepare a soldier for a Recce Sqn by training him at his unit". The proposed course included training in Lynx automotive, communications, and gunnery systems; as well as theoretical and field training in recce ops;
- c. DMOS Preliminary Report Aug 83. Following comprehensive analysis in which many problems were identified, this report concluded that recce skills were not being sustained under the existing structure. The recommended solution was the creation of a separate recce trade for Other Ranks below MWO level.

Loss of recce expertise applies throughout the Armoured Corps, but is especially severe within the 4 CMBG recce squadron. This is because Recce Squadron RCD, as part of 4 CMBG, has an immediate operational role in NWE. Furthermore, because of 4 CMBG's unique role, Recce Squadron finds itself facing peculiar tasks with limited resources.

The aim of this paper is to discuss current difficulties faced by the 4 CMBG Recce Squadron.

The discussion takes the following sequence:

- a. a description of the ideal situation for the development of operational expertise;
- b. identification of shortfalls from the ideal in the present state of affairs; and
- c. recommended courses of corrective action.

AN IDEAL SITUATION

This paper posits a building block approach which proceeds from the establishment of sound and comprehensive doctrine. From this doctrine organizations are developed; these in turn serve to identify the equipments required. Finally, a training system is set up which provides personnel who are both technically skilled in the equipments selected, and tactically skilled in the doctrine established.

DOCTRINE

Role. Force Planners build toward a mission or role to meet a threat in accordance with some doctrinal rationale. The tasks recce units must perform follow from the role. The scope of these tasks may vary in accordance with the type of operation and level of formation being supported. Therefore doctrine must encompass recce tasks in all types of operations and at all levels of command from battlegroup to corps. In practical terms, our doctrine should tie in with the development of Div 86.

The Threat. Tactical doctrine must take account of the training, equipment, and capabilities of our potential enemies. Since the threat is dynamic, so must be the doctrine.

Unity. Doctrine should be promulgated from a single source, and in general terms, should be applicable to and accepted by all users.

ORGANIZATIONS

Singularity. From doctrine, organizations should be developed with a single goal: the fulfilment of doctrinal tasks in war. Thus, war establishments alone should form the basis for all planning, purchasing, manning and training.

Commonality. Units charged with similar tasks should be similarly organized. This eases administration and training.

EQUIPMENT

Quality. Ideally, equipment is produced to meet specifications arising from the previously established doctrine and organizations. In reality, this often means selecting available items which most closely fill

the requirement. The important thing is that the equipment meet the needs of the present and near future.

Quantity. Enough equipment should be purchased to complete the organization in all aspects, and to provide reasonable replacement stocks.

Variety and complexity. There should only be as many types of equipment as absolutely necessary. Each piece of equipment should be as simple as possible to operate and maintain. This eases the manpower investment required for training, operation, and maintenance; as well as simplifying supply and replacement procedures.

TRAINING

Balance. Ideally, training requirements are such that suitable balances of effort can be struck. Such balances include:

- a. training versus non-training activities;
- b. individual versus collective training;
- c. collective versus combined training; and
- d. technical versus tactical training.

Doctrine and Training. The importance of unity of doctrine has been stated above. Since training should be applied doctrine, unity of training is equally important. In the perfect system, therefore, all individual recee training would be conducted by a single agency (a training center); and all collective/combined training would be conducted in accordance with standards prescribed by the doctrinal source. The final step to the most efficient system is to combine the training and doctrinal sources into one - the Armour School.

Professional Training. Training of NCOs and officers must also be consistent with doctrine. As well, it must be progressive and intensive, so that the system produces highly skilled leaders, instructors, and supervisors. This is the key to maintenance of expertise - a regenerative training system.

SUMMARY

Development of operational expertise begins with a clear definition of the role. Comparison of the role with the threat against it produces doctrine, which in turn prescribes the organizations and equipments required. Training meets the requirements to fill the organization, operate the equipment, and sustain the training system itself. This is the ideal - in many ways we are falling short of it.

THE PRESENT PREDICAMENT

Recce is not the only Armour skill to have suffered from the short-falls of the present system. It can be argued, however, that recce has suffered the most, and nowhere is the problem more acute than in Recce Squadron, RCD.

DOCTRINE

Role. The primary doctrinal reference, The Reconnaissance Squadron in Battle, states:

"The role of the recce sqn is to obtain accurate tactical information on the enemy and the ground in all types of operations and pass it back quickly to the higher commander."

The manual goes on to list recce and surveillance as the two primary squadron tasks, and secondary tasks as follows:

- a. guard (when reinforced);
- b. escorts to convoys, VIPs, and prisoners;
- c. traffic control;
- d. detection, monitoring, and surveying of chemical and radiological contamination;
- e. rear area security;
- f. liaison for passage of lines; and
- g. anti - airborne/airmobile surveillance.

Reality. The role and tasks are adequate, clear, and sensible as stated. When they are examined against Recce Squadron's function in 4 CMBG, and the likely operational threat, some issues arise:

- a. the doctrine concentrates on brigade operations almost exclusively. 4 CMBG is likely to operate as an 'independent' brigade under operational control of a corps or division of an allied army. Neither Allied nor Canadian operations at these higher levels has been incorporated, leaving our doctrine lacking from the outset. Additionally, the probable employment of 4 CMBG to fill a gap in allied positions indicates a requirement for integral medium reconnaissance capability. Recce Squadron is neither equipped nor trained to carry out this function;
- b. the doctrine correctly appraises the magnitude of the threat, but does not adequately suggest a means of dealing with it. For example, the squadron is to conduct recce tasks in all types of

operations, including the advance. To advance against an enemy force implies an obligation to penetrate the enemy screen - that is how information must be obtained. The doctrine did not address this difficult task in 1978; in 1984 the enemy is yet more powerful, and the doctrine has not changed. The problem is not limited to offensive operations. Against modern enemy reconnaissance organizations, equipped with BMPs (and even tanks), our reconnaissance squadrons are woefully ill-matched. Even the capability for self protection has been called into question, for the techniques of stealth and concealment cannot always apply.

Unity. Our doctrine not only lacks completeness, it is fragmented as well. The absence of a single doctrine to encompass all aspects of our role has led to competing sources. Additional teaching, some of it supplementary, some of it conflicting, emerges from the Staff Colleges, the units, and the Armour School. The net result has been a tendency toward hobbyhorse soldiering - a divergence of opinion which only serves to complicate the training of troops.

ORGANIZATIONS

Singularity. We have too many organizations. Doctrine should have produced a single effective organization for each level of command. Instead, we have, at brigade level alone:

- a. war establishment;
- b. war restricted establishment;
- c. standard brigade group (in the doctrinal reference);
- d. peace establishment; and
- e. each with its own implications for purchasing, manning, and training.

Commonality. Reconnaissance Squadron of the RCD does not share its organization with the reconnaissance squadrons of Canadian - based Regiments. More confusingly, the RCD does not share its organization with Canadian based Regiments. These differences are closely linked to equipment problems, and the repercussions are discussed more fully below.

EQUIPMENT

24. Quality. The Lynx was developed 20 years ago, when enemy reconnaissance was lightly armoured and stealth was a viable reconnaissance principle. In the face of a more heavily armed and armoured enemy, this vehicle alone can no longer meet the needs of the reconnaissance squadron. Yet because our doctrine has not been revised, replacement or major improvement of the vehicle is not foreseen.

Quantity. Practical constraints have resulted in serious shortages of essential equipment. This has been most keenly felt in the complete restriction of the support or assault troop equipments commonly called for, and the lack of mortar capability which many doctrinal references recommend. Also, while Recce Squadron possesses most of the surveillance, communications, and miscellaneous equipment detailed in the war establishment, Canadian squadrons do not. Thus familiarization with equipment is a major training consideration for new members of the squadron.

Variety and Complexity. The variety of major equipments in the Armoured Corps impacts severely on the recce skills maintained. The introduction of Cougar, a relatively complex "Tank Trainer" bearing little resemblance to a tank, has generated a defacto threeway trade split. Manpower establishments designed for a pure tank/recce doctrine, and then truncated out of peacetime necessity, cannot meet the intensive training demanded by this split. Inevitably, because all our regiments are organized and equipped as armoured regiments, it is the recce squadrons which most often suffer cutbacks in manpower and training time.

TRAINING

The roots of our training problems have been mentioned above:

- a. incomplete primary doctrine and competing secondary sources;
- b. the plethora of organizations and establishments;
- c. dissimilarity of organization and equipment between the RCD and the other Regiments;
- d. an obsolescent, if not obsolete, recce vehicle;
- e. shortages of key recce equipments; and
- f. competition for training resources in a tank - oriented corps comprising tank - oriented units, yet neither completely tank - equipped nor adequately manned.

Rotation policy. The real essence of the recce delemma is the personnel turbulence resulting from the disparity of organization and equipment in the Corps. This has been identified as a problem in Armour 81-85 and is summarized as follows:

- a. Cougar - equipped Regiments must feed personnel to the RCD so that tank experience is widely shared;
- b. since most soldiers rotating into the RCD lack tank qualifications, many of them are posted to Recce Squadron whether they possess recce training or not;

- c. the RCD must conduct tank PCF training annually in order to meet its own requirements for trained tank crewmen. Candidates and instructors for this training are drawn, in part, from Recce Squadron; and
- d. as a result of all of the above, Recce Squadron rotates each year up to 75% of its strength, much of it to fill positions in tank squadrons.

Expertise. The turbulence described above means that Recce Squadron begins each training year with a surfeit of untrained soldiers. Those newly arrived from Canada generally lack experience not only in collective and combined training, but often in trade skills such as Lynx driving and maintenance, HMG handling, and operation of surveillance devices, to name but a few. Valuable training time must be devoted to these basics, at the expense of other important training; eg:

- a. assault/support tp skills;
- b. mine warfare and demolitions training;
- c. combat intelligence training;
- d. NBCW training including survey; and
- e. use of HF/UHF radios.

Stability. With the advent of ORCDP, the pool of older, cross-trained, and experienced crewmen will shrink. So too will our reservoir of trade expertise.

Professional Training. Of equal concern is the turmoil of officers, WO, and Senior NCO postings. Since these leaders are also expected to do "tank time", their stay in the Recce squadron seldom exceeds two years. More critically, few of these leaders ever receive formal training. Recce skills must, therefore, be learned on the job during short and infrequent tours in recce squadrons - this haphazard system cannot provide the intensive and progressive training required to raise the level of professional expertise.

Training Standards. Adding to the problem of limited training time is the lack of recce training standards. This has been partially addressed by the proposed Basic Recce Crewman and Advanced Recce courses, but the development of each has been muddled by the inadequacies of our doctrine. Because the Armour School has not been empowered to produce doctrine, this problem will continue.

SUMMARY

In many respects our doctrine, organizations, equipments, and training system fall short of the ideal. The building block approach has been imperfectly applied; the cumulative effect upon our training, and hence our expertise, has been harsh.

RECOMMENDATIONS

DOCTRINE

Our present doctrine should be rewritten to include:

- a. a multi - level discussion of recce employment within corps and division operations; and
- b. an appreciation of the threat of today and the near future, and the requisite organizations, equipments, and tactics to meet the threat.

The doctrine must be comprehensive and appropriate to our role. It should be issued from a single source and accepted throughout the Corps. The Armour School is recommended as the agency to develop this doctrine; it should subsequently publish training standards to support the doctrine.

ORGANIZATION

A single recce squadron organization, based upon the revised doctrine, should be adopted and promulgated for all purposes. The recce squadrons of all Regiments should be based upon the same organization.

The organization should include all the sub-units called for by the doctrine. Under no circumstances should entire functional groups be restricted (eg: support tp), for this causes equivalent gaps in the overall expertise of the corps.

EQUIPMENT

The Lynx should be updated or replaced to meet doctrinal requirements. At the very least it requires heavier armament and improved mobility and survivability if it is to continue to serve as a scout vehicle.

All equipment identified by doctrine should be procured, and distributed (at least in part) to all squadrons, so that troops may gain familiarity with the tools of their trade.

If the tank, scout vehicle, and Cougar are all to be retained - as seems to be the case - one of the following should occur:

- a. increase manpower available so that recce squadrons are not caught in the squeeze for resources;
- b. reconfigure at least one Regiment so that recce receives priority in training within it; or
- c. adopt a split tank/recce trade system, so that stability in recce training can be reestablished.

TRAINING

The long-term solution to training difficulties will require one of the courses offered in the paragraph above.

In short term, some improvement could be obtained through:

- a. relieving the recce squadron of the burden of accepting undertrained personnel, and in turn surrendering trained leaders and soldiers to tank squadrons. This might be achieved:
 - (1) through de-emphasizing the importance of tank time versus recce time as a career implication; or
 - (2) by making the recce squadron truly independent, perhaps with a change of hat badge for good measure. An interesting variant would be to have all four recce squadrons wear the badge of a fifth Regiment!
- b. efforts to introduce progressive professional training should continue. Specifically, the Armour School should produce training standards for three benchmark courses:
 - (1) basic recce crewman;
 - (2) advanced recce crewman; and
 - (3) a recce officers' course.

CONCLUSION

This paper was produced in response to a perceived decline in recce expertise within the Armoured Corps, as evinced in the 4 CMBG Recce Squadron.

It is contended that recce expertise has declined because the Corps has been unable to follow a smooth path of development from doctrine, through organization and equipment, to training. It is further contended that the level of expertise will continue to decline, unless stern corrective action is taken.

THE EYES AND EARS OF TOMORROW

A Discussion of the Merits of a Wheeled Reconnaissance Vehicle

by Lt J. Cade

"Information is the foundation of battle," said MGen J.F.C. Fuller in his essay on armoured warfare. It is for this reason that the art of battlefield reconnaissance has played such an important role in recent tactical doctrine. Because of the varied and complex roles of the brigade recce squadron, the equipment and vehicles employed in the squadron are a source of continuing controversy. In an effort to meet the conflicting demands of speed, cross-country performance, stealth, armament, and protection, vehicles ranging from the motorcycle to the medium tank have all been tried with varying degrees of success. We replaced our wheeled "Ferret" with the tracked "Lynx" in an effort to achieve better rough-terrain performance. But as we reach the feasible lifetime limit of the "Lynx", once again the question arises:

"should the next recce vehicle be wheeled or tracked?"

From our experiences we have determined a set of characteristics essential to the art of reconnaissance. These characteristics must be kept in mind when determining the requirements of our next recce vehicle. Of these characteristics - mobility, flexibility, logistic economy, and limitations - it is the first three which have the most bearing on vehicle design.

Mobility is essential to the design of a vehicle. Recce tactics demand the ability to move over all types of terrain at high speeds. The recce car is vulnerable in close-quarter fighting and is expected to penetrate deeply into enemy positions. This means that the vehicle must be able to move quickly and be quiet enough to maintain stealth when approaching enemy positions.

Our new vehicle must also be flexible because of the many tasks of a recce squadron and the requirement to respond rapidly to changing situations. It must have a low silhouette to enable it to "sneak and peek". Its armour protection is light but must be able to withstand at least medium machine gun fire. The vehicle must be of such a size that it can withstand the battle pressures of leading the brigade advance yet mobile enough to easily adapt to the speed and mobility required for patrol tasks. The new recce vehicle must have sufficient fire power to pack the punch needed to extract itself from difficult situations on the battlefield.

To give one an idea of the flexibility and mobility required, one should consider the rear-area security task. Soviet tactical doctrine places heavy emphasis upon rear-area, heliborne-airborne incursions. To react to such an attack, the vehicle must be able to move quickly, into any type of terrain, and engage the attacking force until other friendly elements can move in.

Logistic economy is a characteristic of recce out of necessity, not desire. The supply line to the recce troop is long and often runs through insecure areas of the battlefield. It is essential that the recce troop not require large quantities of fuel, spare parts, or maintenance as it is extremely difficult to resupply the recce squadron in war. The squadron's vehicles, therefore, should be reliable, easy to maintain, and relatively fuel efficient. The perfect recce vehicle will possess all of these traits - but what will it look like?

The debate between wheel and track has continued for so long because each side continues to make technological breakthroughs. What of today's light-tracked vehicles? Great Britain has shown the most interest in the light-track recce vehicle, as they were not satisfied with the cross-country capabilities of their wheeled family of scout cars. They are of the opinion that one must be prepared to fight in all theatres of the world. It is not enough to be prepared to fight in Europe, one must be ready to go anywhere. From this argument was spawned the CVR(T)(Scorpion) family; a series of light-tracked vehicles with improved cross-country capabilities, air portability, and fire power.

The Scorpion and Scimitar are fast, highly mobile vehicles with relatively low silhouettes. They boast a comparatively quiet engine but are still faced with the usual noise generated by tracks and sprockets. The Scorpion carries the 76 mm gun system while the Scimitar has the Rarden 30mm cannon. The major selling points of the Scorpion family are its high speed and light weight: this allows air portability and makes the vehicles suitable for use anywhere in the world.



The Scorpion CVR(T) with 90mm gun.

The latest developments in wheeled scout car design have come from both the French and the Americans. The American Gage "Commando" and the French Panhard boast improved differential and tire tread design giving both vehicles vastly improved cross-country/rough terrain performance. Both vehicles have improved sloped armour which provide good protection without sacrificing their light weight. The American scout car carries a Rarden 30 mm cannon mounted in a turret. The Commando also has a low enough silhouette that the turret has not made it top-heavy and easy to roll (a problem experienced with the British "Fox"). Tests on both the Panhard and Gage scout cars show excellent mobility, even through thick mud and heavy sand.



Panhard AML Scout Car with a 20mm cannon and Milan.

During the Vietnam war, the Americans sent the predecessor of the "Commando" scout car, the "Commando" armoured car to Vietnam. Critics argued the futility of such a move as the harsh climate and terrain of Vietnam would prove too much for a wheeled vehicle. The armoured car was employed in rear-area tasks and patrols. It was employed on all types of terrain and reports claimed surprising success. It was found that the capabilities of this vehicle allowed it to handle most situations. The Gage Corporation is claiming that their new scout car is even better.

Although the light-tracked vehicle still possesses better rough terrain capabilities than its wheeled counterpart, technology has compensated, and consequently narrowed the gap. The wheeled scout car is still capable of faster speeds on roads which gives it a quicker response time to changing situations. Both types of vehicles are capable of carrying the same weapon systems and can carry relatively similar armour protection. Tracked vehicles, however, tend to be larger in size and noisier - a definite disadvantage when our tactical doctrine is one of "sneak and peek".

It is in terms of logistic economy that the real differences appear and the merits of a wheeled scout car come to the fore. Wheeled scout cars require less maintenance because of their relative simplicity of design. Because of the stress imposed by a track, a wheeled scout car has three times the life span of its tracked counterpart. In addition, a wheeled vehicle consumes 60 - 80% less fuel, giving it 40 - 50% longer range than a tracked recce vehicle. Wheeled vehicles require less maintenance than light-tracks and, consequently, fewer spare parts. All of these are important considerations when one thinks of battlefield replenishment.

Although the wheeled recce vehicle is easier to keep running, the question of off-road performance still continues as a major argument in favour of tracked recce vehicles. However, Canada has made a political decision that we will go to war should war break out in Europe. That has been, and continues to be our chief military concern. The White Paper on Defence outlines a list of priorities in our defence planning. Of these, the defence of Canada is the highest priority. This poses a problem for a wheeled vehicle because the bulk of Canada is wilderness and extremely rough terrain. We also have a commitment to Norway. The snow of Norway could pose a problem for a wheeled vehicle (no reports are currently available on the winter capabilities of the vehicles discussed). We do not always have the resources, however, to place the most ideal vehicle in each area of operation. We must choose, therefore, the best vehicle for our primary expected theatre of operation - Europe.

CENTAG forces spend 40 - 50% of their driving time on roads. 20 - 30% is spent on easy terrain while 20% is spent on average ground. This means 85% of their tactical driving time is spent on non-difficult terrain. This suggests that there is little requirement for cross-country capability in Europe that the new generation of wheeled scout cars cannot meet.

In summary, the wheeled scout car of today provides low silhouette, quiet engines, adequate fire power and protection, and good off-road performance. What is especially attractive, however, is its low fuel consumption and low maintenance requirements.

With escalating defence costs and tight defence budgets, we are forced to concentrate our defence aims. Our present defence policy calls for the defence of Europe. Because Europe is well developed, with excellent road networks, it is unlikely that we need any cross-country capability that wheels cannot provide. The wheeled scout car will perform the tasks of the brigade recce squadron to a better and more efficient standard than any light-tracked recce vehicle. Our next purchase, therefore, should be a wheeled scout car.

LA RECONNAISSANCE DE CORPS D'ARMEE

PRINCIPES APPLIQUES AU NIVEAU DU

PELTON D'AMX 10 RC

Par le Capt B.B.M. Houssay, ancien officier d'échange
au 12e RBC, et le Maj J.O.M. Maisonneuve, 12e RBC.

Editor's Note: This is the concluding article in the series which
commenced in The Armour Bulletin Volume 18.

Nous avons vu dans le précédent bulletin l'organisation d'un régiment de Cavalerie Légère Blindé (CLB) de Corps d'Armée (CA) français et comment se comportait un peloton en reconnaissance d'axe. Nous allons voir maintenant l'une des missions les plus courantes en marche rétrograde; c'est aussi l'une des missions les plus délicates. Il s'agit du jalonnement.

Jalonner, c'est renseigner en permanence sur la progression d'un ennemi en marche maintenant devant lui des éléments mobiles qui, sans se laisser ni identifier, ni accrocher, saisissent toute occasion de préciser le renseignement et d'infliger des pertes à l'adversaire. Au moment où va commencer le jalonnement, la situation est généralement la suivante: les pelotons de reconnaissance qui viennent de reconnaître des axes parallèles sont au contact de l'ennemi; certains sont bloqués sur leur axe par des éléments d'avant-garde ennemis d'un volume trop important pour qu'ils puissent continuer leur mission de reconnaissance, ce qui les a amené à s'installer temporairement en position défensive pour obliger l'ennemi à se déployer et à manoeuvrer. Nous allons regarder un peloton qui est dans ce dernier cas et qui se trouve déployé en position de tir face à un effectif ennemi supérieur à un peloton qui commence à manoeuvrer, marquant ainsi sa volonté de continuer à avancer.

Les trois AMX 10 RC sont déployés en position tourelle dissimulée et saisissent chaque occasion pour passer en position de tir et infliger des pertes à l'ennemi. Les deux jeeps de l'escouade sont placées soit pour surveiller itinéraire éventuel de débordement ennemi. L'adjoint, quant à lui, est parti avec les deux motos plusieurs kilomètres en arrière pour reconnaître des positions pour les AMX 10 RC sur une ligne favorable à l'observation et au tir.

Le chef de peloton, tout en conservant l'observation et continuant à renseigner sur l'ennemi, étudie sa carte; il repère l'axe que son commandant lui a donné comme direction de jalonnement; il note toutes les positions qui seront sans doute favorables à l'observation et au tir, et les itinéraires qui pourraient permettre à l'ennemi de le déborder sur ces positions.

Il repère aussi tous les carrefours où l'ennemi pourrait changer de direction et lui échapper.

Il organise le décrochage; pour cela il désigne l'indicatif d'appel qui fera le recueil et il dit à chacun dans quel ordre il devra décrocher et où il devra aller, et ce qu'il devra faire.

Quand il reçoit l'ordre de commencer le jalonnement, le chef de peloton place son élément de recueil puis fait décrocher ses différents éléments dans l'ordre prévu. En général, il décroche le dernier. L'élément de recueil ne décrochera que lorsqu'il aura le contact à vue avec l'ennemi. Pour le chef de peloton, il s'agit maintenant de garder en permanence le contact à vue avec l'ennemi. Pour cela, les AMX 10 RC vont décrocher en perroquet (leapfrog) de position d'observation en position d'observation, sans se faire repérer, jusqu'à ce qu'ils arrivent à la position où le sous-officier adjoint (SOA) les attend.

Cette technique du perroquet consiste à se succéder d'une position à l'autre comme l'indique le croquis. En arrivant à la position du SOA, les AMX 10 RC vont être immédiatement placés par les motos; le chef de peloton sera placé par son adjoint auquel il donnera en même temps ses ordres pour la suite. Sur cette position le chef de peloton déclenchera au moment opportun le maximum de feux pour détruire l'ennemi afin de l'obliger à montrer ses intentions et à se déployer. Lorsque l'ennemi amorcera une nouvelle pression, il fera décrocher ses éléments successivement. Le peloton reculera ainsi devant l'ennemi en se dérochant jusqu'à une nouvelle position favorable pour lui infliger des pertes, et ainsi de suite.

L'escouade dans le jalonnement a un rôle d'élargissement de l'observation sur les côtés, pour parer à un débordement ou, vers l'avant (donc vers l'ennemi), si l'ennemi peut changer de direction au moment où les AMX 10 RC doivent décrocher. Elle peut aussi rester en sonnette (ou sentinelle) avant que les AMX 10 RC n'engagent l'ennemi par le feu, pour avertir le chef de peloton du type d'ennemi qui va arriver. Si les motos étaient utilisées pour une raison quelconque, elles pourraient aussi aider le SOA à placer les AMX 10 RC sur une position favorable au tir et à l'observation.

Cette mission se poursuit généralement jusqu'à une ligne de coup d'arrêt où le peloton est recueilli par une unité amie et dirigé vers une zone de recomblerment et de réorganisation.

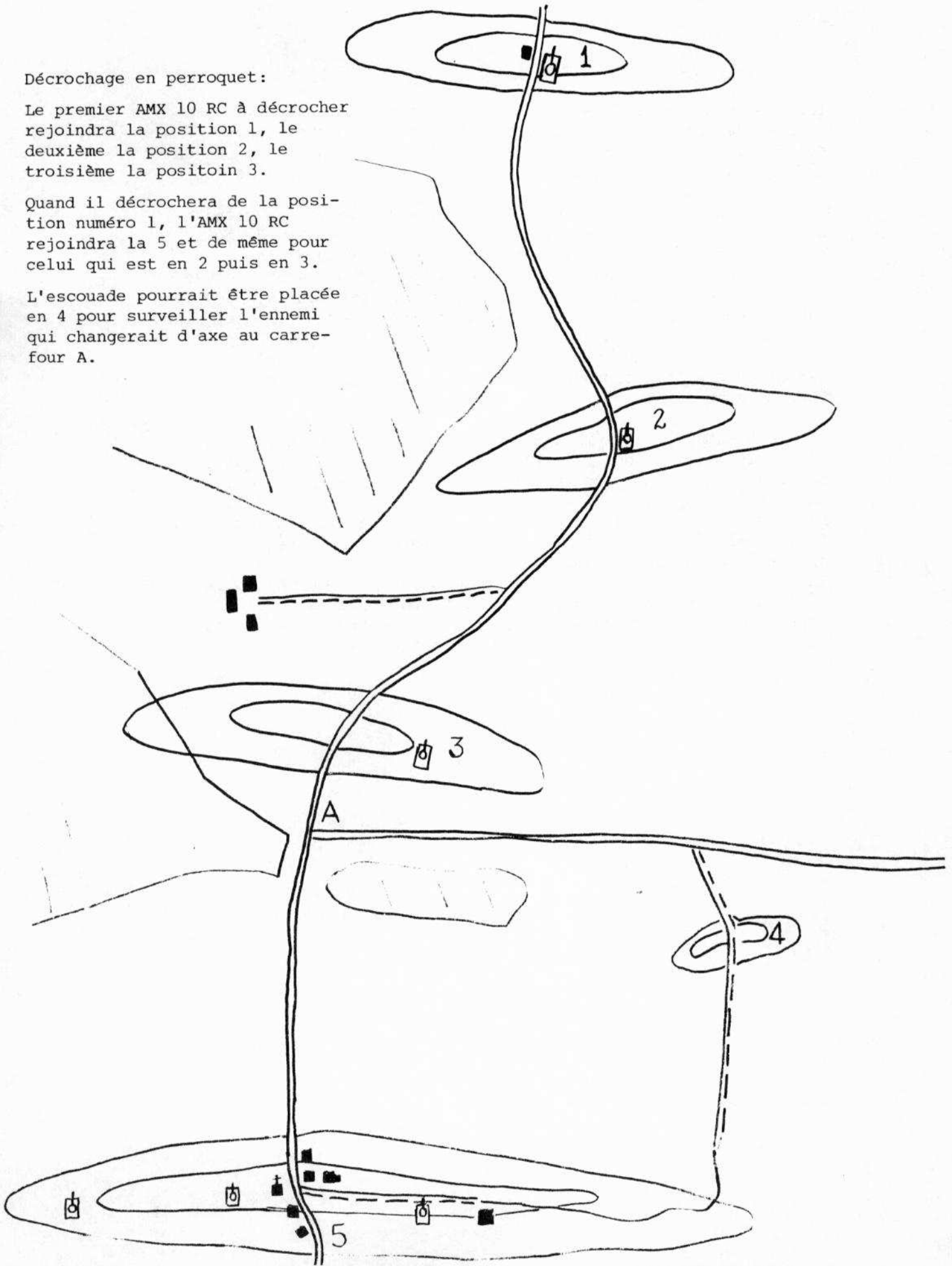
En résumé, les grandes différences entre la reconnaissance canadienne exécutée au niveau Groupe-Brigade et la reconnaissance de Corps d'Armée française sont les suivantes: l'agressivité avec laquelle on accomplit cette reconnaissance est bien sûr la plus grande différence. Les tactiques canadiennes comptent plutôt sur l'artillerie pour faire réagir l'ennemi (il reste à déterminer si

Décrochage en perroquet:

Le premier AMX 10 RC à décrocher rejoindra la position 1, le deuxième la position 2, le troisième la position 3.

Quand il décrochera de la position numéro 1, l'AMX 10 RC rejoindra la 5 et de même pour celui qui est en 2 puis en 3.

L'escouade pourrait être placée en 4 pour surveiller l'ennemi qui changerait d'axe au carrefour A.



les canons seront suffisamment avancés pour pouvoir appuyer les troupes de reconnaissance). Les éléments de reconnaissance français, avec leur AMX 10 RC équipés de canons de 105mm, peuvent infliger des pertes majeures à l'ennemi, et le forcer à se déployer.

Le but primordial de toute reconnaissance est de prendre contact avec éléments du gros des troupes ennemies, ou du moins avec l'avant-garde. L'Armée canadienne, au niveau de la reconnaissance de brigade, le fait subrepticement, ayant peu de moyens de se défendre. Nos alliés français, par contre, reçoivent habituellement l'ordre de réduire la reconnaissance ennemie, sinon la détruire, pour prendre contact avec l'avant-garde. La prise de contact avec ces éléments donne peu de chance à l'ennemi de camoufler ses intentions par l'emploi judicieux de sa propre reconnaissance.

Bien sûr, ces méthodes opposées d'accomplir la mission de reconnaissance ne sont possibles qu'avec les matériaux pour la mener à bien. Pour reconnaître avec agressivité, les trois caractéristiques des blindés doivent être exploitées à fond. Il faut une puissance de feu améliorée, une bonne mobilité sur route (une mobilité qui permet des déplacements quasi-stratégiques) ainsi que la capacité de les quitter pour prendre une position favorable. Il faut aussi une protection blindée accrue. L'équipement des régiments de reconnaissance de Corps d'Armée française est correctement conçu pour ces missions. Peut-être le temps est-il venu pour le Canada de considérer son entrée dans ce domaine...

GENERAL INTEREST...



THE AAG/MG INSTRUCTOR EXCHANGE PROGRAM

by WO P.J. Wonderham

PRODUCTION

Exchange programs for NCO's in the corps are challenging, rewarding and scarce. I'd like to take a couple of minutes of your time to tell you a little bit about the ADVANCED ARMOUR GUNNER/MASTER GUNNER EXCHANGE PROGRAM.

PROGRAM OVERVIEW

The AAG/MG instructor exchange program was introduced in 1981 between British and Canadian Armour Corps and the United States Army Armour Center at Fort Knox. The program allows for a 3 year exchange between a Canadian AAG Instructor and an American MG Instructor. The Canadian Instructor is assigned to the MG Branch of Weapons Department and is responsible for reviewing, revising and teaching all aspects of tank gunnery on the M60A1, A3 and M1 tanks to the Master Gunner Course and ANCOC (Advanced NCO Course), the latter is equivalent to our 6B course.

NOTE: Yearly course loads are: MG approx 225 students
ANCOC approx 540 students

What is a Master Gunner?

A master gunner in our terms would be an advanced gunner with a secondary task of turret mechanic. There is normally one MG assigned per company through to Corps level. American armor units entrust this individual with the information necessary to carry out all of their gunnery related training. The master gunner course is said to be the hardest course in the Army with an attrition rate of approximately 35-45%.

PREPARATION FOR THE JOB OF EXCHANGE INSTRUCTOR

Of course an instructor teaching Leopard or Cougar gunnery in Gagetown has the potential, but cannot step directly onto a stage in Fort Knox and teach gunnery. The exchange instructors (Canadian and British) must undergo a series of preparatory courses, before they are permitted to teach:

- a. The Instructor Training Course (ITC); a 2 week, largely civilian educational specialist course which covers M of I, lesson plan composition and lesson delivery;

- b. The tank specific "check out program"; a 6 week "in house" program designed to prepare the instructor to teach small group instruction on all tank systems and machine guns;
- c. M1 Transition course; a 3 week course designed to bring the instructor from an M60A1 or A3 tank to the same level of competency on the M1, now the M1A1 tank system; and
- d. Platform class "check-out"; This is an ongoing preparation whereby an instructor prepares himself to teach a large group of students (up to 75) on a specific block of theoretical instruction, this is generally an 8 hour class.

It takes anywhere from 1 to 6 months to research, prepare and rehearse for a class as the instructors are not permitted lesson guides or to use the projections as a teaching guide. This time frame is dependent on the class content and the instructor's normal workload. Once the instructor is ready to deliver his "platform" class he must endure, first, a class presentation (raking over the coals) to his fellow instructors. If successful he must present his class to educational specialists who ensure the instructor doesn't say such things as...."you-all" too often. The day of reckoning comes very quickly when you are placed in a large state-of-the-art classroom complete with TV monitors and many students, most of whom have been on one specific tank all of their careers, who are very critical about the information being put out and enjoy watching instructors squirm and tap dance around questions.

DUTIES

Instruction is only a small part of the job. First and foremost, one must keep in mind the fact that you are representing your country. At times this can be very demanding both socially and on the job. Many questions are asked about "our" system and "our" country, and of course accuracy and diplomacy must be exercised when even casual references are made. It is pleasing to note that all previous associations related by American tankers have been extremely positive, especially their dealings with the RCD during CAT and REFORGER. (The guys with the little deer on their hats).

CONCLUSION

All is not work and study at Fort Knox as I am sure you are probably aware. The base which maintains some 40,000 personnel has every conceivable recreational and educational facility a family could ever want, and with Kentucky's geographical location finding a warm place to go on leave is no problem. The tour so far has been both challenging and rewarding and very beneficial from a service point of view. Much that has been learned has come from equipment texts that may rarely if ever be useful in Canada. The greatest mutual benefit derived from the program, I feel, comes from the day to day involvement in the American service environment. From this involvement the American soldier can see and learn first hand from a Canadian NCO that we do business, albeit on a smaller scale, with somewhat different equipment, as seriously and professionally as they do.

DO THE TRADITIONAL DEFINITIONS OF THE CANADIAN
MILITARY PROFESSIONAL APPLY TO
THE OFFICER OF THE 1980'S?

by Capt L.J. Zaporzan

"Professional groups are uneasy. Doctors, engineers, lawyers and clergyman are experiencing 'identity crises'...Like other professional groups, military men find the crises of identity requires profound re-appraisal of their purpose, roles and reasons for being".¹

In his search for identity, the Canadian military officer of the 1980s is trying to find out what professionalism really means. Is he a professional or a manager in a special business?² How do traditional values meld with the modern officer's personal values and conduct? Can he determine the relevance of traditional values in the execution of his normal duties?

The aim of this paper is to persuade the reader that the traditional definitions of the Canadian military professional must be revised to include occupational values. Social evolution, due mostly to rapid increases in technology, is changing the military profession.³ Therefore, the definition of the Canadian military profession, based almost entirely on traditional values, must be re-evaluated.

A survey of the literature indicates that the theories of Huntington, Hackett and Janowitz provide the basis for defining traditional military professionalism. Hackett's theory underscores the "application of force in the resolution of a social problem" and "unlimited liability" as the marks of the military profession.⁴ Huntington states that the military professional is characterized by expertise in the management of violence, responsibility to the state for its security, and corporateness in that officers are incorporated into the officer corps and share a similiar set of values.⁵ Janowitz sees the professional as characterized by education in political and military affairs, the possession of managerial and technical skills, a broad understanding of domestic and international affairs and as motivated by professional considerations.⁶ His model describes an officer whose motivation is a "higher calling".

If Huntington or Hackett's measures of professionalism are used, the Canadian Officer must reconcile many paradoxes. This country has not fought a war since Korea. The importance placed on the quasi-military roles of surveillance and rescue in the 1971 white paper on violence as the main purpose of the Canadian Military.⁷ As the officer becomes further

removed from combat, the importance of many of the traditional professional values change. Self-sacrifice, unlimited liability, honour, duty and valour, though not denied, are no longer a major issue.⁸ The result is that the traditional view of the military may not be applicable.

Janowitz's theory that the military officer is motivated by professional considerations can also be challenged. To remain a creditable force, the Canadian military has had to keep up with rapidly changing technology. The result has been that the military has had to build up a large body of specialist officers whose qualifications and jobs are closely paralleled by civilian counterparts.⁹ For example, there are the engineers who coordinate designs and manage projects. There are also the computer specialists required to integrate hardware and develop software. Is "unlimited liability", the "management of violence" or a "higher calling" applicable to them? I think not. They are specialists motivated mostly by interest in their jobs and other "occupational" factors. Therefore Janowitz's theory is not applicable.

A trend toward a freer discipline and methods of decision-making in the military indicates a more "civilianized" approach within the military.¹⁰ Authoritarian command and immediate decisions are still required in combat, but how many Canadian officers have had to make combat decisions? Most of our contacts have no relation to the combat situation, therefore we rely on the techniques of initiative, negotiation and committee decisions as practiced by the civilian business world.¹¹ The result is a "managerial" approach to the military. Under such circumstances, it can then be argued that officers tend to be as much bureaucrats as professionals.¹² If that is the case, modern officers are leaning towards occupationalism as opposed to traditional professionalism.

The officer of the 80s has a number of motivators which add up and keep him in the service. Though serving one's country is still a factor, job satisfaction is probably the primary motivator.¹³ Liking one's job is important, but there should be no doubt that career progression, pay and benefits are also motivating factors. Materialism is an important influence in our society.

Lastly the modern officer considers the effect his career decisions will have on his family. Many spouses work and contribute substantially to their family's standard of living. They then exert pressures on the officer that clash with the traditional value of duty first, that is, going where you are sent, working long hours and weekends, and accepting lengthy separations.¹⁴

In view of the modern officer's situation, can he still be considered a professional? I believe that he is, but not longer in the pure traditional sense.

Although I have dismissed Janowitz's theory that officers are motivated by professional considerations, I accept his belief that there are three types of officers. "Heroic leaders" are combat officers who perceive professionalism in the traditional sense; "military technologists" are those who place more emphasis on technological and administrative

matters; and the "military manager" joins the two extremes. He bridges the need for technological innovation and the need to maintain traditional values in order to have an effective combat force. He has contacts with society and views himself as a pragmatist. This is Janowitz's theory of the "pragmatic professional".¹⁵ If this theory is accepted, and considering that less than half the officers in the Canadian Forces are combat officers, then it follows that traditional military values are relevant to less than half the officers of the Forces.

I believe that the majority of the officers see themselves in much the same way that United States Air Force Captain James H. Slagle sees himself:

"At any one time, my motivation may be oriented towards the concept Dr. Charles Moskos calls 'occupationalism' or job orientation. On the other hand, I sometimes find that I am at the other end of the spectrum, having a deep patriotic feeling or 'calling'. Whatever my background, I come from a different background than my senior leaders, and I bring to the Air Force a different set of needs and values. I believe professionalism is extremely important, and all the theories and concepts of professionalism are important. Some traditional values are essential - but I question the utility of others".¹⁶

Some readers might be shocked that this officer has admitted to being motivated by occupational considerations such as pay and job satisfaction. Some senior Canadian officers might take this as proof that the officer of today is not as professional as they are. They are probably right, using a definition of professionalism which was developed in the 50s or early 60s. In 1960 many of their seniors had combat experience as the Korean War had ended eight years earlier and the Second World War only 15 years earlier. They were close to war as they were growing up during both these conflicts and could relate to self-sacrifice and duty when it was explained by their superiors. But those combat veterans are gone now and combat seems a remote possibility to most officers.

The officer of the 80s also carries different "sociological baggage". Few would deny that concepts such as job security, pay, careerism and retirement benefits are important to most members of our society. Why then, should these concepts not be important to military officers? Officers come from our society and do consider them.

Captain Slagle suggests, that traditional values are not rejected and can co-exist with occupational values.¹⁷ A University of Maryland study concluded:

"What our analysis seems to suggest is that the Army may not have to choose between institutional and corporate models. Rather, it may be able to make good use of both... There may be no harm in making Army service a job as long as it is not just a job".¹⁸

I believe that the Canadian military professional can also tolerate a co-existence between traditional and occupational values.

If Janowitz's model of heroic, technical and managerial officers is accepted, then less than half of the Canadian Forces' officers embrace traditional values. The majority see themselves as being job oriented some of the time and as having a "calling" at other times.

American studies have indicated that occupational values and traditional values can co-exist in the military profession. I believe that this is equally applicable to the Canadian Military.

In conclusion, the theories of Huntington, Hackett and Janowitz are the basis for defining traditional military professionalism, however, they are not applicable to the Canadian military. Canadian officers have been far removed from combat and do not see self-sacrifice, unlimited liability and duty as being relevant in the performance of their normal duties. Rapidly changing technology has resulted in the need for a large body of specialist officers who are motivated by pay, benefits, and careerism are influenced by their families. The result is that traditional definitions of Canadian Military professionalism must be revised to include occupational values.

THE WORTHINGTON SWORD

Captain M.R. McNorgan

One of the Armoured Corps' most prized possessions is a worn but serviceable infantry officers' sword, 1895 pattern, with the words F.F. Worthington PPCLI, scratched on the blade. Every year since 1952, a graduate of armoured officer training has been called forth to be presented with this sword and to be declared the top graduate of his class.

The Worthington Sword was the first and remains the most prestigious of the Armour School's swords. The story of how an infantry sword inscribed with the initials PPCLI came to be an emblem of Armoured Corps excellence is a fascinating one.

Frederic Franklin Worthington or Worthy as he is better known, lived a life of seventy-seven years filled with more than one person's share of colour, adventure and action. He is the subject of an excellent biography by his wife Larry and the reader looking for more detail than this short article can give is referred there.

Born in Scotland in 1890, Worthy was orphaned at the age of eleven and sent to Mexico to live with his half-brother, a mining engineer. When the Mexican bandit Pancho Villa raided the mine in 1902, Worthy's brother was killed leaving the boy alone in the world. Travelling to the Pacific coast, Worthy became a merchant seaman. He was present at the San Francisco earthquake in 1906. He was captured by Indians in California in 1908. He was involved in revolutions in Nicaragua and Mexico and he was thrown into a Cuban jail for gun running, (he was innocent).

The outbreak of the First World War in 1914 found him on a ship off the west coast of Mexico. He instantly decided to return to Britain to enlist in the Royal Navy. Travelling across the US on his way to New York he changed his goal deciding to return to his native Scotland to enlist in the Black Watch. The British Consulate in New York informed him that the fastest route to the UK was through Canada so off he went to Montreal. Here fate took a hand. Meeting a soldier in a kilt wearing Black Watch badges, he expressed astonishment that the regiment should be in Montreal when there was a war going on in Europe. On being told of the existence of the Canadian Black Watch he went directly to the regiment's armoury in Montreal and joined the Canadian Army as an Infantry private.

Two years of trench warfare saw Worthy rise to the rank of Sergeant as well as receiving the Military Medal and bar for bravery. Having been granted a battlefield commission late in 1917, he returned to France from Officer Candidate School as a reinforcement officer in the Machine-Gun Corps. From March 1918 until the end of the war, he served with the 1st Canadian Motor Machine-Gun Brigade (the first ever Canadian armoured unit). Serving with this unit, in the space of less than a month, Worthy won the Military Cross and a bar. He was also introduced to a new form of mobile warfare, machine-guns mounted on vehicles protected by armour plate.

The war over, Worthy remained overseas with the occupation force in Germany, returning to Canada with his unit in 1919. He sought, and was granted, a commission in the Regular Army as a Captain in the Royal Canadian Permanent Machine-Gun Brigade. An Army re-organization in 1922 brought about the disbandment of the Machine-Gun Brigade and the transfer of Captain Worthington to the PPCLI, as the Machine-Gun Company Commander.

In 1936 Captain Worthington became Captain and brevet Major Worthington, thus concluding 19 years in the rank of Captain. With promotion came a course at the Royal Tank Corps School at Bovington, England and a mandate to establish the Canadian Tank School. Raised at Wolseley Barracks in London, Ont. on 1 November 1936, the School consisted of 19 all ranks drawn from various arms of the service. Worthy's title was Chief Instructor.

By the spring of 1938, Worthy had become the Commandant and Chief Instructor. The School had become the Canadian Armoured Fighting Vehicles School and all operations had been transferred to Camp Borden. The School had also grown to encompass a strength of 26 all ranks, 12 Carden-Loyd machine-gun carriers, and an assortment of other vehicles.

With the outbreak of war in 1939, Worthy strove mightily to prepare Canada's armoured forces for combat. This proved a monumental task as he had few men and fewer resources.

In June 1940, Worthy was directed to prepare an order to create a Canadian Armoured Corps (CAC). This was done and the CAC was formally raised on Tuesday, 13 August 1940. Worthy was now a full Colonel.

Even though the Army now had an Armoured Corps, the Corps still had no equipment to speak of. In typical fashion, Col Worthington, hearing that the US had a number of World War I vintage Renault tanks in long term preservation, went to the US to investigate. He quickly arranged the purchase of 265 tanks, 45 tons of spare parts and 13 new engines. Everything was bought as scrap metal at \$20.00 per ton. The "scrap metal" was shipped by rail to Camp Borden addressed to Mr. F.F. Worthington, Camp Borden Iron Foundry.

A year later he was a Brigadier commanding the 1st Army Tank Brigade consisting of The Ontario Regiment, The Three Rivers Regiment (now 12eRBC), and The Calgary Tanks (now KO Calgr R). Having trained this brigade and having taken it to England, Worthy was promoted yet again to Major-General, and given command of 4th Infantry Division with orders to convert it to an armoured division. He accomplished this task well and was subsequently awarded a CB in 1943.

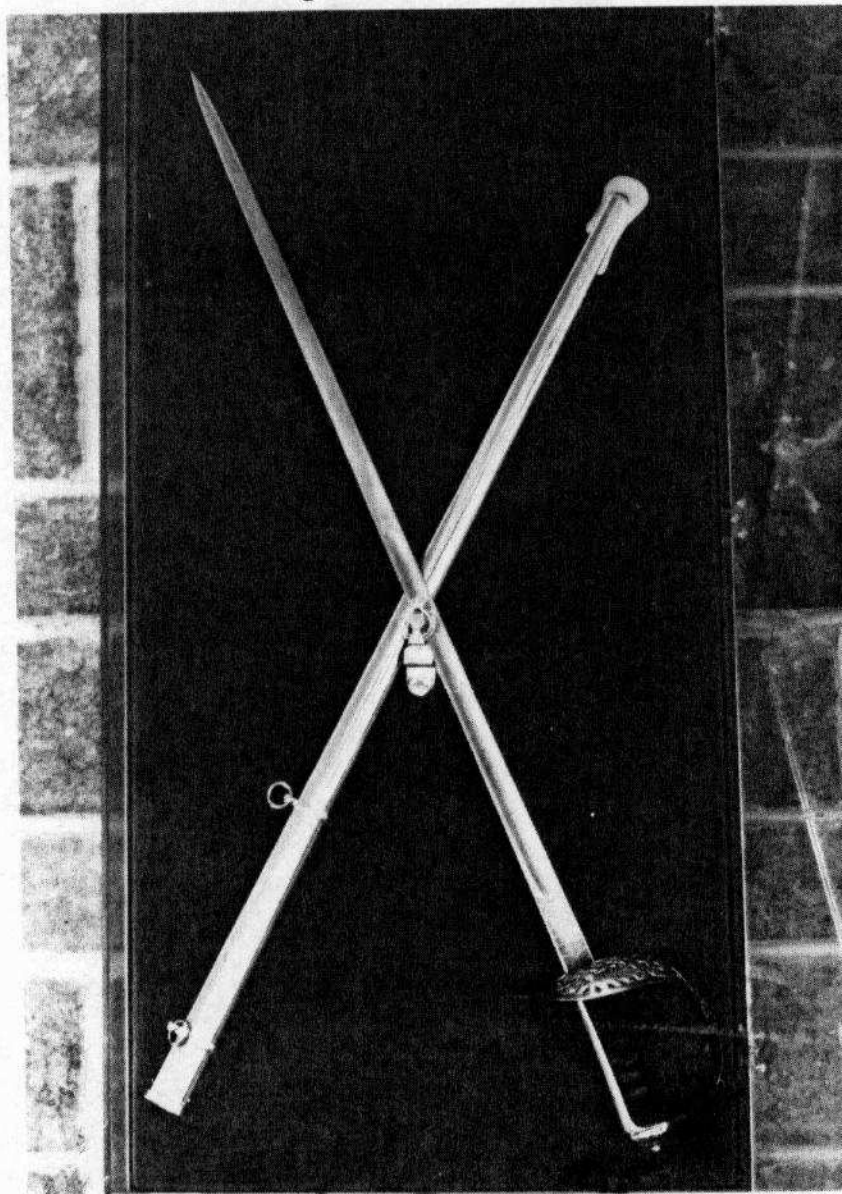
The spring of 1944 brought disappointment as Worthy was suddenly declared to be too old for an active command and was posted back to Camp Borden as Camp Commander. He served there and in Western Command until shortly after the end of war.

Retiring in 1947, he was appointed Colonel Commandant of the now Royal Canadian Armoured Corps (RCAC) in 1949. With the appointment came an invitation to take part in the RCAC School's annual graduation parades. In 1952 Worthy expressed a wish to make a presentation to the top candidate of the graduating class. The item chosen for presentation was his own sword.

Every year since 1952, Worthy's sword has been presented on parade to the top candidate of Armour Officer Classification Training. When Worthy died in December 1967 his widow, Larry Worthington, stepped in to carry on the tradition.

The inscription on the scabbard of the Worthington Sword reads as follows:

Sword
of the
Honourary Colonel Commandant and Founder of the RCAC
Major-General F.F. Worthington CB, MC, MM, CD
Presented Annually to the
Outstanding 2nd Year RCAC Cadet



WINNERS OF THE WORTHINGTON SWORD

5201	OCdt	G.G.	Martin
5301	OCdt	C.D.	Campbell
5401	OCdt	J.N.	Chappel
5501	OCdt	G.N.	Ewing
5601	OCdt	A.S.	Henry
5701	OCdt	C.G.G.	Bristowe
5801	OCdt	R.W.	Cotie
5901	OCdt	G.R.	Bailey
6001	OCdt	W.K.	McNaughton
6101	OCdt	I.S.	Rote
6201	OCdt	R.C.G.	Laird
6301	OCdt	M.C.	Jordaan
6401	Lt	D.C.	Summers
6501	Lt	R.A.	Burns
6601	Lt	L.J.	Skinner
6701	Lt	M.L.	Beckett
6801	OCdt	L.	Clifford
6901	OCdt	V.P.F.	Guy
7001	Lt	L.E.	Travis
7101	Lt	R.J.	Shuter
7201	Lt	J.G.	Taylor
7301	Lt	J.H.J.	Russell
7401	Lt	F.P.	Crober
7501	Lt	W.R.	Allen
7601	Lt	D.S.	Clement
7701	Lt	M.G.	Macdonald
7801	Lt	M.K.	Carswell
7901	Lt	W.J.	Natynczyk
8001	2Lt	J.R.	Ferron
8101	Lt	D.W.	Kitchen
8201	2Lt	J.P.G.	MacIntyre
8301	2Lt	J.R.	Babiuk
8401	2Lt	J.L.C.	Branchaud
8402	2Lt	S.J.	Young
8501	2Lt	H.A.	Ferguson
8502	2Lt	S.M.C.S.	Grenier

IN MEMORIAM

GORDON MINTO CHURCHILL

by LCol (Ret) A.S. Christian M.C., C.D.

With the death of Colonel the Hon. Gordon Churchill, DSO, MA, LLB, PC, a distinguished soldier and politician passed into history. In his lifetime Mr. Churchill saw at first hand a great deal of our country's history, much of which he was involved in the making. He was probably the last of the "loyalists" of the Diefenbaker era.

Gordon Churchill was born in Coldwater, Ont. on Nov 8, 1898. He was educated at Public and High Schools in Port Arthur and Winnipeg and later at United College, Winnipeg and at the University of Manitoba. Prior to the Second World War he taught at High Schools in Dauphin and Winnipeg.

I first met Gordon Churchill when the Fort Garry Horse mobilized at the outbreak of war in Sept 1939. To we young officers, he was a firm but fair older soldier who often gave us sound advice, whether solicited or not, but always with his kindly sense of humor. His experience as a very young machine-gunner in France from 1916 to 1919 during WWI and later as an officer in the Militia gave him a sound, practical approach to soldiering.

In his capacity as adjutant of the Regiment in early 1940 he was a stabilizing influence at a difficult period when our role in the Canadian Army was not yet clearly defined. Once in England in 1941, he was promoted to Major to command a tank Squadron, the Regiment having attained its role in the Armoured Corps during our fourteen months training at Camp Borden. Again his leadership and common-sense stood us in good stead during the many months of waiting for the invasion of France.

Sadly, Gordon Churchill left the Fort Garry's in 1943 to become second-in-command of the Elgin Regt (Tank Delivery) but he always kept contact and visited the Regiment whenever possible. During the preparations for "D" Day, Gordon Churchill was given the task of organizing and commanding the 1st Armoured Carrier Regt (The Kangaroos) whose role it was to carry the infantry into battle. He commanded this unit until the end of hostilities with courage and dedication and was awarded the Distinguished Service Order.

After VE Day he was appointed Dean of Khaki College in England. While there he was nominated to run for the Army seat in the Manitoba Legislature, to which he was elected in 1945. He was elected to the House of Commons in 1951 having in the meantime gained a degree in Law. He was re-elected in 1953 and again in 1957 and 1958. He was sworn in as a member of the Privy Council and Minister of Trade and Commerce on June 21, 1957 in the Diefenbaker Cabinet.

In October, 1960 Mr. Churchill was appointed Minister of Veterans Affairs and Government House Leader. Notwithstanding these very demanding responsibilities he took a great interest in the problems of veterans and of his departmental officials. With the resignation of Douglas Harkness as Minister of National Defence in February 1963, Gordon Churchill took over until the defeat of the Diefenbaker Government in June of that year. He continued in Opposition until his retirement from the House in 1968, returning to his old law firm in Winnipeg. In 1976 he moved with his wife, Mona to British Columbia where he resided in Victoria and at Mill Bay. Following Mrs. Churchill's death in 1983 he returned briefly to Ottawa but returned to B.C. shortly after the 1984 Federal Election. Until he was hospitalized he resided at Port Moody near his daughter Winona (Mrs Roy Cusson). I had visited him several times over the past few months and spent some time with him on Tuesday, July 30th. He was in good spirits and had retained his sense of humor.

With his passing his former colleagues of the Conservative Party, his comrades of the Fort Garry Horse and his family will sorely miss a loyal and devoted gentleman. In all his tasks, as teacher, soldier, lawyer and politician he did not spare himself, much to the detriment of his health. With his passing Canada has lost a great Canadian - he was always self effacing and exemplified the motto of the Fort Garry Horse - "Facta non Verba" - "Deeds not words".



ROYAL CANADIAN ARMOURED CORPS SCHOOL

50TH ANNIVERSARY



The Commandant and all ranks of the Armour School take pride in hosting two important Corps events during 1986.

During the week of 8-12 September the annual Royal Canadian Armoured Corps Association Conference will be held at CFB Gaagetown. Following the conference, the School will celebrate the occasion of the 50th Anniversary, Saturday, September 13th.



To mark the Anniversary Her Excellency, The Governor-General, Mme Sauvé has been invited to preside over this historic event.

A full day's activities have been planned to welcome back former black hatters and support staff to celebrate this "benchmark" in the Corps' history.

The schedule of events will proceed as follows:

1000-1130 hrs - parade and commemorative service;

1130-1400 hrs - post-parade reception and Governor-General's receiving line;

1230-1400 hrs - Lunch at the Carleton Officers' Mess with the Governor-General, VIPs, School Officers and wives; and
2000-2400 hrs - all ranks dance.

All formerly serving staff and friends of the RCACS are cordially invited to participate in this 50th Anniversary celebration. The significance of this event cannot be fully realized without your support.

For further information feel free to contact:

Capt R.J. Round
c/o The Armour School, CTC
CFB Gaagetown
Oromocto, NB
EOG 2P0
Telephone: 1-506-422-2582

SEE YOU THERE!

