

ARMOUR
NEWSLETTER



VOLUME 7

JANUARY 77

This Newsletter is published under the authority of Col D.A. Nicholson, CD, Commandant Combat Arms School. Views expressed are those of the authors and do not necessarily reflect official policy or opinion unless otherwise stated.

EDITOR - Captain N.A. Nickles, CD

All correspondence should be addressed to the editor, c/o Armour Dept, Combat Arms School, CFB Gagetown, Oromocto, N.B.

The Regiment

THE FOLLOWING IS PART OF THE TEXT OF A TOAST TO THE REGIMENT PROPOSED BY THE LATE BRIGADIER WILLIAM MURPHY, C.B.E., D.S.O., E.D., AT THE ANNUAL OFFICERS' MESS DINNER OF THE BRITISH COLUMBIA REGIMENT HELD IN VANCOUVER IN 1952. BRIGADIER MURPHY IS A FORMER PRESIDENT OF THE ROYAL CANADIAN ARMoured CORPS ASSOCIATION.

"THE REGIMENT IS NOT THE OFFICERS AND MEN WHO SERVE IT. THE REGIMENT IS NOT THOSE OFFICERS AND MEN WHO ORIGINALLY FOUNDED IT OR WHO SERVED IT IN WARS AND INTERVENING YEARS OF PEACE. THE REGIMENT IS NOT THOSE OFFICERS AND MEN WHO WILL PROUDLY CARRY ITS NAME IN THE YEARS TO COME. THE REGIMENT IS ABOVE AND BEYOND THOSE WHO SERVE IT.

IT WOULD TAKE A FAR MORE ELOQUENT SPEAKER THAN MYSELF TO ADEQUATELY DEFINE FOR YOU THAT INTANGIBLE SOMETHING TO WHICH WE DO HONOUR AT THIS TIME.

THE REGIMENT IS TRADITION -- THE REGIMENT IS SERVICE -- THE REGIMENT IS LOVE OF COUNTRY -- THE REGIMENT IS UNSWERVING LOYALTY TO OUR QUEEN AND ALL THAT SHE STANDS FOR -- THE REGIMENT ABOVE ALL ELSE IS SACRIFICE.

THOSE WHO SERVED IT YESTERDAY, THOSE WHO SERVE IT TODAY, AND THOSE WHO WILL SERVE IT TOMORROW, HAVE ADDED, AND WILL ADD, GLORY TO ITS NAME. THEY ARE HONOURED IN THAT OPPORTUNITY.

YEAR BY YEAR THE FACES IN OUR RANKS CHANGE. YEAR BY YEAR YOUNG MEN COME FORWARD TO TAKE THE PLACES OF OLDER MEN. BUT THE REGIMENT GOES ON.

WHEN ALL ARE BUT A MEMORY, THE REGIMENT WILL STILL STAND -- FAMOUS FOR PAST DEEDS, EVER READY FOR NEW DUTIES."

--- CONTRIBUTED BY R DE HULL

CONTENTS

NEWS LETTER FOR ARMOUR

COMMANDANTS FORWARD	III
INTRODUCTION	IV
ADDRESS BY COLONEL COMMANDANT	1
ARMOUR DEPARTMENT BULLETIN	3
CENTURION TO LEOPARD	13
WORTHINGTON PARK	15
KNOW YOUR REGIMENTS	18
TO SEE OR NOT TO SEE	21
BOOK CORNER	22
AFV RECOGNITION TEST	24
OP GAMESCAN 76	25
THE RENEWED ARTILLERY THREAT TO ARMOUR	27
AVGP - A CORPS APPROACH?	37
FLASHBACK #6	41
RCACA (CAVALRY)	42
THE MATHEMATICS OF TACTICAL DOCTRINE	45
BLACK HATS IN GAGETOWN	46

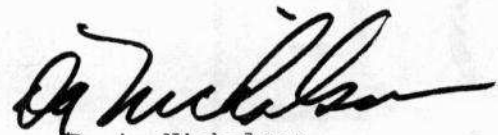
Commandant's Forward

This issue of the newsletter reflects, aside from a lot of editorial effort, an encouraging increase and variety in contributions. I would, however, like to see more articles from across the Branch.

Perhaps the following questions might serve as food for thought, and a guide to literary effort, by some of you: --

1. How do we plan to fight if our radios are "blacked out" by enemy EW measures? By day? By Night?
2. How can we improve our crew commanders' ability to spot and engage targets quickly?
3. How can we streamline and sharpen up our drills for regrouping?
4. How can we compensate for crew fatigue on a "24-hour battlefield"?

These are only a few of the basic questions to which we must find answers if we are to fight effectively. Let's get busy thinking, discussing and writing about these basics while we still have the relative leisure to do so.



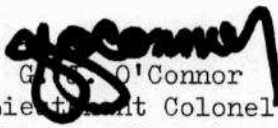
D. A. Nicholson
Colonel
Commandant Combat Arms School

Introduction

Since the last issue of the Armour Newsletter there have been major developments in our Branch. The RCD have received Leopard A2s, the Leopard C1 contract has been signed and the contract negotiations for the Cougar are nearing successful completion. With this equipment regular and militia units will be able to develop and maintain the battle skills necessary to operate in general war.

Besides the obvious benefit of increasing our battle effectiveness, the new equipment purchases will result in a substantial increase in the training load over the next few years. The majority of our regular personnel and a substantial number of militiamen will have to be trained on one of the new armoured vehicles. To help accomplish this, we will be producing new courses and pamphlets which will take into account the most up to date training methods and developments.

Our branch faces a very challenging period considering the array of anti-armour weapons likely to be used in future conflicts. However, if we get our training right, then our new equipment will allow us to outmanoeuvre and outgun our potential enemies.


G. O'Connor
Lieutenant Colonel
OC Armour Department

ADDRESS BY MAJOR GENERAL BRUCE F. MACDONALD, DSO, CD

COLONEL COMMANDANT RCAC

AT GRADUATING CEREMONY, COMBAT ARMS SCHOOL

AUGUST 1976

Your Honour, (The Lieutenant Governor), General McGregor, Colonel Nicholson, Distinguished Guests, Visitors, Officer Candidates, Ladies and Gentlemen.

You young gentlemen by your presence and your performance here today do credit and honour to Canada, to the Armed Forces and to yourselves. I congratulate you.

I am sure your training program has been vigorous and difficult. Indeed I hope this is the case for you are all embarked on a difficult, hazardous and demanding profession. Those who aspire to lead Canadians in combat must be stressed and tested in their training. If the training is easy then it is not good.

You are fortunate to be getting your training here. This Combat Arms School is unique. For here you train as you will fight - not as Infantry, Armour or Artillery but as members of the ground team of combined arms.

Let me, for a moment, address myself to those of you who will join the Regular Forces:

- a. You have not chosen an easy profession.
- b. Your effectiveness rests on three bases, namely moral, mental, and physical fitness. Guard them well.
- c. You walk in the steps of some giants of history; men of the category of Wavel, Eisenhower, Marshall and Montgomery.
- d. Indeed, in a Canadian context we are all honoured today to have here with us General Jean Victor Allard. It might interest you to know that General Allard started his military career as a Second Lieutenant in the Three Rivers Regiment. Following a most distinguished wartime career he remained in the Regular Forces and became Chief of the Defence Staff.

If you are going to be professional soldiers you should expect to face some criticism and misunderstanding. Let me suggest what some of the charges may be and what your reply might be:

- a. People may charge that you, as a soldier, like war. This is like suggesting that the doctor who spends his life in the study and cure of cancer likes cancer.
- b. Some people may comment upon the futility of armed forces and allege that they contribute to the danger of war. May I suggest

that you quote to them the following maxim "Love without power exposes the world to the frightening hazards of power without love".

- c. Thirdly, people may comment on how expensive the military are. I urge you to ask how expensive is unpreparedness? I think the record of history is entirely clear. It indicates that had the Allies been prepared to fight in 1914 or 1939 both of these wars could have been avoided - at a vast saving in lives and treasure.
- d. Last Spring I heard an address by Dr. Luns, the Secretary General of NATO. He made the point that the greatest act of provocation is to be unprepared for war. This is a very great truth. It should be remembered by all.

Finally, I wish to address a few words to those of you who upon graduation are proposing to enter Canada's militia:

- a. You also have chosen a challenging avocation.
- b. You are citizen soldiers who walk hand in hand with your Regular Force colleagues who are the soldier citizens.
- c. Your greatest enemies are frustration and public apathy. Remember that all the problems you confront have been experienced before. They happened in the days before 1914 and again in the days before 1939.

You who choose to serve in Canada's Reserve Forces are the present day embodiment of some one and one quarter million Canadians, living and dead, who proudly wore the uniform of the Armed Forces of Canada in World War II. You can serve proudly for you fill a great and fundamental need; though at any point in history this may not be recognized by some.

God forbid that there should be either war or revolution but the lesson of history is terribly clear. Heretofore there has always been war and revolution; there is nothing to suggest that the nature of man has changed.

In closing let me offer you this final thought. Sometimes it is suggested that Canada does not need armed forces in peacetime because if war comes we will be able to find the necessary experts. It is true that we can recruit doctors, engineers and the logisticians from civilian life. However, what is not understood is that we cannot find and we cannot hire from any civilian profession men who are skilled in the art of leading and training men for war. This is the special expertise possessed only by those of you who are trained in the art of military leadership. Men like you cannot be hired, they must be grown and educated in Canada, in peacetime.

Yours is an honourable profession that bears great responsibility. You must be proud of your task, you must be worthy of your great responsibility. I salute you for what you have done, for what you are doing and for what you will do.

Good fortune to all of you.

Armour Department Bulletin



Armour Department CAS

December, 1976

Tactics Squadron

For those readers who are familiar with the Combat Arms School organization, we must quickly stamp out the rumour that TACTICS DEPARTMENT has become Tactics Squadron of the Armour Department. The truth is that the former Officer-NCO Training Wing of Armour Department has simply changed its title for one more fitting and descriptive of its function with Armour Department - ie Tactics.

Since the last edition of the Armour Newsletter, Tactics Squadron has been fully committed to the task of running career courses. During the calendar year 1976, we have conducted two Trade Level 6A courses; one Trade Level 6B course; the Squadron Commanders Course; three Phase 2 Armour Officer Classification Training Courses (Armd OCT); three Armd OCT Phase 3 courses, one Phase 2 and one Phase 3 Reserve Entry Scheme Officer course; one Armd OCT Phase 4A; and one Armd OCT Phase 4B course. In addition three Land Orientation Field Training (Recce) courses have been conducted for students attending the 403 (Helicopter Operational Training) Squadron "KIOWA" courses. Needless to say the time spent in the field by all Tactics Squadron instructors is considerably higher than that required by Armour Officers' or NCO's in most other jobs. To this end the Squadron instructors are transferred between the Trade Squadrons and Tactics Squadron at least once in their tour of duty at CAS to attempt to share the field time equally amongst all Armour personnel within Armour Department.

Looking ahead at the CAS course schedule for 1977, our share of the courses to be run will keep us all busy and fully committed over the next year. There are some changes in the wind for some of the courses but we'll let the details come out officially through normal channels. Like everyone else in the Corps, we are anxiously awaiting the arrival of LEOPARD and our turn to convert to the new tank.

For those of you who may have read or seen a copy of CAS Precis 140 "The Recce Troop Leaders Manual", we are pleased to report that the manual has been updated as a result of having been used at the CAS as a recce reference for the past six months; and that the amended version of the manual will arrive at HQ FMC shortly for conversion to a Canadian Forces Publication in early 1977. In Nov 76 we will begin to write "The Tank Troop Leaders Manual" with a view to having a draft copy in use at the CAS by early Spring (1977).

On the sports and social side, the Squadron has had a successful year in that the names of Tactics Squadron personnel are continually being engraved on Armour Department Sports Trophies and our attendance at Department functions is good. We take our hats off to Gnry Sqn for a well run Golf tournament and to D&M Sqn for a most enjoyable Meet and Greet Dance. We look forward to hosting the annual Funspiel which will be held this year on 5 Mar 77. All black hats in the area are cordially invited to join with us for a day of fun and frolic at the Gagetown Curling Club.

Lastly if you are selected to attend a course being conducted by Armour Department, CAS, do not hesitate to write if you are at all in doubt about any aspect of the course. All of the instructors will gladly help in every way they can to make your stay in Gagetown and your time spent on the course as pleasant and as worthwhile as possible.

Communications Squadron

Communications Squadron has been rolling along quite successfully and is the least affected by the Leopard purchase announcement, however, there are rumours, only rumours, of new radio equipment which will enter service and perhaps a new crew commanders box which will be used with voice secure equipment.

Communications Squadron has become an all arms team having now acquired infantry and artillery representatives. The squadron is having more demands placed on it for comms training. This increase could be the result of an increased awareness by the Combat Arms of the need for good comms at all levels or perhaps just the result of a successful advertising programme by previous OC's. The squadron now instructs on at least 32 different courses conducted at CAS.

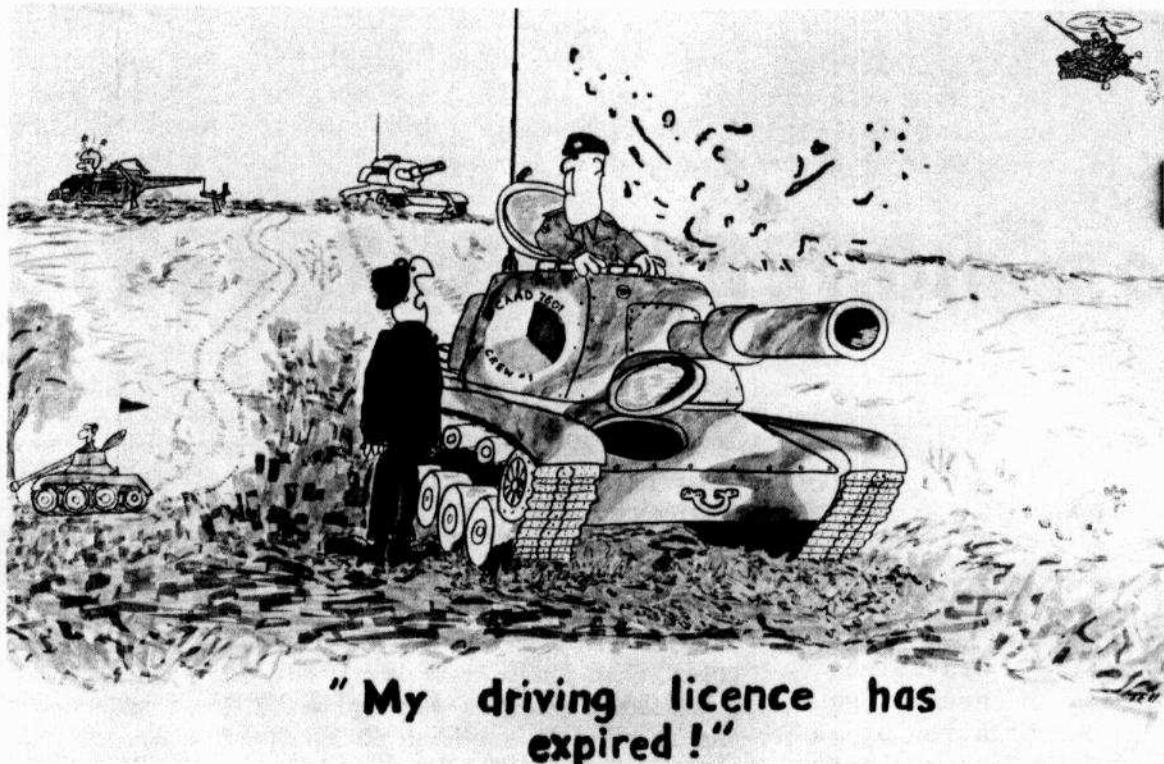
The advanced communicator course is planned to be validated at the unit by Armoured Standards in the near future. Course 7602, which was conducted in the fall of 1976, had an infanteer as the top student for the first time; perhaps Armour is losing its hold on the claim to being number one in comms. Contingency plans are also being made to increase the number of students to take up the slack left by the cancellation of three advanced tank gunner course.

The new Armour officer phase training package has reduced the amount of training given to a trainee from 10 days to $6\frac{1}{2}$. It is interesting to note that this reduction still leaves the Armour trainee with more communications training than his counterparts in the infantry and artillery.

The enlarged package on field expedient antennas has been extremely well received by all students. The instruction is now available in handout and in programmed instruction package (PIP) form. The significance of this subject is that a radio operator can now increase the range of an AN/PRC 25 up to 40 Km by constructing an antenna in its crudest form using WD 1 wire 2 pop bottles, a flashlight battery, and 2 tent pegs. These developments should be of great interest to unit sigs NCO's and Battle Captains.

YOU CANNOT COMMAND WITHOUT THE CONTROL PROVIDED BY COMMUNICATIONS

D&M Squadron



We have just completed the last Combat Arms Driving and Maintenance Instructors Course of 1976 with the course fully loaded, the instructors as keen and eager as ever and the training aids holding up under the strain very well - after all they should be the best maintained vehicles to be found. As well as Armour, Artillery and Infantry students, we had a Sapper from 3 Fd Engr Sqn Chilliwack.

With the purchase of the Leopard having been announced recently the question arises - why train on Centurion? We cannot stop training drivers and instructors while waiting for delivery of Leopards. A gap of up to two years would be unacceptable for career progression and for the inability of instructors in the future. In the case of instructors a person who can instruct driving and maintenance on a Centurion can certainly do so on a Leopard after mastering the basic Leopard knowledge.

The new $1\frac{1}{4}$ ton vehicles were included in the D&M Instructors course last fall and the $3/4$ ton dropped.

During the summer of 1976 one Armour Officer Phase Two and two Phase Three courses went through D&M Squadron as well as two Reserve Officer Courses.

After the usual summer changes in instruction staff the Squadron ran a Cadre Course of three weeks for the benefit of the new arrivals as well as those that have been with the Squadron a while.

Starting in Jan 77 the D&M portion of Officer training will be revised to include Leopard and AVGP. Until the School receives the vehicles, interim courses will be conducted. For Phase Two the M113 family and $\frac{1}{4}$ ton will be taught until the arrival of AVGP. For Phase Three the Centurion will be taught until the arrival of Leopard.

MAINTENANCE IS A COMMAND RESPONSIBILITY

Gunnery Squadron

With the "Green Light" for Leopard C1 now official, the first inklings of the massive and complex conversion required is just beginning to be felt. The introduction of Leopard will essentially require a change in our whole attitude towards tank gunnery. The sophisticated, yet simple to operate gunnery fire control system will cause many an old Centurion gunner literally to shake his head in disbelief.

Since the last newsletter several major decisions have been taken in the area of gunnery training which will greatly benefit the corps. The cancellation of all further Centurion Tank Gunner Courses and the Instructor Tank Gunnery Course in 1977 will allow some flexibility in the conversion program and permit the RCD to train tank gunners on the Leopard A2 direct from TQ 3 Lynx, rather than converting them from Centurion to Leopard gunnery. The officer training will see an improvement in all phases. For example, the phase two officer candidate will now receive an eight day machine gun course. This will be followed by a comprehensive sixteen day tank gunnery (dry) package in phase three, with a week of open range firing at the end of the phase. By leaving the live firing until the end of the phase three training, only those trainees who have passed will be allowed to qualify on the range. This should result in an added incentive for those who need it as well as provide a substantial savings in ammunition. Finally in his fourth phase the young officer will participate as a troop leader in a live fire tank battle run. It is felt now that the graduate officer should be better versed in all aspects of armoured gunnery and be better qualified to perform and supervise gunnery related tasks at any unit.

COURSES 1976

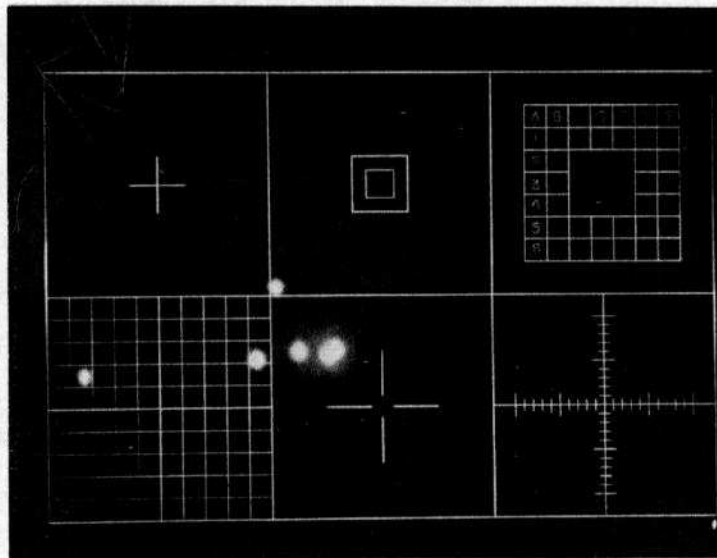
As usual the standard of gunnery on Tk Gnr Serials 7601 and 7602 was exceptionally high. Students generally were well motivated this year. On the ranges, they proved to be deadly accurate, especially on the movers.

The TQ 6A courses in '76 did receive more ammunition than in the past. Serial 7601 was able to conduct live fire battle runs and 7602 conducted both static and battle run practices.

Starting in January 77 all courses should experience a boost in ammunition because of the course cancellations spoken of earlier. The squadron should be able to conduct all open range practices at the recommended scale of ammunition and not on the restricted scale of the past. For example, the phase three officer cadets will now fire a total of 64 rounds HE instead of the restricted scale of 6!

The last advanced course, ITG 7601, graduated 18 IG's. Since it turned out to be the last of its kind on Centurion, there was a hint of sadness as the last rounds were fired down range in the midst of a snow-storm in Dec 76. The next such course won't be until the fall of '78 on the Leopard C1. Many people are anxiously awaiting that day.

Things To Come



CONSISTENCY OF LAY
LASER DESIGNATED TRAINING DEVICE

Proposed improvements for K-19 are numerous and exciting to the squadron personnel. Several add-on modular classroom/crew bays will give us the additional space required to house future Leopard and AVGP courses. With the influx of all the leopard training aids and new vehicles beginning in '78, an increase in manpower is also hoped for.

In December 76, a team from DREV under Dr R.W. MacPherson visited the squadron to do an informal trial on a "Consistency of Lay, Laser Designated Training Device". The "black box" houses a screen which contains six aiming marks (the ones in the photograph are trial ones) which will be the standard cross hair configuration scaled to represent a shooting in screen. It also mounts a camera device which is loaded with a standard B&W polaroid film cassette. Quite simply, it is designed to replace the .22 cal CIM mount. Its operation is also simple. By using the standard laser on the IMR, a gunner's consistency of lay is checked. Up to six crews could fire,

since multiple exposures on each cross hair are readable. The picture readout will show a grid system with each cross hair indicated but the gunner will only see a cross hair. The film develops in 10 seconds and the IG has an excellent method of critiquing the crew. For more defined assessment, single rounds could be fired at successive cross hairs, but the user has the flexibility to adapt this to the level of the student. The device is powered by a 110V source and easily plugs into the laser on the tank. It is hoped these devices can be acquired in time for training in 78.

With the new year fast approaching, tank gunnery is once again blossoming. With the advent of Leopard and AVGP, new life has been injected into the Corps. We in Gunnery are anxiously looking forward to being a part of it.

EXPERIENCE IS THE BEST TEACHER - ONLY HER FEES ARE VERY HIGH

Target (Almost) Fire

On a bleak and cold tenth of December, 1976, the students on the last Centurion Advanced Armoured Gunnery Course were waiting behind the tower on Firing Point Four in CFB Gagetown for a hand-picked crew to fire two APDS rounds.

The significance of this moment was that these rounds were to be the last two rounds fired on the course, the last of it's kind until the Leopard makes it's debut in CFB Gagetown. Just as important to the students on the course, these rounds would mark the end of a three month long course designed to qualify them as instructors in tank gunnery.

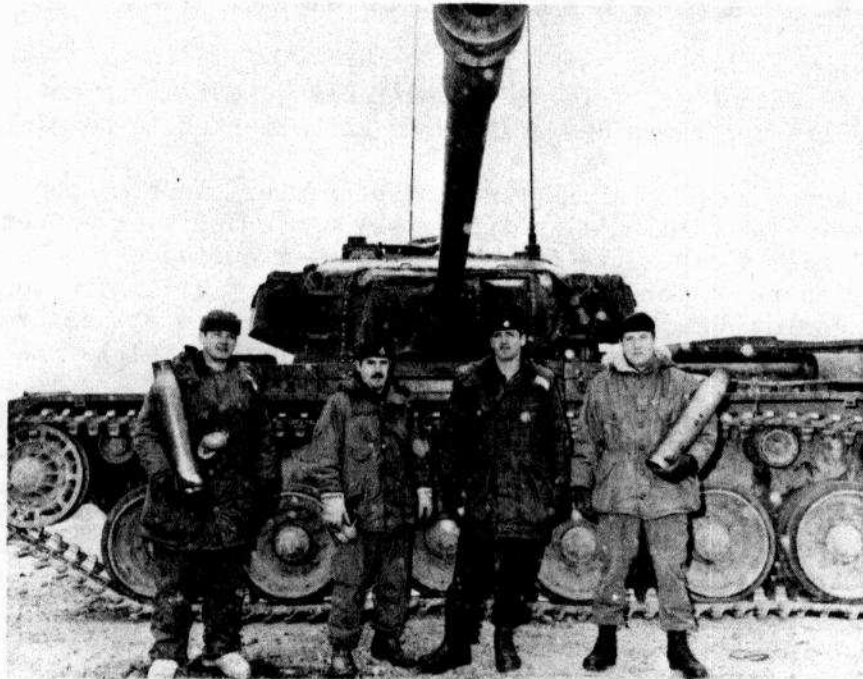
As the red flag was raised in the tower the Course Officer, Capt S.J. Ewing, LdSH(RC), looked out over the firing range and realized that the rounds would have to be fired soon as the target picked at Dot Five (1800 metres for the uninitiated) was rapidly becoming obscured by the snow that had been falling for the last fifteen minutes.

The red flag was raised on the tank to fire the two rounds and the command "Action" given by MCpl Davio ML, the Crew Commander, brought about hurried responses from the OC Gnry Sqn, Capt R. Hook, the gunner, and Sgt Zwicker TC the loader. To the turret crew's dismay it was found that the tank batteries were dead and the gunnery was inoperative. Amidst the laughter from the students the green flags were raised on the tank and the tower and another tank was driven up to boost the tank's batteries with a slave cable. This done, the red flag was raised again on the tower and amidst muffled cries of "misfire" and warnings not to fire the APDS rounds on the Hesh scale from the students, the red flag was raised on the tank and the turret crew brought to action again.

By now the snowfall had increased to the point where the Dot Five target was totally obscured and a target at Dot Three (1425 metres) was chosen instead.

As the slightly tense, and by now somewhat impatient students watched, the first round was fired....and was minus! Surrounded by the derisive laughter of the course personnel the gunner cheated, just a little, and the second round was fired.....target!

A Dangerous Crew



MCPL DAVID ML(CC) CPL BERNARD F(DV2)
SGT ZWICKER TC(LDR) CAPT R.E. HOOK (GNR)

With the applause of the students ringing in their ears, the turret crew dismounted and had their picture taken holding the casings of the last two rounds fired. A picture was then taken of all the students and this completed, the course moved back to the base for a bit of maintenance and a lot of partying.

Although it had not yet been decided what form the empty casings will take to commemorate the occasion it was felt likely by the course students that Sgt Zwicker TC, would make two commemorative ashtrays out of them to go to the highest bidder. Bidding starts at fifty dollars.

Au Detachement

Au Détachement, le Departement Blindé est désormais responsable de conduire des cours de Conduite et Entretien et de Communications Avancés.

Nous nous préparons pour notre premier cours avancé depuis mai 76. En effet, l'adj Thibault, notre expert en conduite et entretien au departement blindé, fut designé pour travailler exclusivement a la préparation du premier cours de Conduite et Entretien en tant qu'instructeur chef. La mise au point des plans de lecons, des fascicules et des exercices pratiques fut un travail d'envergure. Du 5 au 27 sept, ce fut la phase de preparation finale du cours avec l'equipe d'instructeurs qui révisa le programme en détail. Le cours est maintenant en marche depuis le 27 sept et les etudiants demonstrent beaucoup d'interêt et travaillent avec enthousiasme.

L'équipe d'instructeurs de conduite et entretien avance est une equipe bien rodée, les adjudants Thibault, Czimmek et le sergent Beaulieu enseignent ce sujet depuis 3 ans au Detachement.

Pendant ce temps, l'équipe de communication avancée se prepare. L'Adj Dion, en plus d'assumer la tache d'adjudant de division, travaille



à mettre au point le cours de communication pour le mois de fevrier 1977. Les Sgts Brisson et Jobin sont présentement en train de suivre le même cours a Gagetown et une liaison étroite avec l'aile des Communications de Gagetown s'est établie. Nous prévoyons rassembler notre équipe et finaliser la préparation des cours dès decembre.

Notre principale préoccupation est actuellement d'assurer le meilleur standard possible et le plus haut niveau d'efficacité d'instruction. Notre raison d'être est de former des instructeurs francophones competents et efficaces qui sauront instruire leurs soldats efficacement dans leur langue.



Sortie

Centurion to Leopard C1

by LCol G.J. O'Connor

As Armour personnel I am sure that you are interested in some details of how we will convert from the Centurion to the Leopard C1 tank. To outline these details I will start with the government decision. On 20 May 76, the government agreed to purchase 128 Leopard C1 tanks to improve our contribution to NATO. These tanks will be delivered in late 1978 and early 1979. In the interim period, Jan 77 to Dec 78 we have secured a loan of 35 Leopard A2's from the FRG Ministry of Defence. All the Leopard A2's have been allocated to the RCD so that they can maintain their operational role during the time the Centurion is being phased out and the Leopard C1 is being phased in.

The decision to purchase the Leopard C1 was the result of a very thorough study of the current NATO tanks and the technological improvements available to each. Compared to the Centurion, the Leopard C1 (Leopard A3 with technical improvements) is a new generation armoured fighting vehicle. It is equipped with the British 105mm gun as is the Centurion, however the gun control has been much improved by coupling it to a laser range finder and ballistic computer. This equipment ensures that a well trained gunner has a very high probability of a first round hit. The tank also has low light level television for the gunner and crew commander to view and sight the weapon system at night. Along with improved fire power, the Leopard provides increased agility and mobility. It has a (horse) power to weight ratio of approximately 19; a range of 600 Kms and a top speed of 65 Kms per hour.

The conversion from Centurion to Leopard C1 will involve only gunnery and driving and maintenance. Basic tank tactics will not be affected and the radios in the Leopard C1 are the current family of American radios which we are now using. Although CAS has the primary responsibility for developing and conducting this new training, the RCD are very much involved. They are conducting a special training programme for the next two years. They have to convert personnel from Centurion to Leopard A2 then Leopard A2 to Leopard C1. Initially, for the Leopard A2, they must train crew commanders, gunners and drivers for their new tanks and communicators to operate the German radios. Part of this training will be beneficial to the Leopard C1 programme as the driving and maintenance and a small portion of the gunnery is the same on both vehicles. When the Leopard C1 courses are introduced at CAS in 1978 this training bonus will mean that quite a few crewmen already have the necessary training.

To ensure a smooth transition to the Leopard C1, the Armour Department training plan envisages six stages:

- a. Train a few CAS Armcd instructors in Leopard C1 skills.
- b. Prepare Leopard C1 courses and training pamphlets.
- c. Convert remaining CAS and selected RCD instructors.

- d. Convert the CAS Training Tank Squadron which will be equipped with the new tank trainer (MOWAG) but must be prepared to operate Leopards to support training.
- e. Conduct normal Leopard C1 courses.

As the starting point of the plan, a D&M team will be sent to Lahr this year to be trained by the RCD on the Leopard A2s. This will permit us to introduce Advanced Leopard D&M training in 1977 sponsored by the RCD and early next year sponsored by CAS using RCD tanks. In the case of gunnery, we will have to send a team to a NATO Armour School that offers training in the Leopard C1 gunnery system. Unlike the D&M courses, the new gunnery courses will not be conducted until the Leopard C1s arrive in Gagetown.

The first Leopards will arrive at CAS in Aug 78. Throughout the fall and winter, Armour Department will carry out the conversion of instructors, the Operational Tank Squadron and the CAS Training Tank Squadron. During this period the first Leopard courses are scheduled as follows:

- | | |
|--------------------------------|--------------------|
| a. Advanced Tank Gunnery | Sep to Dec 78; |
| b. Leopard Tank Gunner | Jan to Mar 79; |
| c. Combat Arms Advanced Driver | Sep to Dec 77; |
| d. Leopard Tank Driver | Apr to May 79; |
| e. Crew Commander | Sep to Dec 78; |
| f. OCT Phase 3 | Mar to May 79; |
| g. OCT Phase 4 | Jun to Aug 79; and |
| h. Squadron Commanders | Mar to May 79. |

The number of personnel being converted will be kept to a minimum. It was decided at a recent Armour Branch meeting that conversion would be on a "need only" basis. No one will receive training unless they are to be employed where they need it. For promotion purposes, all Centurion qualifications will remain valid. Thus the majority of candidates taking the normal Leopard courses at CAS in the near future will not be repeating training that they originally received on Centurion.

The new training aids and tanks will be issued to CAS first so it can carry out the conversion training and normal Leopard courses as soon as possible. The RCD will receive their equipment a few months later. To give you some idea of numbers, Armour Department will hold 9 MBTs for gunnery and driving and maintenance training. The Gagetown Operational Tank Squadron which is the source of the CAS tactical training tanks will hold 19 MBTs and 1 ARV. The RCD will be equipped for three tank squadrons totalling 57 MBTs and 3 ARVs.

We are nearing the end of the Centurion era. In Germany, the RCD have already started training on Leopards. Within CAS, we have been ordered to cancel a number of Centurion courses. If the delivery of Leopard C1s happens as planned, the Centurion will be retired in Dec 78. All subsequent CAS tank training will be on Leopard or MOWAG. Between now and 1979 there is a lot of work to be done but for us tankers it is a "labour of love".

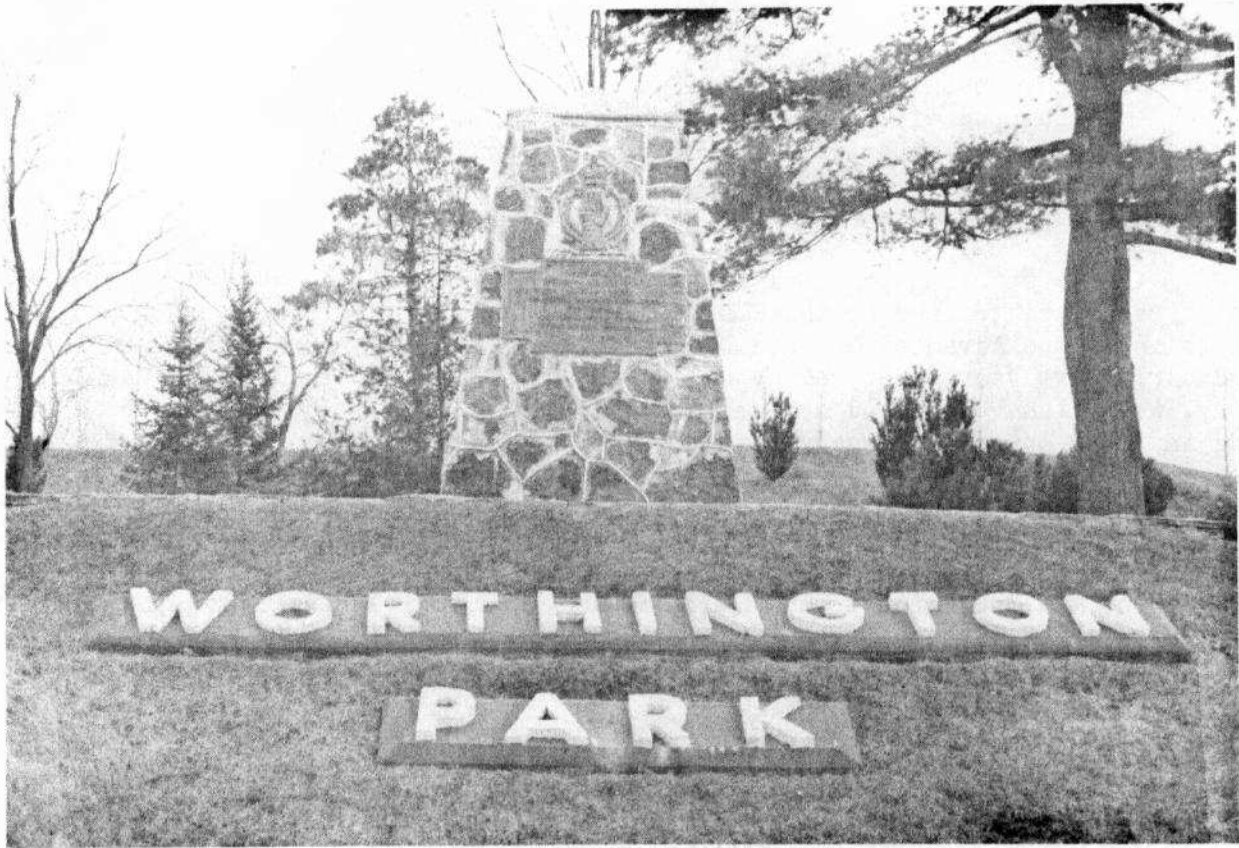


Photo Courtesy H. Langan Enterprises

With the move of the Combat Arms School from CFB Borden to CFB Gagetown in 1969 the problem of the control of the RCAC Museum was brought to a head. Concurrent with this particular problem it became evident that there was a real need for reorganizing the other Corps museums located within CFB Borden.

In 1970 the decision was taken to amalgamate the separate museums scattered throughout the Base into one location centered on Worthington Park and using the former RCAC School Officers' Mess, Building E108, in which the indoor portion of the RCAC Museum was located.

From 1970 to the present action has been taken to carry out the amalgamation and redesignate the overall Museum complex as the CFB Borden Military Museum.

PRESENT ORGANIZATION

At the present time the CFB Borden Military Museum is organized in the following adjacent areas:

- a. Building E108, which contains the Small Arms Weapon display, the Royal Canadian Armoured Corps Section, the Canadian Forces Medical Services Section, the Canadian Forces Intelligence and Security Section, the NBC Section and a display of uniforms;
- b. Building E-35, which contains the Logistics Branch Section (formerly the Royal Canadian Army Service Corps Museum) and the Land Ordnance Engineering Branch Museum (formerly the Royal Canadian Electrical and Mechanical Engineers Museum, relocated from CFB Kingston), and

- c. Worthington Park, which contains the grave and bust of MGen F.F. Worthington, the RCAC War Memorial and the Armoured Vehicle and Heavy Weapon display.

Responsible for the on going functioning of the Museum, including displays, is a committee established as a part of the Base Fund. The Committee is at present chaired by Major Bob Neelin, LdSH(RC), Commandant CFNBCS. The Committee members are drawn from all sections of the Base and are representative of their particular section of the Museum. For example the RCAC member is Capt George Chandler, 8CH, who is on the Operations and Training Staff at Base Headquarters.



Photo Courtesy H. Langan Enterprises

RCAC SECTION

Of particular interest to the Armoured Branch are, of course, the RCAC Section of the Museum and Worthington Park. The enclosed Visitors' Guide describes in detail the wide variety of vehicles and weapons displayed in the Park. This excellent booklet, including the photographs, was prepared by Major Howie Langan, RCD, who is now on retirement leave.

The RCAC Section contains artefacts and memorabilia relating to the development of the RCAC School while at Camp Borden, as well as of Regular and Militia units of the Corps dating from the Boer War, through World War I, World War II, Korea and UN Peacekeeping activities. Indeed a wealth of history.

FUTURE DEVELOPMENT

The CFB Borden Military Museum continues to expand. This winter will see the acquisition of two additional buildings, one of which will be developed as an Air Section. Already four aircraft, including a CF100 fighter and a Sabre have been acquired. The other building will be used to ease the somewhat crowded conditions of existing sections.

The entrance hall to building E108 is now in the process of being redesigned to display a history of the development of Camp Borden from its beginning as a vast tented camp in 1915 to the present. Other similar developments are in mind.

VISITORS

This past year has seen over 15,000 visitors go through the Museum. Visitors range from military personnel living on the Base or here on course, tourists in the local area, school children from many parts of southern Ontario, and service clubs and other organizations. Recently LGen J.W. Quinn, ADM (Per) visited. On 1 May 1976 Mrs. Worthington made a lengthy visit to view her husband's grave and to tour the Museum. At a luncheon hosted by the Base Commander after the tour she was made an honorary life member of the RCAC (Cavalry) Association.

CONCLUSION

The Armoured Section in particular and the Museum complex as a whole are well worth a visit by RCAC personnel who may happen to be in the area of CFB Borden. Visiting hours are 0900-1500 weekdays and 1330-1530 weekends and holidays.



Photos Courtesy H. Langan Enterprises

Know Your Regiments

THE GOVERNOR GENERAL'S HORSE GUARDS

Regimental March: "Men of Harlech"

Motto: Nulli Secundus

BATTLE HONOURS

North West Canada, 1885, South Africa, 1900

First World War: Mouth Sorrel, Somme, 1916, Flers-Courcelette, Ancre Heights, Arras, 1917, '18, Vimy, 1917, Hill 70, Ypres, 1917, Passchendaele, Amiens, Scarpe, 1918, Hindenburg Line, Canal du Nord, Cambrai, 1918, Valenciennes, Sambre, France and Flanders, 1915-18.

Second World War: Liri Valley, Melfa Crossing, Gothic Line, Lamone Crossing, Misano Ridge, Fosso Munio, Italy, 1944-1945, Ijsselmeer, North-West Europe, 1945.

Perpetuates the 4th Canadian Mounted Rifles Battalion, the 7th Regiment, Canadian Mounted Rifles, and the 216th Battalion, Canadian Expeditionary Force, 1914-1919.

Headquarters -- Downsview, Ont

ORGANIZATION

The Regiment was organized as a regiment on 17 May 1889 and incorporates the following regiments:

The Governor General's Body Guard originated on 27 Dec 1855 when the "1st and 2nd Troops of Volunteer Militia Cavalry of the County of York" were authorized. The 1st Troop was redesignated: "The Governor General's Body Guard for Upper Canada", 27 Apr 1866; "The Governor General's Body Guard for Ontario", 1 Jul 1867. It was reorganized as a two troop squadron on 5 May 1876. On 17 May 1889 it was reorganized as a regiment by the transfer to it of 1st Troop, 2nd Regiment of Cavalry (authorized on 27 Dec 1855 as the "2nd Troop of Volunteer Militia Cavalry of the County of York") and 2nd Troop, 2nd Regiment of Cavalry (authorized on 17 Jul 1856 as "The Markham Troop of Volunteer Militia Cavalry"). It was redesignated "The Governor General's Body Guard", 13 Jul 1895. On 15 Dec 1936 The Mississauga Horse was amalgamated with the Regiment under the designation "The Governor General's Horse Guards". It was converted and redesignated "3rd (Reserve) Armoured Regiment (The Governor General's Horse Guards)", 1 Apr 1941; and redesignated "The Governor General's Horse Guards (3rd Armoured Regiment)", 4 Feb 1949; "The Governor General's Horse Guards", 19 May 1958.

The Mississauga Horse was authorized on 1 Apr 1903 as the "Toronto Light Horse" by the formation of three squadrons and the amalgamation of "J" and "K" Squadrons, Canadian Mounted Rifles (authorized on 1 Apr 1901 as the "Toronto Mounted Rifles"). The Regiment was redesignated: "9th Toronto Light Horse", about 1903; 15 Mar 1920; "The Mississauga Horse", 1 Apr 1924. It was amalgamated with The Governor General's Body Guard on 15 Dec 1936 as above.

HISTORY

Early History. The Governor General's Body Guard for Ontario served in North West Canada, 1885, on General Middleton's lines of communication. The Governor General's Body Guard contributed volunteers to the Canadian Contingents during the South African War, 1899-1902.

First World War, 1914-1919. The Governor General's Body Guard and the 9th Mississauga Horse contributed volunteers to the 3rd and 2nd Battalions, CEF, respectively, on their formation in September 1914, and later recruited for the 4th Regiment, Canadian Mounted Rifles, CEF. The 9th Mississauga Horse also recruited for the 7th Regiment, Canadian Mounted Rifles, CEF. The 4th Regiment, Canadian Mounted Rifles served in France with the 2nd Canadian Mounted Rifles Brigade until January 1916 when it was reorganized as the "4th Canadian Mounted Rifles Battalion, C.E.F." and served with the 8th Infantry Brigade, 3rd Canadian Division until the Armistice. A member of this battalion, Pte TW Holmes, won the VC on 26 Oct 1917. The 7th Regiment, Canadian Mounted Rifles (less "A" Squadron, which had been reorganized in Canada as the "2nd Divisional Cavalry Squadron") formed the Canadian Mounted Rifles Depot in England.

Second World War, 1939-1945. Details of the Regiment were placed on active service on 1 Sep 1939 for local protective duty. The Regiment mobilized the "2nd Canadian Motorcycle Regiment, C.A.S.F., (G.G.H.G.)" on 24 May 1940. This unit was redesignated: "The Governor General's Horse Guards", 9 Feb 1941; "3rd Armoured Regiment (The Governor General's Horse Guards)", 11 Feb 1941. It embarked for the United Kingdom on 9 Oct 1941. It was converted and redesignated "3rd Armoured Reconnaissance Regiment (The Governor General's Horse Guards)", 1 Jan 1943. This Regiment landed in Italy on 19 Dec 1943 as a unit of the 5th Canadian Armoured Division. It moved to North-West Europe on 16 Feb 1945. The active unit was disbanded on 31 Jan 1946. A 3rd (Reserve) Armoured Regiment (The Governor General's Horse Guards) served in the Reserve Army.

NOTE: The seniority of this Regiment was established by General Order No. 1 of 27 Apr 1866 which redesignated the "1st Troop of York Cavalry" as "The Governor General's Body Guard for Upper Canada".

RECENT HISTORY

Upon disbanding in Jan 46, the Regiment returned home to Toronto and settled in to being a Militia Regiment once again.

The Horse Guards continued to train each year and attended summer concentrations in Camps Petawawa and Niagara (before the CFB system).

In the early fifties a few members of the Regiment got together and formed the GGHG Cavalry Squadron with a view towards keeping cavalry traditions alive, and more important, re-activating the tradition of providing Mounted Escorts for various Regal and Vice-Regal personages.

Today the Cavalry Squadron regularly escorts the Lieutenant Governor of the Province of Ontario on the occasion of the Opening of the Spring Session of the Legislature of Ontario; and distinguished persons who officiate at the Annual running of the Queen's Plate. (In recent years we have provided a 72 man mounted escort for Her Majesty the Queen and His Highness Prince Phillip, The Governor General of Canada, the Queen Mother and the Duke and Duchess of Kent).

Although the Regiment owns a few of the horses involved in these escorts, most are donated or loaned by interested citizens.

The Regiment, throughout the late 50's took part in NBCW training, and in fact, formed the headquarters for a MSG.

In the sixties we happily returned to the Armoured role and began training in recce tasks. Those were the days - speeding at upwards of 30 mph down a road waiting for the enemy to pounce. It was only later that the Militia was told that although recce was done as fast as possible, there were other things that had to be done; like clearing laterals, doing bridge and route reports, etc.

As the years went by our proficiency in our role increased to the point where we felt comfortable in debating the finer points of recce with our regular force mentors, such as LCol Bill Terry of the Armoured Training Regiment in Borden, and subsequently with the 8th Canadian Hussars who have to put up with us on frequent summer concentrations.

In its role of providing support to the Regular Force, the Regiment has attached people to the Royal Canadian Dragoons in Germany during Fly-over Training, has sent people to CFS Alert, and has participated in CCUNEFEME.

There are strong attachments to our Allied Regiments in the UK. In 1975 we entertained the RSM and the Hq Troop Sgt of 1st The Queen's Dragoon Guards for a couple of weeks in Toronto.

In early June 1976 the Commanding Officer, The RSM and a party of eight others went over to Europe and paid a visit to the Allied Regiments in England (Household Cavalry) and Germany (The Royal Horse Guards and 1st The Queen's Dragoon Guards). In addition they visited, and were entertained by, the Royal Canadian Dragoons.

An event of prime importance took place on 1 Jan 76. The senior militia regiment and the senior regular force regiment were affiliated. This is the first time that a Reserve unit has been formally affiliated to a Regular Force unit. This affiliation recognizes certain historical facts.

The RCD were a Toronto unit and has taken into it members of the Horse Guards at various times. In addition, both units share 11 Battle Honours.

We, in the Horse Guards look forward to a long and mutually beneficial relationship whereby we in the GGHG can provide a link between Toronto and Germany.

EDITORS NOTE:

This is the first of a new series in the Armour Newsletter. It was felt that the regular force units and their militia compatriots were sufficiently well known and thus the reason for starting with the militia units. The order presentation of the units was determined by their order of precedence. Each unit will have presented the official history as contained in "THE REGIMENTS AND CORPS OF THE CANADIAN ARMY", Volume 1 of the Canadian Army List, Queens Printer 1964. Each unit will also be asked to submit amendments and post World War II History.

To See or Not To See

By Capt W. Fulton

Technology in the field of equipment for night operations has advanced at a rapid rate over the last few years. There is presently being developed a comprehensive range of night vision equipment which will considerably improve our ability to operate at night. This equipment is based on image intensification. Unlike Infra Red devices which are in service now with the Centurion tank and which are mainly active devices that can be detected, image intensification is an entirely passive non-detectable system. It relies for its effect on the illumination which comes from the moon and stars. This ambient light is collected and magnified up to 64,000 times. The second generation devices presently being produced, give a brighter clearer image that is much less susceptible to "white out". The range is dependent upon the amount of ambient light present. The performance is also offset by adverse weather conditions such as fog, rain, and snow. Smoke and dust on the battlefield have the same adverse effect.

Despite the disadvantages, Image Intensification devices are a tremendous step forward in night fighting capability. They have increased the need for absolute light discipline, because any light, regardless of colour or hatches closed or open can be very easily detected by these devices at ranges in excess of 2000 meters.

With the advent of the Leopard tank and AVGP for the Canadian Forces, new and modern night vision equipment will be introduced. The commander, gunner and driver will be equipped with image intensification devices. Little is known at the moment about the commander and gunner sights.

The driver will be equipped with the American produced AN/VVS-2 night driving viewer. Thus periscope gives a X1 magnification and a 45° field of view. It is a very effective second generation device which will greatly improve his night driving capability. It operates on batteries or off the vehicle power supply as desired and it can therefore be dismounted and used in an OP role. It allows the operator to detect a standing man at about 150 metres. It can be removed or installed in seconds. It also comes with various interface brackets so that it can be used in both Leopard and AVGP. Because of the simplicity of the AN/VVS-2 very little time is required to train drivers.

The technology in night viewing devices is increasing rapidly and with the purchase of the AN/VVS-2 night driving periscope combined with image intensification sights for the gunner and the commander, Canada will be able to compete with any nation on the modern night time battlefield.

Book Corner

Review of

Always A Strathcona... by Capt J.M. Snell

Most Regimental histories have, it seems, been written in isolation. After reading a copy of most of these histories, one is left with the feeling that the Regiment concerned fought the war singly and without reference to the events both political and military that guided the completed expeditions.

To this collection, the Lord Strathcona's Horse (Royal Canadians) have added a new chapter. As part of the Regiment's Seventy-fifth Anniversary celebrations, Mr. William B. Fraser, a local Calgary author, was commissioned by the Regiment to weave together the various pieces of Regimental history available. Unlike the two volumes of the Regiment's history which are available (Stand to Your Horses and Strathcona's '39-45, which cover the First and Second World Wars respectively), Always A Strathcona... covers the entire spectrum of the Strathcona's heritage.

Mr. Fraser takes us back to the real beginnings of the Canadian military tradition and through his introduction we begin to realize how unique our military past is. Within this framework we are led into Confederation, the Riel Rebellion and finally the first major military crisis for the new Nation - The South African War.

It is here that the Regiment receives its name and establishes its credentials including the awarding of the First Canadian Victoria Cross of the campaign to Sgt "Tabby" Richardson of Battleford. The war against the Boers confirmed in the military minds of Ottawa the value of the rough, hard men of the Western Prairies. These traditions, however, had to a large extent already become part of the western military organization.

After General Middleton's trek across the west to subdue Riel, the necessity of creating a permanent military presence west of Lake Superior became evident. The establishment of the School of Mounted Infantry at Winnipeg in 1885 provided the nucleus for the original Strathconas.

Not a page of the Regiment's history is missed. We are brought through the trials of the post war period up to the mobilization difficulties of 1914. We share the wet and damp coldness of training in England. Finally the Strathconas are deployed to the front but their horses are left behind. The first commitment to battle, at Festubert, was as infantry. However, the Strathconas and their horses were reunited and the Regiment went on to achieve fame at the last great cavalry charge on 30 March 1918 at Moreuil Wood.

The conclusion of war saw the Regiment strengthen its ties with the west. Not only was the Regiment part of the Winnipeg community but part of it moved further west to establish itself in Calgary.

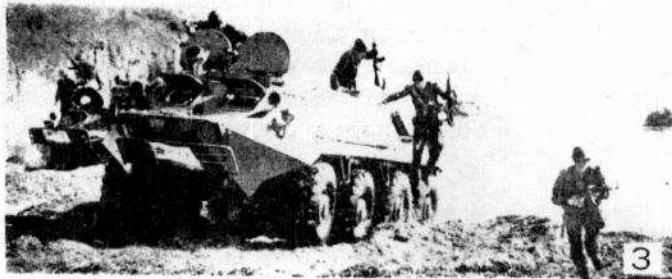
Confusion also surrounded the outbreak of the Second World War. Horses were quickly discarded and the Regiment received its first tanks. Again the Regiment endured the wet English hardships of preparation for battle. Leaving England, the Strathconas were part of the force committed to the "Boot". The campaign in Italy was as a hard, demanding endeavour. The crossing of the Melfa River on 24 May 1944 reaffirmed the tenacity of the Strathconas. In fact to this day, the Regiment celebrates the 24th of May as "Strathcona Day".

Unlike most military histories, the Strathcona's history does not stop in 1945. Mr. Fraser has gone into considerable detail outlining the Strathcona's contribution to United Nations Peacekeeping Forces beginning with Korea and running to today's involvement in the Middle East.

Always a Strathcona... is more than a Regiment's history. The author's easy to read, fluent and moving style has produced a work which shows the Regiment as part of the larger military community. One does not have to be a Strathcona to gain the essence of being a Strathcona. Bill Fraser has given us a readable work that makes people want to be Strathconas.

The book is approximately 200 pages, hard covered with maps and photographs. It is available from the Regimental Kit Shop, Lord Strathcona's Horse (Royal Canadians) CFB Calgary, Calgary Alberta T3E 1T8. The publication price is \$10.00 postpaid.

Fighting Vehicle



Identification Test



Report by type, function and nationality and then check with the solutions given on Page 40.



OP GAMESCAN 76

8 CH PARTICIPATION

(or "the real reason Olympic security was so successful")

The 8th Canadian Hussars (Princess Louise's) began the Olympic security tasking as the orphan of 2 Combat Group ... during initial planning as augmentees for other Petawawa units, later as guards for Montreal vital points but in the end result doing one of the more challenging group of taskings of the operation.

The unit:

- a. provided athlete security at eight Montreal area athlete training sites;
- b. provided athlete security at two Olympic competition sites (Montreal Forum and, later, Etienne des Marteau);
- c. supplemented security at Dorval and Mirabel airports;
- d. assisted Montreal city police during the two major bicycle events; and
- e. provided a vanguard squadron in the Ottawa area (B Sqn).

The regiment operated out of the Heymans Hilton (Marymount School) in Montreal and guarded athletes whenever they were on site (usually 0700-2200 hrs). The largest squadron in the Corps (A Sqn - 230 personnel) performed the Montreal security duties while the quietest (but most highly trained) soldiers sat around Ottawa with B Squadron for a few weeks.

Memorable highlights of the Montreal operation included the employment of ferrets in the airport areas, the daily contact with the world's finest athletes, the association with the Montreal city police, the constant supervision by RHQ officers of the Forum task (especially during gymnastics and basketball finals), the visit of the Chief of Armour to the front lines and, of course, the city itself.

Ottawa memories were restricted to B Squadron doing their twice times 10 miler, the OC's dog getting lost and the squadron impressing the local air natives by rappelling off hangar roofs.

The CO and DCO managed to find 45 minutes out of a busy PT, social and supervisory schedule to meet with Princess Anne, the Regiment's Colonel-in-Chief, at the Olympic stadium.



Seven troop ferrets are prepared prior to deploying to the airports.



Sentries are positioned during OP FAIRVIEW.



Members of the Forum Troop restrict access to the athlete's entrance.

The regiment enjoyed/endured (choose one) its summer, found time to socialize with 12e RBC on occasion, was impressed by the three man LdSH contingent and was unimpressed by the lack of contribution from the RCD. It is assumed that, even without increment, the school soldiered on regardless.

THE RENEWED ARTILLERY THREAT TO ARMOUR

By Major D.A. Gronbeck-Jones

When the tank first appeared on the battlefield in the First World War, its invulnerability to small arms fire made it a formidable platform for machine guns and light, direct-fire guns used in support of assaulting infantry. Its invulnerability was challenged only by other high-velocity direct-fire guns on other tanks or those manned by artillery personnel. Indirect-fire artillery was of limited value against these behemoths, primarily because the contemporary fire control techniques did not permit quick and accurate shifting of fire on a fast-moving target. Thus, a direct hit was seldom possible, and with the light guns predominately in use, near-misses were usually ineffective against even the thin armour of the time. A truly effective anti-tank gun was not in the field by war's end, although several had been developed which were suitable to counter the thin armour of the day.

Between wars, despite having to take second place to the counter-air problem, guns were developed by various nations in the 37mm (2-pdr.) range to defeat known First World War tanks. This classic piece of retro-grade vision became painfully clear when, at the start of the Second World War, it was discovered that the light guns were ineffective against the new tanks fielded by the Germans. In the North African Campaign, this marked deficiency in anti-tank capability on the part of the artillery was overcome in part by the use of direct support field guns in the anti-tank role, and later by the introduction of specially designed anti-tank field guns such as the British 17-pdr.

Equally important to the problem was the development of new ammunition which was more successful at defeating armour. The concurrent development of tungsten APDS projectiles during the first years of the war resulted in a stabilized situation at the end of the war, with most belligerents fighting tanks with artillery guns of 75mm or more, employing armour-piercing discarding sabot (APDS) and hollow-charge high explosive anti-tank (HEAT) munitions.¹

It is significant that in the Second World War, as in the First World War, artillery fired in a direct role was a threat to armour, but seldom was indirect fire used with effect. Experience had shown that indirect fire was wasteful in ammunition when used against tanks and of limited value. Furthermore, the infantry lost its close artillery support when guns were employed in the anti-tank role. The period following the Second World War, and even right up until the present day, has done little to change people's minds about the ineffectiveness of indirect-fire artillery against tanks. Virtually every country has adopted recoilless guns and/or anti-tank guided missiles (ATGM) in the interim, controlled by infantry. Notably only the Soviet-bloc countries keep large numbers of anti-tank guns in inventory, and these are only complementary to the infantry ATGMs.

¹Ian Hogg, Artillery (New York: Ballantyne Books, 1972).

Significant in the formulation of opinions on the subject of defeating armour has been the development and success of aircraft-delivered munitions. It has come to be assumed that the FGA aircraft would be the partner of the contact arms in the anti-tank confrontation. Battles between two modern nations in which there has been extensive use of armour have been few and far-between. Notable exceptions have been the Arab-Israeli conflicts of 1967 and 1973.

In 1967, the Israeli artillery was far down in the military pecking order. Everything, even infantry, was in support of armour. The Israelis looked upon their air force as the premier arm in support of tanks, and the main source of firepower to destroy tanks in depth. After all, in the Middle East the weather is seldom a problem; their Phantom and Skyhawk aircraft carried, even in artillery terms, a formidable punch; and since an aircraft flies back to base to re-arm it meant a simplified logistic problem. We all know the Egyptian Air Force was destroyed on the ground, giving total air superiority to the Israelis and permitting them to fight as they had foreseen: aircraft in support of tanks, with artillery doing nothing against the Egyptian armour. The already-discussed conception about the value of artillery was reinforced. ²

In the 1973 conflict, popularly called the Yom Kippur War, there were no successful pre-emptive air strikes on Egyptian airfields. Not only was an air superiority battle to be superimposed over the land battle for the duration of the war, the increased air defence effort on the part of the Arabs made Israeli incursions into airspace over the forward battle area very expensive in terms of downed aircraft. Close air support was not there when it was needed in the quantity required to do the job.

This lesson, that an effective air defence is a realistic option for the first time in history, must be accepted. The second lesson is that without close air support, or even with moderate close air support, ground forces have to rely upon their own indirect fire weapons.³ The Israelis found out as well that the 105mm howitzer has no place on the armoured battlefield. This late observation only confirmed what had already been determined by NATO countries when they decided to adopt guns of 155mm calibre as standard. The Israeli observation was an empirical one, however, and not based entirely on the same basis as NATO's. The Israelis found that 155mm guns firing indirect could and did stop assaulting tanks on several occasions. A concentration of 10 rounds fire for effect by three regiments (36 guns) would outright destroy any tanks which received a direct hit on any portion of the tank, and even near-misses broke tracks, aerials, and sighting equipment. Fuel tanks punctured by shell fragments were common, and the use of white phosphorus shell in conjunction with HE turned minor casualties caused by splinters into major ones when the ruptured fuel tanks exploded. ⁴

²Brigadier T.L. Moroney, O.B.E., "Artillery Support in the Yom Kippur War," Journal of the Royal Artillery, CII (March, 1975), p. 11.

³Ibid., p. 12.

⁴Ibid., p. 12.

The Israelis found in this rather short war that conventional artillery, even in the indirect fire role, is effective against all types of armour, even modern Russian tanks. The Israeli reaction in the days following the Yom Kippur War has been to plan an artillery reorganization which could be considered quite radical. What they want to do is make General Support (against the tank threat) priority one for divisional artillery units. Second priority for artillery would go to counter-bombardment, for the gun line found in Soviet-bloc armies is formidable. Given those priorities, guaranteed response to calls for fire by supported formations would be impossible. Thus, the Israelis plan to give infantry and even armoured units their own 81mm and 120mm self-propelled mortars. To do so in my opinion is a mistake, a solution based on a single battle scenario. As I will discuss later, other solutions are possible, and other developments of recent years may render organizational changes of this magnitude unnecessary. Nevertheless, the protagonists of the Yom Kippur War and their allies are aware now that even conventional medium artillery as found in most NATO and Soviet-bloc countries is effective against armour if it is employed in sufficient mass.

Concurrently, development of specialized ammunition has been going on, and although few types have seen war service these Improved Conventional Munitions (ICM) designed for 155mm tubes have a primary target - the tank.

There are good reasons why the tank-killer role should be taken on by the artillery. Even if one accepts that there are effective anti-armour weapons systems in the hands of the infantry and other combat arms, these elements of the battle are detracted from their main tasks when they alone take on all the tanks expected to be seen on the enemy side. Lack of visibility out to maximum effective ranges as well as the strain of real battle conditions promise to limit the effectiveness of anti-tank guided missiles. Range is, and always has been, a limiting factor of recoilless guns. Mines take too long to lay and there is always the possibility that the enemy will come where the mines are not, or that his prior planning will allow him to locate mines quickly and breach the minefields with dispatch. Superimposed on all of these systems is the critical limiting factor: the sheer tonnage of ammunition which is needed by these forward troops to accomplish the job of defeating a majority of the advancing armour.

The artillery does not at present suffer to the same extent when supply of ammunition is considered. The tonnages of ammunition which are routinely handled could, if they included armour-defeating ICMs, nicely complement what is in reality only a short-range capability possessed by infantry ATGMs and recoilless guns. The artillery can fire with relative impunity from their gun positions at armour in depth even while forward troops are engaged in close battle. The infantry anti-tank weapons will be laid aside at this time when bayonets are in demand. We are at present depending upon FGA aircraft to hit

those tanks in depth while troops are in contact and otherwise engaged, but as previously pointed out that is not a viable solution to the problem if we cannot depend on air forces to be there under all conditions of air superiority and weather.

Although conventional medium artillery can stop tanks as the Israeli experience has determined, the situation is enhanced by the ICM. One type of ICM is the 155mm projectile which is in fact a carrier of smaller "bomblets" which are expelled from the shell by airburst over an advancing tank column. Each bomblet is a baseball-sized shaped-charge munition capable of penetrating top armour on any tank it hits. The scattered bomblets permit saturation of an area with a relatively small number of full-sized rounds.

The bomblet projectile is adaptable to any artillery round larger than 155mm, and an ICM warhead is also available for the 762mm Honest John rocket. This latter weapon will distribute, with one warhead, sufficient bomblets to saturate several grid squares of terrain. Needless to say, the target must be seen by an OP or other acquisition means and still be on the target when the rounds arrive in order to be effective. It remains a difficult gunnery problem to hit a moving target, and even stationary vehicles under trees have some degree of protection from the light bomblets.

To overcome the mine-laying problem, a projectile is feasible which scatters mines in the same manner as the bomblet ICM. These "stick mines" are sown quickly, and where needed, to meet a sudden armoured advance. Each mine is capable of blowing a track, stopping the tank or other vehicle cold so that it can be easily engaged by other weapons, thus slowing down the momentum of the attack. While these mines are only scattered on the surface and can be relatively easily removed, they achieve their effect by blocking what the enemy thought was a secure route, possibly one over which reconnaissance elements had already passed and safely cleared. The resultant delay thus imposed on the armoured assault force stuck behind the barrier would give our commander the opportunity to destroy the elements on our side of the barrier at a minimum, and ideally the opportunity to deliver a counter-stroke against the main body while it is in its temporary state of disorganization and confusion. Of course, mines scattered in this manner will self-destruct after a designated period of time to permit our own advance when this is possible.

ICMs, as the name implies, are just conventional ammunition, albeit improved, fired from conventional artillery equipments. Their use would not be practical if it were not for all of the other improvements to artillery techniques and procedures in recent years. Reaction times to calls for fire have been significantly reduced. The probability of achieving a first-round hit has been increased by more accurate methods of position determination, both at the gun end and at the target. We can safely say that today it is possible to hit a portion of a target with the mean point of impact of a battery, without adjustment. Put into other words, any given round directed at a target will almost certainly impact within 100 metres of it, and probably within 50 metres of it.⁵ That means a technical "hit", since the lethal radius of a shell is sufficient to cover the target.

⁵Based on a six-gun battery with a frontage of 150 metres, equipped with 155mm howitzers.

Impressive as this may seem compared with where we were only 10 short years ago, the ability to hit a pin-point target is a task nearly as difficult as it was in the First World War. Artillery system errors are cumulative. A centimetre's error in survey at the gun adds to a metre at the observer's location (transmitted to target location by his laser rangefinder); to this add a change in projectile velocity caused by a change in air temperature since the last meteorological readings; a gunner's firing at one mil over or short of the desired elevation because he is tired; and the end result is a projectile which statistically never lands "in the bucket". Even if the "bucket" is the size of a tank, it is probably moving around anyway to make the problem seem insurmountable.

Probable error has always been a function of hit capability for more than artillery weapons. Credit for solving the problem has to go to the US Air Force, which has been developing several systems which allow bombs and missiles to be terminally guided to a pinpoint target. One system, that in which the missile seeks a target which has been laser-illuminated, has been tried in the Vietnamese War with great success.

The principle was seen to be adaptable to an artillery projectile, in theory, from the outset of development. The hardest part of the challenge was to make complex electronic circuits which could withstand the very high stresses encountered by an artillery shell on firing. Those stresses are complicated in an artillery tube by the rotation imparted to the projectile by the tube's rifling. At the moment of firing an M109A1 155mm howitzer (with extended range tube), acceleration stresses on the projectile reach 9,000 Gs. To adapt the terminally guided bomb meant that such elements as the gyroscope, electronics, and optics had to be redesigned. Special mountings had to be invented, and in some cases completely different approaches had to be considered.

One feature of the terminally guided bomb or missile is the relative ease with which wings and fins can be added. This is not all that simple with an artillery projectile, as such control surfaces must be retraced inside the projectile while the projectile is in the barrel. The projectile's rotation is also detrimental to a guidance system using control surfaces, and the rotation must be reduced to a much smaller level than a normal projectile has upon leaving the gun.

Despite a relatively small research investment of \$25 million, the Cannon-Launched Guided Projectile (CLGP) has been developed and tested. The prototype was produced by Martin-Marietta Aerospace for the US Army, for use in the 155mm howitzer M109A1. It may be fired without any modification to the howitzer, alone or in combination with conventional rounds, and it may also be fired from any other 155mm howitzer. Normal propellant charges are employed.

Fortunately for the developers, nowhere near the HE content of a standard projectile is needed to destroy a tank, given a direct hit and a shaped-charge warhead. Thus, the projectile contains a goodly weight of guidance components and control surfaces without exceeding the weight of the standard round. The resulting CLGP is approximately twice the length of the standard 155mm HE round. The rotation problem

was overcome by employing a freely rotating driving band which keeps the projectile stable instead of rotating it as it goes up the tube. On egress from the tube, the control surfaces and wings extract, and from that point on the projectile is capable of being guided by receipt of reflected laser illumination in the target area.

The latest prototype has both fins which are control surfaces, and wings which are fixed which give the projectile the ability to glide, thus extending range and permitting the round to be "flown" beneath cloud cover. This is essential to allow the maximum time for guidance and thus increase accuracy.

The CLGP requires an illuminated target at present, that is, a target which is being "painted" by a laser beam which is coded to match the projectile's receiver. If the projectile does not receive its proper signal it will continue on its near-ballistic trajectory. The laser illumination is conventionally provided by a ground observer, but can also be provided by a heliborne one, or even a remotely-piloted vehicle (RPV) equipped with a television camera to extend the range and altitude of a human observer's eyes.

During trials conducted by the US Army at White Sands Missile Range, eight missiles were fired. Seven direct hits were obtained under a variety of conditions. Two hits were obtained against moving tanks, the most difficult of which was crossing the line of fire at 20 mph at a range from the howitzer of 4 km. Under these circumstances the projectile has a minimum of time to manoeuvre to score a hit. Another significant hit was obtained against a tank at 8 km range, with both target acquisition and laser designation by an Aeronutronic-Ford Praeire 2 RPV. The operating observer, at his television monitor, commanded the operation via data link to the RPV, designating the target by laser while the CLGP was in the terminal phase of its flight. A direct hit was obtained to the tank turret. ⁶

The extent to which the CLGP can be terminally guided is limited, of course. The CLGP must be directed into what is called an "acquisition basket" in order for the reflected laser illumination to be seen by the CLGP's sensor. In addition, there must be sufficient airspace to allow the projectile room to manoeuvre.

With all the other modern improvements to gunnery that have been previously discussed, achieving the acquisition basket should not be a serious problem. As with the air force's smart bombs and missiles, a low cloud cover can have a deleterious effect of the homing capability and the CLGP may acquire the laser designation too late to permit the required flight correction to be made.

As long as the OP/RPV can keep the laser beam on the target, the projectile will continue to home on it. Any interference with this capability of keeping the laser on target for ten seconds or so will cause mission failure. A fast-moving target could move out of the target area of the CLGP or go behind cover, but the skilled OP will learn how to anticipate where the target will be at a given time, just as he does now in engaging a moving target with HE.

⁶Clarence A. Robinson, Jr. "Wings to Boost Guided Projectile Range," Aviation Week & Space Technology, CIII (October 13, 1975), p. 56.

Trial firing of the CLGP prototypes have shown so far that an accuracy of less than one metre is possible. That's the "bucket" into which gunners have been trying to drop rounds ever since the Battle of Crecy! Not only that, a range of 20 km is expected to be achieved during trials.

Also in the development process are 8-in howitzer CLGPs, which will increase the HE content delivered to the target and permit a larger variety of targets to be engaged. A terminal guidance system employing infrared homing is also being tried by the US Navy for its 5-in. 54-cal. gun. That round, which is rocket-assisted and designed for anti-aircraft use, can be sabotaged for use in the 155mm howitzer. It could mean that the projectile could find its own target, or that the OP need only give it rough steering with his laser designator. In any case, the accuracy is assured by such improvements.

The addition of an RPV as a designator is an exciting prospect for the future. In the forward battle area, it means that enemy tanks will no longer be able to rely on the cover afforded by ground to shield themselves from view. They will be as vulnerable to artillery fire as they are to aircraft, perhaps even more so since the RPV can fly overhead without risk to human life and with minimal financial risk.

An RPV such as Canadair's MARASTAS, or any other of a large number of RPVs under development, could carry a georeference system, a television camera, and a laser designator. It is so small that the chances of detection are remote. Hovering or orbiting hundreds of feet above the enemy's rear echelons, its remote operator can select targets at will, send fire orders to the guns, designate the target with the laser, watch the target being engaged, determine the damage done, and repeat the procedure on another target until the RPV runs out of flying time or is destroyed. Repeat this sequence of events many times over the battlefield, with simultaneous engagements potentially as many as one per gun per 20 seconds, and no one could deny that there has been a significant change in the capability of the artillery to destroy.

As the British artillery found in the North African Campaign, and as the Israeli artillery found in the Yom Kippur War, the requirement to engage tanks with artillery will become so large that the primary role (at least the traditional primary role) of neutralizing enemy infantry will be in jeopardy. With the CLGP, unlike the previous two historical precedents, the requirement is not dependent upon masses of artillery. It could be, but it need not be.

Close support artillery regiments should retain their primary role and there should be no degradation of their ability to answer calls for fire on a priority basis from their supported formations and units. They should, on the other hand, be able to deliver ICMS as a part of that close support role. It would be the exception, rather than the rule, however, that the CLGP would be used in that role as the supported formation or unit should have its own capability to destroy any tanks within its 1000-metre sphere of influence.

A divisional general support artillery regiment, long needed in any case for counter-battery tasks, could also assume the tank-killer role with the CLGP as its primary weapon. It would include an RPV troop in order to give it its own long-range target acquisition capability. Employed with covering troops prior to the main defensive battle, they could begin attrition of enemy tanks long before we now foresee that event happening. From the primary gun positions behind the obstacle, it would continue to engage tanks long before they come into ATGM range. OP parties, using either RPV control units or the ground-mounted laser designator when appropriate, should be decentralized to formations and come in direct support to them only when the tanks that remain come within the sphere of influence of their supported formation.

Given a stable situation vis-a-vis enemy tanks and anti-tank weapons, the general support regiment could concentrate on counter-battery tasks using the RPVs and either CLGPs or conventional munitions.

As with all artillery, especially in the defensive battle, the divisional artillery commander must retain control of his general support artillery regiment and keep the ability to change operational relationship as the battle progresses. In most types of offensive operations, centralization of control of the general support regiment is also called for, unlike conventional artillery, in order to achieve economy of effort. Observers should accompany reconnaissance in order to begin the earliest possible attrition of enemy armour. That attrition should continue throughout battle procedure and attack phases without hindrance. If the general support regiment is dedicated to tank destruction there is no doubt that it should be the divisional commander's resource. Observers belong where they can do the job best; there is no point in their being shared equally among the brigades or allotted to a reserve force.

The renewed artillery threat to armour will not go on without a counter from the enemy, just as we cannot expect that it will be long before the enemy employs the same devices and tactics against us. We would, of course, be ready to counter his efforts. This "chicken versus egg" situation is a result of every technological leap.

Our counter is two-fold. Primarily, defensive measures must be taken at all times to decrease the ability of the enemy to produce effective counter-battery fire. Secondly, we must improve our ability to locate enemy guns quickly and accurately, retaliating as soon as possible with better methods of bringing down fire onto gun positions far in the enemy's rear echelons.

By way of defensive measures, we must first of all keep gun positions a matter of mystery to the enemy until they are occupied. They must not be occupied until they are going to be used, and once used, the guns must move elsewhere before retaliation is brought to bear. Fortunately, technology is at hand with a solution once again, or will be very soon.

Canada's Gun Alignment and Control System (GACS) gives self-propelled guns the ability to leave a gun position while it is not being used for firing, and to return to it and recommence firing within a minute or so of ar-

rival. The GACS system, or one similar to it, allows a battery to have several alternative battery positions, or, on the other hand, occupy more than one position at a time with only a few guns in each. While firing CLGPs, there is no need for massing of guns, and guns could even be located singly with fire orders being received by radio from a command post in a central location. The guns could also retain battery control, yet disperse much more widely about a single GACS reference unit if the terrain permitted. They could move after each few rounds to a new position, individually, still within range of the GACS reference unit yet providing sufficient dispersion within the battery that enemy counter-battery fire could never be effective. When required to mass for a conventional fire mission, the guns could adopt a standard battery layout for the shoot, still using the same reference unit, and then disperse again immediately for their own protection.

While potentially expensive in GACS equipment, the results can be maintained in the battle area with minimal risk to the gun batteries. Only a lack of imagination would limit deployment possibilities. Close support regiments, with most of their fire being conventional missions, would have to continue to deploy in battery groups. Keep in mind that an enemy's counter-battery (CB) capability, though perhaps enhanced to counter the CLGP threat, would work just as well against the close support batteries. Since a battery's role could be interchangeable, the CB threat applies equally to all batteries. One can see that mobility is the best defence for any artillery battery, and the only rest to be had will be while well-camouflaged in a hide. It remains for technology to come up with a device that defeats laser illumination without blinding the protected unit (better smoke, perhaps). The best defence is mobility and concealment from the far-reaching television camera in an RPV.

I feel that the locating battery needed by a division should be a part of a divisional general support regiment, including the RPV troop as part of that battery. We would not take lightly the enemy's capability to destroy our tanks, and thus our artillery must have the ability to locate his batteries as soon as they fire.

While once again the RPV-mounted television camera (or other sensor) comes to mind, it must first have a place to go to look for guns. Conventional target acquisition methods as we have them now remain extremely important. Those which provide real-time intelligence, even if relatively inaccurate, are the most important. We can no longer wait for pinpoint accuracy if it is too late in arriving, thus those acquisition methods which employ film photography will certainly become only an adjunct to the artillery intelligence system. In-flight reporting by aircraft may also become a thing of the past if the enemy's air defence system is as good as we hear it is.

Sound ranging, for all the world the same system it was in the First World War, can tell us where to look in a hurry, and that is really all that is needed when an RPV is going to go out and make a positive location of the hostile battery (and engage it at the same time).

The RPV of the future will accomplish more than any other device has ever done as far as target acquisition is concerned, and it will, in conjunction with the CLGP or conventional munitions, provide us with our best means of accurately bringing down fire on a hostile battery. This same device will let us know what damage has been caused, and even follow the fleeing battery to re-engage it in another location or even on the move.

With accuracy of location, and accuracy of retaliatory fire, we have a CB capability such as has never been known before. Add to that winning combination a gun locating radar such as that recently produced for evaluation by the Hughes Corporation for the US Army, and it will be seldom that the enemy fires his guns without being detected. Once seen, our new capabilities will ensure his ultimate destruction.

The CLGP has provided a truly cost-effective method of destroying the tank. The 155mm round will cost approximately \$3,500 each in terms of constant 1975 dollars.⁷ In considering cost one can ignore the delivery system, already in use, and thus the CLGP is the most cost-effective means of destroying a tank at long range that has ever been developed. Add to this a one-round hit and kill probability, the short time involved in the destruction of each tank, the relative immunity of the delivery means, the outstanding range of the weapon, the compatibility with other current developments, and it must be agreed that the CLGP is certainly one of the most significant breakthroughs in the history of modern war.

For the first time, artillery in the indirect-fire role is not restricted to neutralization of an area. It can destroy, and it can destroy the tank and the other armoured vehicles which we see as our greatest threat on tomorrow's battlefield.

⁷Ibid, p. 57.

BIBLIOGRAPHY

"The CLGP Anti-tank Weapon." International Defence Review, Vol. 8, No. 2 (April, 1975), 262.

Farndale, Brigadier M.B. "Artillery in the Armoured Battle." Journal of the Royal Artillery, CII (March, 1975), 14-17.

Hogg, Ian. Artillery. New York: Ballantyne Books, 1972.

Morony, Brigadier T.L., O.B.E. "Artillery Support in the Yom Kippur War." Journal of the Royal Artillery, CII (March, 1975), 11-14.

Robinson, Clarence A., Jr. "Wings to Boost Guided Projectile Range." Aviation Week & Space Technology, CIII (October 13, 1975), 56-57.

AVGP - A CORPS APPROACH?

By ICol D. Lightburn

THE BACKGROUND

1. Articles on Armoured Vehicle General Purpose (AVGP) in the past two Armour newsletters (plus readers thoughts on same) indicate that some confusion exists regarding the potential introduction of this vehicle into Armoured Regiments.

2. During the past 12 years the Armoured Corps has undergone a number of organizational and equipment changes, shifts in training emphasis and, of late, has faced a rather uncertain future. The government decision on the tank and the purchase of the Leopard provide the Corps with a firm starting point from which to "get back on track". In addition to the introduction of Leopard in the RCD, Canadian based Armoured Regiments may receive the AVGP and it is this proposition that appears to have created some undesirable confusion within (and outside) the Corps and given rise to some counter-productive emotionalism.

AIM

3. The purpose of this article is to put the employment of the AVGP in its proper perspective and to tie it in with Corps (and Combat Arms) training aims over the next several years.

WHY THE PROBLEM?

4. The reasons for the confusion surrounding AVGP are many:
- a. the timing of the discussion on same ... at the same time as the Leopard decision;
 - b. traditional arguments ... wheels vs tracks, armour vs light armour vs armoured car regiments vs ...;
 - c. "purists" ... "we can only use Leopards to learn collective armour skills" or "the AVGP cannot face the T62 in a head on tank battle";
 - d. confined thinking ... "wheels", therefore UN tasks or "light armoured wheeled vehicle" therefore IS tasks or "armoured car" therefore upgun the CAST squadron or "DFS", back into light armour or " " ...
5. With the above background clearly muddling people's thinking several facts underlie the whole problem:
- a. the Corps is now very definitely back in the "heavy armour" business and to a considerably greater degree than at present;

- b. the question of one or the other, tank or AVGP, is academic ... only a specified number of tanks are available in the current dollar limited program ... for the foreseeable future;
- c. the Corps has for some time sought a means of maintaining gunnery skills ... and AVGP is a planned means, not an accident;
- d. AVGP is not being purchased as a specialist or ad hoc piece of equipment to be "hung on to the side of the Corps" to do a limited or specialist role;
- e. the Corps has a very definite individual and collective training problem; and
- f. other elements of the Combat Arms have little or no opportunity to learn battle group tactics and exercise same.

SOLIDLY BACK IN THE TANK BUSINESS

6. The one year loan of some Leopard A2s to the RCD marks the beginning of a recommitment, on the part of the Forces, to "heavy armour". Of greater impact on the Corps is the increase to the RCD of one tank squadron, on a flyover basis, following the arrival of the Canadian A4 Leopards in 1978. This 50% increase in the regiment brings with it an even greater personnel bill ... to be met from Canadian based regiments. This requirement plus the fact that the Corps is now virtually out of that residue of tanker skills, left over from the days when there were four tank regiments, has several implications:

- a. the flyover commitment to an operational theatre cannot be met without the group being trained to a certain level (individually and collectively);
- b. the fact that the Corps is "short" on tank skills now only compounds the requirement for considerable flexibility in meeting this large operational flyover commitment, and the normal rotation (i.e. Canadian units need considerable numbers of personnel trained and oriented to the tank);
- c. individual training requirements can be met by adjusting the emphasis in the 6A, advanced instructor and other career courses and by maintaining Leopard gunnery skills on training turrets (scheduled for Canadian based units);
- d. collective training can be accomplished in advance for large numbers of personnel in only one place, i.e. at a Canadian based regiment ... or regiments. The calendar at the Combat Arms School, as we all know, is more than full and the equipment used continuously. Given the added problem of tank conversion training for a while, plus a

Leopard emphasis in career courses and basic Leopard gunnery courses, there is not the time, the instructors or the tanks to conduct collective armour training in Gagetown. In addition the RCD can ill afford to have to continue to train (from square one) large numbers of rotation troops.

THE AVGP

7. If one understands the problem(s) raised above, plus the lack of opportunity for collective training in Canadian Combat Groups, then "a" solution lies in AVGP ... not the perfect solution but, then again, not an impossible one. It is easy to sit back and be idealistic and make the blindingly obvious statement that "AVGP isn't a tank so we can't do tank training". It is equally idealistic and somewhat narrow to suggest that "its got wheels, its an armoured car therefore its only use is in a divisional armoured car regiment".

8. On the "its not a tank" approach, AVGP certainly isn't. It does however, possess certain characteristics recognizable to armoured readers ... firepower, mobility, communications and armour protection. It also takes little imagination to visualize the size of the troop that the AVGPs might form, perhaps four. From there no one would suggest that battle drills for this troop should be radically different from four tanks. The troop would still have to move (using fire and movement), and might still approach blind corners, gaps, minefields and crests in a manner not unlike four tanks. Any differences would result from the degree of mobility and armour protection, thus requiring a better appreciation of ground and a better selection of cover. Accordingly then if each Canadian armoured regiment had a squadron (or two) of, say, three troops of four AVGPs each there would be no difficulty at all in meeting the collective training requirement of the "heavy armour" world and, in particular, all arms collective training.

9. With respect to the "force-in-being" approach, or "its only an armoured car" ... that view on the surface has merit but is simplistic. Just because the AVGP has wheels its employment should neither be restricted to nor oriented to internal security or UN roles. Similarly the fact that it has a bigger gun than Lynx does not make it the be-all-end-all CAST squadron vehicle. AVGP could well do IS duties, could well be used in a UN scenario and could well add firepower to CAST situations. To specifically train for any or only such roles, however, would be wasteful and not in the best interests of the Forces. A troop of four AVGPs that is collectively trained in "heavy armour" drills and formations could, in its stride, undertake any of the "narrow" roles suggested by some ... as armoured troops, crewmen, and the equipment of the time have done for years.

RECONNAISSANCE AND LIGHT ARMOUR?

10. The introduction of AVGP and the Corps orientation toward the tank will mean a decreased quantity of reconnaissance sub-units, however each armoured regiment will retain a squadron's worth (sound familiar?). Skills

can be maintained for many years almost without further formal training ... and then maintained à la pre 1964 days. Until the actual introduction of AVGP it makes little sense however to do anything with ferret and lynx except perfect those reconnaissance skills.

11. As for light armour ... it served a useful purpose for a period ... it provided Canadian based Combat Groups with a degree of firepower and an economy of force unit. DFSVs were not forthcoming during the period, assault troops cannot now be maintained due to tight manning situations (and lack of APCs) and infantry mortars have never been (and are not) available to armour commanders.

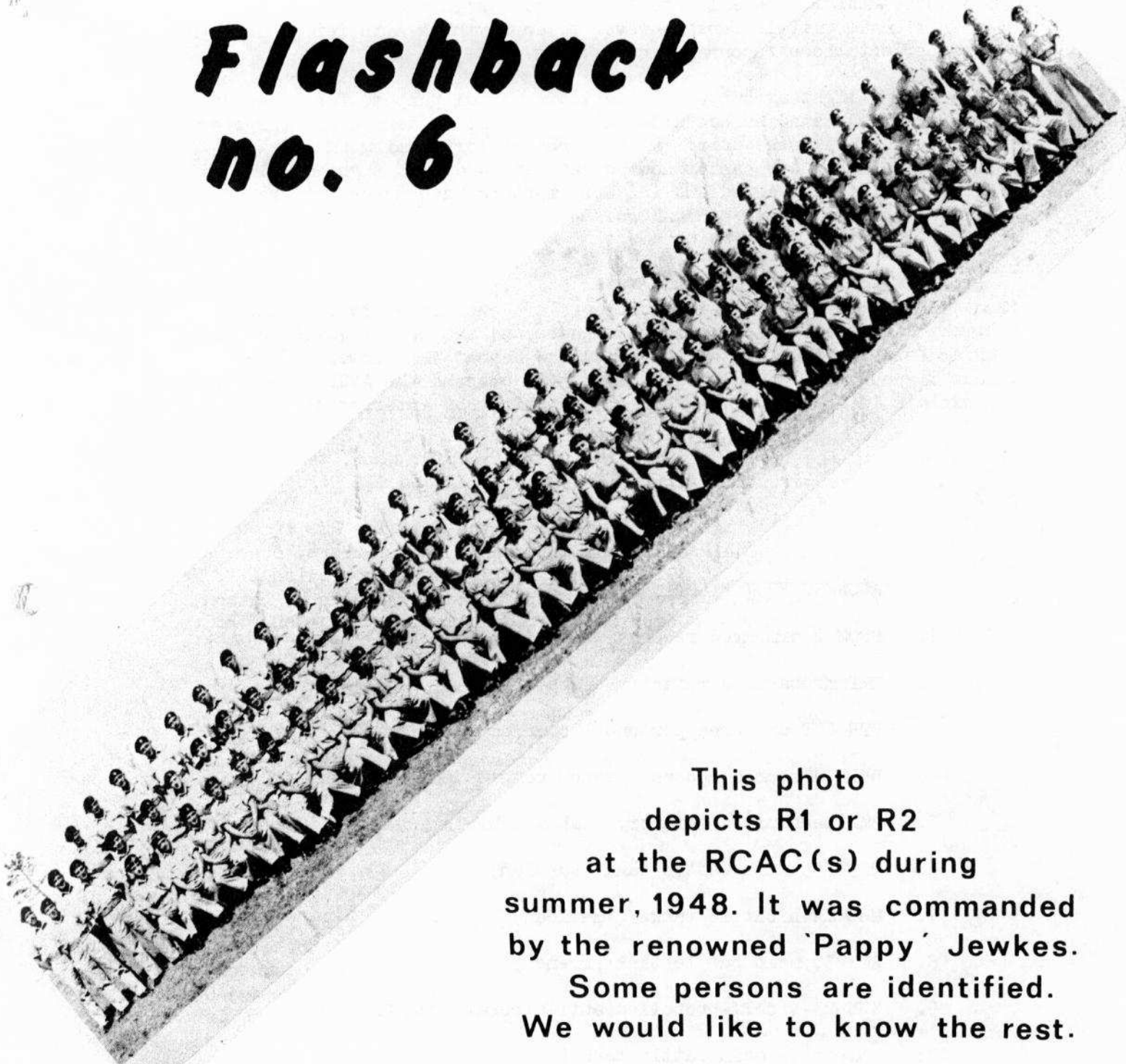
SUMMARY

12. In summary then armoured officers are encouraged to put aside emotional and idealistic arguments, understand the real requirement for AVGP and start orienting the Corps and the Combat Arms towards "heavy armour". Once you as an armoured reader understand the AVGP situation ... explain it to other professionals who might be interested!

ANSWERS FROM FIGHTING VEHICLE IDENTIFICATION TEST:

1. BROM-2 armoured reconnaissance combat vehicle (Russian)
2. BMP mechanised infantry combat vehicle (Russian)
3. BTR-60P armoured personnel carrier (Russian)
4. BRDM armoured reconnaissance combat vehicle (Russian)
5. BMP mechanised infantry combat vehicle (Russian)
6. T 54/55 main battle tank (Russian)
7. M60 main battle tanks (American)
8. AMX 30 main battle tank (French)
9. ZSU-23-4 self-propelled anti-aircraft gun (Russian)
10. Chieftain main battle tank (British)

Flashback no. 6



This photo depicts R1 or R2 at the RCAC(s) during summer, 1948. It was commanded by the renowned 'Pappy' Jewkes. Some persons are identified. We would like to know the rest.

RCACA (Cavalry)

Conference

held at

Gagetown

The 54th Annual RCAC (Cavalry) Association Conference, was hosted by the Combat Arms School, CFB Gagetown, over the period 29 Sep to 03 Oct 1976. Despite the travelling distances involved for some, the conference was well attended with all Militia Armoured Units and the Regular Units being represented by Commanding Officers or Deputy Commanding Officers. A new twist was added with the attendance of the Maritime RSS Armour Officers as observers. The grand total delegates, life members, observers and guest speakers stood at 80. On the VIP list was Association Life Member, still very spry and active despite his 86 years Maj-Gen H. Letson, Maj-Gen B.F. MacDonald, our Corps Colonel Commandant and Maj-Gen J.P.R. Larose, Director of Land Operations.

The main agenda items worked out by the President, LCol M.A. Stevenson, involved a day of guest speaker presentations, a day and a half of syndicate discussions, final resolutions approval and new executive elections for 1977 and the traditional wrap-up Mess Dinner. The total program was further fleshed out with an arrival cocktail reception hosted by the Commandant of CAS, a CAS Demonstration and a "Maritimes Night" hosted by the two Atlantic Militia Area Armour units, the PEIR and the 8CH from Moncton.

The first guest speaker was Maj-Gen W.H. Nutting, Director of Strategy, Plans and Policy for the US Army. He spoke on "The State of the Nations and the World" with the underlying theme of the threat and the contributions that he considered were essential if NATO is to counter this threat. BGen G.G. Bell, Member of the Advisory Council followed Maj-Gen Nutting and spoke on our defence posture and the problems our force is facing now and will face in the future. This presentation was followed by our Corps Director Col Fox who reviewed and updated the conference members on the State of Armour. Later the same day, LCol the Hon M.J.H. Allenby, a regular Army Officer commanding a territorial unit, the Royal Yeomanry, spoke on the territorial Army Volunteer Reserves or TAVR with particular emphasis on how the TAVR is trained and supported and the relationships between the territorials and the regular Army. That evening, LCol W.R.C. Little Assistant Secretary, gave a slide presentation on the Worthington Museum and the state of the museum vehicles in Worthington Park.

With presentation over, syndicates formed and discussion subject matter assigned, the work began that would lead to the final conference resolutions. Each syndicate had its share of regular armour officers who were expected to lend their expertise and assistance in the item deliberations.

During syndicate discussions time-out was taken for a visit to the field to observe the Centurion firing, see an example of an Armour/Infantry team in action and watch the TOW missile perform at maximum range. For many delegates these were firsts, for others it was a reinforcement of the importance of emphasizing the team concept if Armour is to survive on the battlefield and in the eyes of our political masters.

Maritime Night by theatrical standards was a "smashing success". The non-initiated were introduced to raw oysters and oyster shucking. The standard fare was fresh caught lobster. The entire program was sponsored by 8CH Moncton, and the PEIR who provided oysters, lobsters and the take home Maritime specialties packages.

The last day on the conference proved, as is traditional, quite hectic. The content of the final resolutions were hammered out and refined. These will be presented in the next issue of Armour. The following new executive for 1977 were elected:

President	- LCol N.B. Hall
Vice-President Eastern Region	- LCol J.B. Connolly
Vice-President Central Region	- LCol W.R. Newman
Vice-President Western Region	- LCol J.A. Hubbard
Secretary-Treasurer	- LCol J.V. Davies

The last activity was the Mess Dinner. Needless to say, it was the highlight of the conference, the final gathering. It was all the more auspicious because the band was a militia band, the PEIR Band. Their performance was first class even to the regimental marches, many of which they rehearsed for the first time one hour prior to the Dinner. The last act of the dinner saw coveted competition trophies change hands as the previous year's winners presented them to the new recipients. For those not familiar with the trophies, and what they represent, a review follows:

The National Trophy

The WORTHINGTON TROPHY - to be awarded to the Militia Armoured Unit attaining the highest overall standard of Corps proficiency/professionalism.

1975 Winner - PEIR

1976 Winner - PEIR

The Geographic Trophies

Eastern Region

BUCHANAN TROPHY - awarded to the Unit attaining the highest overall standard of Corps professionalism in Secteur de L'Est/Atlantic Area. Open for competition to the PEIR, 8CH (M), RCH, R de Hull, Sher R, 12e RBC (M).

1975 Winner - PEIR

1976 Winner - PEIR

ROSS TROPHY - awarded to the first runner-up in Atlantic and Eastern Regions.

1975 Winner - R de Hull

1976 Winner - R de Hull

Central Region

CUMBERLAND TROPHY - awarded to the Unit attaining the highest overall standard of Corps professionalism in Central Area. Open for competition to the GGHG, Ont R, QY Range, Elgin R, 1 H, Windsor R.

1975 Winner - Ont R

1976 Winner - QY Range

LEONARD TROPHY - awarded to the runner up Unit in Central Area.

1975 Winner - QY Range

1976 Winner - Ont R

Western Region

DUNWOODY TROPHY - awarded to the Unit attaining the highest overall standard of Corps professionalism in the Prairie and Pacific Areas. Open for competition to the BCR, BCD, SALH, KO Calg R, Sask D FGH.

1975 Winner - BCD

1976 Winner - BCD

MURPHY TROPHY - awarded to the runner-up Unit in the Prairie and Pacific Areas.

1975 Winner - FGH

1976 Winner - BCR & FGH

What did the conference accomplish? That can best be summed up by the President LCol Stevenson who said "I think the conference made the members of the Association fully aware of the potential Russian threat to western civilization and the stand to be taken by NATO with particular reference to the Canadian contribution and the role of the Militia in this".

$$C = K X^{-2}$$

$$Y = M X^3$$

The Mathematics of Tactical Doctrine

By LCol W.K. Megill

$$K = 5/M$$

Introduction. The author was inadvertently exposed to a paper on the curriculum of Military Colleges, and expressed the unsolicited opinion that a sound knowledge of mathematics is essential to an officer's education because it teaches the elements of logical analysis and proof. The following solved problem is designed to demonstrate the applicability of the above postulate. It is also designed to confound the sceptics who believe that such problems can be solved only by the "two-up, left-flanking, hot-meal-on-objective" approach. Incidentally the TULFHM00 approach can be used on this particular problem, and any non-confounded sceptic is invited to try it.

Given. "The shock effect of tanks in the attack varies as the square of the number in the attack" (Gen Bruce C. Clarke, US Army, quoted in Military Review, Jun 76, p. 27).

Required to Prove. That this is nothing more than a vivid expression of Standard Canadian Doctrine for the Army (SCD (Army)).

Construction. Remove the Light Armoured Regiment. This is the only way that SCD (Army) can be expected to survive.

Proof. Let shock effect = y , and number of tanks = x
Then the postulate becomes $y = mx^2$ (Equation 1)
where m is the coefficient of shock.

Theorem. Casualties will be least when the shock effect is greatest. Thus there is an inverse relationship.

$$\text{Cas } x y^{-1}$$

$$c = kx^{-2}$$

There are four types of tank casualties, namely x , y , z , and BR.

$$\text{Thus } 4 = kx^{-2} \quad \text{(Equation 2)}$$

where k represents a bad spell of casualties, which usually begins with a c.

$$4x^2 = k$$

$$x^2 = \frac{k}{4} = \frac{y}{m} \quad \text{(From Equation 1)}$$

$$mk = 4y \quad \text{(Equation 3)}$$

Corollary. In a recent one-sided discussion with the author, Comdt CAS stated that he had an armoured doctrine already printed - CAMT 3-1. This means that modern tank warfare is closely approximated by the Centurion Mk V, and we may estimate with fair accuracy in equation 3:

$$mk = 5 = 4y$$

$$k = \frac{5}{m} \quad (\text{Equation 4})$$

Calculation of m. To calculate the value of m in modern battle conditions, consider the six day war. From one point of view they got rid of all of 'em in 6 days. From the other point of view this was a 9 days' wonder. In the 20th century context we must give equal weight to both opinions, so that:

$$\text{all of } m = 6 + 9$$

$$m = 15$$

Now m is the coefficient of shock, and we must consider whether or not it is a universal constant. The Shock Theorem, presented here without proof, states "You can shock some of the people all of the time, and all of the people some of the time...", which implies that m is not constant with respect to people or to time. Therefore, we must modify the value $m = 15$ by a factor we shall call the "RCAC Factor" to obtain a value for m applicable to our people and our time.

The RCAC Factor. It has been said that at no time in our history have our people been so divided. Therefore, in order to maintain consistency, the RCAC factor must be applied as a divisive rather than as a multiplicative factor. Thus:

$$m (\text{Canada}) = \frac{m (\text{Middle East})}{\text{RCAC}} \quad (\text{Equation 5})$$

There are only four elements to be used in determining the RCAC factor. We have excluded the Colonel Commandant, the Militia and The School. This is a shocking thing to do, and will therefore have the effect of minimizing m by maximizing the RCAC factor. This is entirely consistent with the Canadian dictum that nothing is more shocking than applying lessons learned outside the country to our own institutions.

Therefore we consider the four elements:

Functionally: $(\text{RCAC}) = (\text{Canada}) (\text{Europe})$

Geographically: $(\text{RCAC}) = (\text{East and West}) (\text{Europe})$

Arithmetically: This becomes:

East = (12-8) This difference is settled annually by a hockey game of which the above score is typical.

West = 2nd Armd Regt

Europe = 1 The proof of this is left to the reader.

$$\begin{aligned}(\text{RCAC}) &= ((12-8) + 2) \quad (1) \\ &= 6\end{aligned}$$

Therefore we may calculate

$$m = \frac{15}{6} = 2.5 \quad (\text{From Equation 5})$$

$$k = \frac{5}{m} = 2 \quad (\text{From Equation 4})$$

Therefore equation 2 becomes

$$4 = 2x^{-2}$$

$$\text{or } 2 = x^{-2}$$

$$m(2) = m (x^{-2}) \quad (\text{Equation 6})$$

The multiplication used to obtain equation 6 requires that $m = 0$, and should thus be valid until the year 2001 when the Leopard will need to be replaced.

Conclusion. We have seen the derivation of Equation 6 from Equation 1. Our intention was to show how mathematics can aid in the formulation and interpretation of doctrine. What we have proven beyond doubt in this paper is the influence of Canadian armoured doctrine on the US forces and particularly on Gen Clarke. Noting the positive left-hand and negative right-hand coefficients in Equation 6, and resisting the temptation to draw spurious conclusions about FMC HQ, we see that this equation is merely the mathematical expression of a doctrine which instructors at The School have taught so often they have come to believe it themselves:

USE EM BY TWOS YOU LOSE EM BY TWOS

BLACK HATS IN GAGETOWN

<u>SIN</u>	<u>RANK</u>	<u>NAME AND INIT</u>	<u>REGT</u>	<u>EMPLOYED</u>
431 400 092	COL	NICHOLSON DA	FGH	COMDT CAS
429 576 358	LCOL	O'CONNOR GJ	RCD	OC ARMOUR DEPT
614 050 045	MAJ	CALDWELL RH	RCD	OC TRG SP GP
612 140 913	MAJ	CATHCART CW	LDSH (RC)	SO2 PERS ADM
106 543 374	MAJ	LATHAM ECH	RCD	TACTICS DEPT
405 373 986	MAJ	MCGUIRE MT	12RBC	SO2 OPS
430 285 049	MAJ	MULLIGAN KH	LDSH (RC)	OC TACTICS SQN
431 330 950	MAJ	PORTER WH	12RBC	SO2 COORD
429 575 038	MAJ	SEELEY KRT	RCD	2IC ARMOUR DEPT
445 988	MAJ	TIMMIS MF	(RAC) 17/ 21st LANCERS	TACTICS DEPT
431 057 892	CAPT	ANDREWS WS	RCD	ARMED STDS
224 978 916	CAPT	AUBRY RJA	12RBC	TACTICS SQN
104 793 989	CAPT	EDDY KT	12RBC	SO3 COORD
438 049 819	CAPT	EWING SJ	LDSH (RC)	SO3 TRG AIDS
224 391 235	CAPT	FOURNIER JR	RCD	SO3 ARMED PUBS
436 981 823	CAPT	FULTON WJ	RCD	SO3 PERS SVCS
106 714 934	CAPT	HAMILTON AK	RCD	OC D&M SQN
707 458 006	CAPT	HOOK BE	RCD	2IC TACTICS SQN
433 867 363	CAPT	HOOK RE	RCD	OC GNRY SQN
106 382 682	CAPT	KRYZANOWSKI MA	LDSH (RC)	SO3 SCHED
433 859 907	CAPT	MADILL DS	12RBC	S&E ARMED STDS
432 266 849	CAPT	MARSH HJ	12RBC	S&E ARMED STDS
429 576 283	CAPT	MAYNE TG	LDSH (RC)	TACTICS DEPT
426 428 579	CAPT	MCKENZIE JR	RCD	FMC WT
431 947 142	CAPT	MOYER JK	12RBC	TACTICS SQN
431 059 120	CAPT	NICKLES NA	12RBC	OC COMMS SQN
1430955132008	CAPT	PETIOT AML	FR ARMY	TACTICS SQN
435 160 395	CAPT	RICHARD JRB	LDSH (RC)	TACTICS SQN
431 059 864	CAPT	ROBERTSON AR	LDSH (RC)	SO3 ARMED STDS
431 059 443	CAPT	THORNTON KL	RCD	OC ARMED SQN
224 520 726	CAPT	TRUDEL JAA	8CH	AO ARMOUR DEPT
437 220 643	LT	JACKSON BG	8CH	GNRY SQN
430 284 752	LT	JOHNSTON MA	RCD	TACTICS SQN
616 964 771	LT	KNIGHT RD	LDSH (RC)	TRG SP GP
437 788 540	LT	MCNORGAN MR	8CH	TRG SP GP
709 398 689	LT	OVERTON CC	LDSH (RC)	TRG SP GP
442 049 896	LT	SPEAKE NEE	LDSH (RC)	TACTICS SQN
613 356 104	LT	WILLIAMSON EB	LDSH (RC)	FD MOB GP, TN O
608 587 457	CWO	PROUSE WL	RCD	DCWO/RSM ARMOUR DEPT
429 580 376	CWO	YEOMANS CW	RCD	BASE RSM
612 191 924	MWO	ALLARD EA	12RBC	SSM GNRY SQN
106 406 507	MWO	MACADAMS AL	RCD	GSM/FD MOB GP
613 354 828	MWO	MACDOUGAL TT	LDSH (RC)	SSM ARMED STDS
106 543 366	MWO	MURRIN DF	RCD	SSM ARMED SQN
431 238 781	WO	BROWN IM	8CH	TACTICS SQN
106 406 366	WO	CONRAD RE	RCD	CAS COORD
431 239 136	WO	DELEAVEY DA	LDSH (RC)	GNRY SQN
431 239 219	WO	DOYLE JJ	12RBC	TACTICS SQN
429 372 055	WO	FOUGERE JA	12RBC	GNRY SQN
105 172 076	WO	GRANT IM	RCD	TACTICS SQN
431 153 485	WO	HALEY AV	LDSH (RC)	TRG SP GP
431 545 102	WO	HUTCHINSON HW	RCD	GNRY SQN

106	405	905	WO	KOELBL	LJ	RCD	TACTICS SQN
431	156	637	WO	LYNK	RJ	LDSH (RC)	GNNRY SQN
431	239	847	WO	LYONS	TJ	8CH	D&M SQN
431	270	347	WO	MARTIN	GE	LDSH (RC)	SSM D&M SQN
431	155	480	WO	MCGREGOR	JS	8CH	MARCOM CADETS
431	240	233	WO	MUNRO	JG	12RBC	GNNRY SQN
106	543	176	WO	MUNROE	BS	8CH	GNNRY SQN
431	548	940	WO	OAKLEY	CW	8CH	CAS COORD
431	240	498	WO	RUTLEDGE	TS	LDSH (RC)	GNNRY SQN
429	371	784	WO	SANTER	RH	LDSH (RC)	FD MOB GP
422	112	094	WO	TURNER	AR	LDSH (RC)	GNNRY SQN
431	155	001	WO	URBANOWSKY	TE	RCD	SSM COMMS SQN
431	549	179	WO	WILMOT	WP	8CH	TACTICS SQN
436	591	911	A/SGT	BARR	AD	8CH	TRG SP GP
429	371	693	SGT	BARR	GC	8CH	COMMS SQN
431	547	017	SGT	BATTLE	WA	8CH	TACTICS DEPT
104	816	806	SGT	BLACKBURN	TE	8CH	GNNRY SQN
429	371	933	A/SGT	BOUTILIER	RR	RCD	FD MOB GP
430	295	824	SGT	BROWN	CE	RCD	ARMOUR TRG COORD
429	365	273	SGT	BROWNRIDGE	RB	RCD	GNNRY SQN
431	548	346	SGT	BURGESS	LT	RCD	COMMS SQN
106	406	069	A/SGT	CANN	GW	8CH	TRG SP GP
431	152	677	A/SGT	CHISHOIM	RM	8CH	FD MOB GP
610	567	653	SGT	CURRIE	AB	8CH	TRG SP GP
422	112	110	SGT	CUSTUS	CB	LDSH (RC)	TRG SP GP
613	353	804	SGT	CUTHILL	TJ	12 RBC	D&M SQN
429	371	727	SGT	DELANEY	KJ	LDSH (RC)	D&M SQN
429	577	687	SGT	DOLOMOUNT	JR	LDSH (RC)	TRG SP GP
431	239	359	SGT	FOSTON	RL	8CH	TACTICS SQN
429	371	867	SGT	HAYES	AA	RCD	COMMS SQN
429	372	147	SGT	HOURIHAN	RJ	RCD	TACTICS SQN
431	270	099	SGT	JODOIN	R	12RBC	D&M SQN
613	354	463	SGT	JOHNSON	BV	8CH	TACTICS SQN
209	767	730	SGT	LEDUC	JH	12RBC	TACTICS SQN
213	222	391	A/SGT	LOCKYER	SB	RCD	GNNRY SQN
426	775	888	SGT	MALONEY	MJ	8CH	GNNRY SQN
106	752	017	SGT	MCNEIL	JS	RCD	TACTICS SQN
708	307	038	A/SGT	MCPHERSON	RN	RCD	TRG SP GP
431	240	191	SGT	MORRIS	MS	LDSH (RC)	D&M SQN
431	269	877	SGT	PARDY	FR	8CH	TACTICS SQN
104	932	777	SGT	PERRY	GA	8CH	TRG SP GP
610	566	556	SGT	PINSENT	S	8CH	TRG SP GP
431	154	433	SGT	REGULAR	CV	LDSH (RC)	TACTICS SQN
431	240	480	SGT	RUSSELL	GM	LDSH (RC)	D&M SQN
431	155	373	SGT	SALMON	GR	LDSH (RC)	COMMS SQN
431	151	944	SGT	VANCE	RF	RCD	TRG SP GP
434	162	517	SGT	VERGE	AD	LDSH (RC)	TACTICS SQN
431	155	191	SGT	WELCH	EK	8CH	TRG SP GP
613	356	179	SGT	ZWICKER	CD	LDSH (RC)	GNNRY SQN

107	559	817	MCPL	BEST	LJ	8CH	TRG SP GP
615	944	949	MCPL	BLUETCHEN	LT	RCD	TRG SP GP
106	406	697	MCPL	BRIGGS	EG	8CH	COMMS SQN
106	715	329	MCPL	CORREY	MJ	8CH	TRG SP GP
107	418	279	MCPL	DOIRON	RP	RCD	TRG SP GP
427	123	393	MCPL	DRAPER	CF	RCD	FD MOB GP
221	034	168	MCPL	FLUET	JJ	RCD	GNRY SQN
106	922	156	MCPL	GARNIER	EJ	RCD	CAS COORD
613	354	208	MCPL	GRANDY	L	RCD	FD MOB GP
106	715	022	MCPL	GURNEY	JM	8CH	FD MOB GP
613	354	307	MCPL	HARPER	PI	LDSH (RC)	D&M SQN
106	715	055	MCPL	JUSTASON	BD	RCD	TRG SP GP
708	002	043	MCPL	KUBE	FM	RCD	BASE ACCN SEC
610	130	197	MCPL	MCLEISH	KA	RCD	GNRY SQN
431	550	110	MCPL	MICHAUD	YR	12RBC	FD MOB GP
105	541	908	MCPL	MILLARD	JD	8CH	GNRY SQN
431	154	178	MCPL	MOORE	WA	8CH	TRG SP GP
104	995	824	MCPL	MORTON	BH	RCD	GNRY SQN
106	543	341	MCPL	MURPHY	LL	RCD	FD SP GP
106	406	457	MCPL	REEVES	PJ	RCD	BASE LIBRARY
431	154	806	MCPL	STRAIGHT	CA	8CH	TRG SP GP
431	155	118	MCPL	WALSH	MT	8CH	CAS COORD
207	302	670	CPL	ARVISAIS	JB	12RBC	FD MOB GP
108	333	626	CPL	BASTARACHE	LJ	RCD	TRG SP GP
230	801	532	CPL	BEAUDRY	JE	12 RBC	TRG SP GP
230	041	246	CPL	BERGERON	JRC	12 RBC	TRG SP GP
106	406	663	CPL	BERNARD	FC	8CH	GNRY SQN
106	405	897	CPL	CAMPBELL	HA	RCD	BASE ACCN SEC
431	238	880	CPL	CASEY	RC	RCD	FD MOB GP
229	662	135	CPL	CHAYER	HMA	12 RBC	FD MOB GP
421	638	925	CPL	COOPER	JL	8CH	FD MOB GP
613	353	788	CPL	CRAYNE	LW	LDSH (RC)	TRG SP GP
106	003	999	CPL	DAMERY	CW	8CH	FD MOB GP
431	152	917	CPL	DECOSTE	JA	8CH	TRG SP GP
106	542	913	CPL	DOUCETTE	HJ	8CH	TRG SP GP
429	372	006	CPL	DOW	RC	8CH	D&M SQN
422	302	307	CPL	EGGLETON	CB	8CH	GNRY SQN
431	153	097	CPL	ESTABROOKS	OG	8CH	TRG SP GP
431	153	162	CPL	FITZPATRICK	GB	RCD .	ARMOUR DEPT HQ
421	415	951	CPL	FORBES	LJ	RCD	CAS COORD
106	406	440	CPL	GALLANT	AA	RCD	GNRY SQN
234	553	964	CPL	GAMACHE	JP	12RBC	TRG SP GP
107	132	201	CPL	GARSIDE	AE	8CH	TRG SP GP
108	635	913	CPL	GAUDON	WL	LDSH (RC)	TRG SP GP
431	269	687	CPL	GLAUDE	JHR	8CH	TRG SP GP
440	572	535	CPL	HARTSHORN	DG	8CH	TRG SP GP
104	920	608	CPL	HAZLETT	WD	8CH	GNRY SQN
429	372	188	CPL	JOHNSTON	EG	RCD	FD MOB GP
103	798	773	CPL	JONES	CJ	8CH	TRG SP GP
229	664	842	CPL	LABELLE	JL	RCD	FD MOB GP
100	534	627	CPL	LAMBE	MT	RCD	GNRY SQN
613	354	612	CPL	LAUZON	WJ	LDSH (RC)	TRG SP GP

431	067	545	CPL	LEBEL	JYJ	12 RBC	FD MOB GP
431	153	998	CPL	LEMIRE	RF	LDSH (RC)	FD MOB GP
107	114	845	CPL	LEVASSEUR	GR	8CH	TRG SP GP
434	221	669	CPL	MARCHIONI	RD	RCD	TRG SP GP
234	810	390	CPL	MARCIL	JCJ	12 RBC	TRG SP GP
613	354	984	CPL	MARTIN	BF	8CH	TRG SP GP
106	542	863	CPL	MELANSON	EA	8CH	TRG SP GP
107	606	402	CPL	NICKERSON	BA	8CH	FD MOB GP
233	179	050	CPL	O'GRADY	JDS	12 RBC	TRG SP GP
435	164	462	CPL	PARSLEY	DB	LDSH (RC)	FD MOB GP
224	411	355	CPL	PEPIN	JE	12 RBC	FD MOB GP
431	310	432	CPL	PERRY	RK	8CH	TRG SP GP
100	211	028	CPL	RICHARDSON	LD	8CH	FD MOB GP
429	217	441	CPL	RICKARD	JE	8CH	TRG SP GP
234	503	845	CPL	ROUILLARD	JM	12 RBC	FD MOB GP
107	040	545	CPL	ROWSELL	VC	RCD	TRG SP GP
431	269	968	CPL	RUSSELL	JD	8CH	CAS COORD
615	178	456	CPL	SEDOUR	WJ	8CH	FD MOB GP
100	444	272	CPL	STEWART	BG	RCD	FD MOB GP
442	434	767	CPL	ST PIERRE	JO	12 RBC	TRG SP GP
104	893	425	CPL	TAYLOR	JS	8CH	CAS COORD
712	754	803	CPL	TURNER	MH	LDSH (RC)	FD MOB GP
600	145	296	CPL	VALLEY	FT	RCD	TRG SP GP
100	761	592	CPL	VOTOUR	DC	RCD	TRG SP GP
106	752	082	CPL	ZINCK	LG	RCD	CAS COORD
227	524	386	PTE	BARRY	JD		TRG SP GP
247	798	556	PTE	BODDEN	RE		TRG SP GP
241	297	571	PTE	BOUCHARD	JC	12 RBC	FD MOB GP
113	473	763	PTE	BOWIE	DJP		TRG SP GP
113	803	555	PTE	COAKLEY	KC	8CH	TRG SP GP
112	509	294	PTE	CORMIER	JPGD		TRG SP GP
112	592	787	PTE	CORMIER	NM		TRG SP GP
623	729	449	PTE	DALLAIRE	RG	LDSH (RC)	TRG SP GP
111	373	098	PTE	DUNN	MG	LDSH (RC)	FD MOB GP
112	358	247	PTE	EDWARDS	CG		TRG SP GP
113	497	333	PTE	FISHER	LJ	LDSH (RC)	TRG SP GP
235	793	346	PTE	FOURNIER	D	12 RBC	TRG SP GP
229	547	286	PTE	GIGUERE	JAS	12 RBC	FD MOB GP
113	113	187	PTE	GORMAN	PD		TRG SP GP
113	007	785	PTE	GREEN	AJ	8CH	TRG SP GP
438	912	578	PTE	GUERIN	ED	8CH	TRG SP GP
457	961	662	PTE	HELE	SL	LDSH (RC)	TRG SP GP
110	555	059	PTE	HEWITT	CR		TRG SP GP
107	888	687	PTE	HOPE	DA		TRG SP GP
459	166	401	PTE	JUNKIN	BC		TRG SP GP
240	852	384	PTE	LABRECQUE	JLG	12 RBC	TRG SP GP
110	940	772	PTE	LINEHAN	CJ	LDSH (RC)	TRG SP GP
621	913	201	PTE	LYONS	JS	LDSH (RC)	FD MOB GP
109	864	033	PTE	MACLEAN	RJ	8CH	TRG SP GP
716	203	724	PTE	MAPPIN	VL		TRG SP GP

113 170 716	PTE	MCGINIS	DJ		TRG SP GP
239 402 613	PTE	MERCIER	JR	12 RBC	FD MOB GP
623 649 191	PTE	MITCHELL	WM		TRG SP GP
452 912 215	PTE	MORTON	RW	LDSH (RC)	TRG SP GP
459 213 740	PTE	PARISEE	PJ		TRG SP GP
113 824 783	PTE	POWER	GH	LDSH (RC)	TRG SP GP
111 757 274	PTE	POWER	PA	LDSH (RC)	TRG SP GP
709 147 243	PTE	RANDALL	TC		TRG SP GP
616 045 423	PTE	REIMER	DW	8CH	TRG SP GP
113 596 647	PTE	SHAW	JG	8CH	TRG SP GP
110 357 472	PTE	SHEFFAR	VK	8CH	FD MOB GP
230 079 477	PTE	TARDIF	JR	12 RBC	TRG SP GP
453 092 033	PTE	THERIAULT	LW	8CH	FD MOB GP
113 716 161	PTE	THOMAS	JE		TRG SP GP
114 186 414	PTE	WEDGE	JG	8CH	TRG SP GP
111 211 132	PTE	YOUNG	BM	8CH	TRG SP GP

Distribution

Colonels/Comdt

Armoured Branch	- 1
Artillery Branch	- 1
CELE Branch	- 1
Military Engineering Br	- 1
Infantry Branch	- 1
Canadian Forces Dental Svcs	- 1
Canadian Cadet Services	- 1

Cols of Regts

LdSH(RC)	- 1
RCD	- 1
8CH	- 1
12e RBC	- 1

Association Presidents

Armoured Branch	- 1
-----------------	-----

NDHQ

CDS	- 1
CLDO	- 1
DLP	- 10
DLR	- 1

NDHQ (Cont'd)

DPCO Armd	- 1
DPCOR Armd	- 1
DRS	- 26
DCdts	- 1
DGLO	- 1
DLO	- 1
DIS	- 5
ULO'S	- 15
DGPCO	- 1
DPC Col	- 1
DPCO	- 1
DGPCOR	- 1
DPCOR (OT)	- 1
D HIST	- 2

FMC HQ

Comd	- 1
DComd	- 1
COS Ops	- 10
COS Adm	- 8

Colleges/Centres

CABC	- 3
CTC	- 20

Colleges/Centres (Cont'd)

CFC	- 10
CFSS	- 2
CLFSC	- 10
NDC	- 5
CMR	- 10
RMC	- 10
RRMC	- 10

Groups

HQ 4 CMBG	- 5
HQ 1 Cbt Gp	- 5
HQ 2 Cbt Gp	- 5
5e G de C	- 5
10 TAG	- 3

LOs

CDLS London	- 5
CDLS Washington	- 5

Regiments

CAR	- 1
3 Mech Cdo	- 1
8CH	- 20
LdSH(RC)	- 20
12e RBC	- 20
RCD	- 20
1 RCHA	- 1
2 RCHA	- 1
3 RCHA	- 1
5eRALC	- 1
1 PPCLI	- 1
2 PPCLI	- 1
3 PPCLI	- 1
1 RCR	- 1
2 RCR	- 1
3 RCR	- 1
1 R22eR	- 1
2 R22eR	- 1
3 R22eR	- 1

Schools

CFOCS	- 10
CFRS	- 5
CFWOS	- 5
CAS	- 30
DET EAC 1	- 5

Hel Sqns

403 (Hel) OTS	- 3
408 Sqn	- 3
422 Sqn	- 3
427 Sqn	- 3
430 ETAH	- 3
438 ETAC	- 3
444 Sqn	- 3
450 Sqn	- 2
450 Sqn Det	- 2

RSS

RSS Atlantic	- 2
RSS Toronto	- 2
RSS Montreal	- 2
RSS Esquimalt	- 2
RSS Winnipeg	- 2

UN

CANCONCYP NICOSIA	- 5
CANMILCON ISMALIA	- 5

SP Estb

CANSUPPORT SECKENHEIM	- 2
-----------------------	-----

TCHQ

Comd	- 5
------	-----

Militia

Milarea Halifax	- 5
Milarea Toronto	- 5
Milarea Montreal	- 5
Milarea Esquimalt	- 5
Milarea Winnipeg	- 5
Mil Dist Sydney	- 2
Mildistone Montreal	- 2
Mildistwo Montreal	- 2
Mildist Quebec	- 2
Mildist Moncton	- 2
Mildist Edmonton	- 2
Mildist Hamilton	- 2
Mildist London	- 2
Mildist St Johns Nfld	- 2
Mildist Ottawa	- 2
Mildist Charlottetown	- 2
Mildist Regina	- 2

Militia (Cont'd)

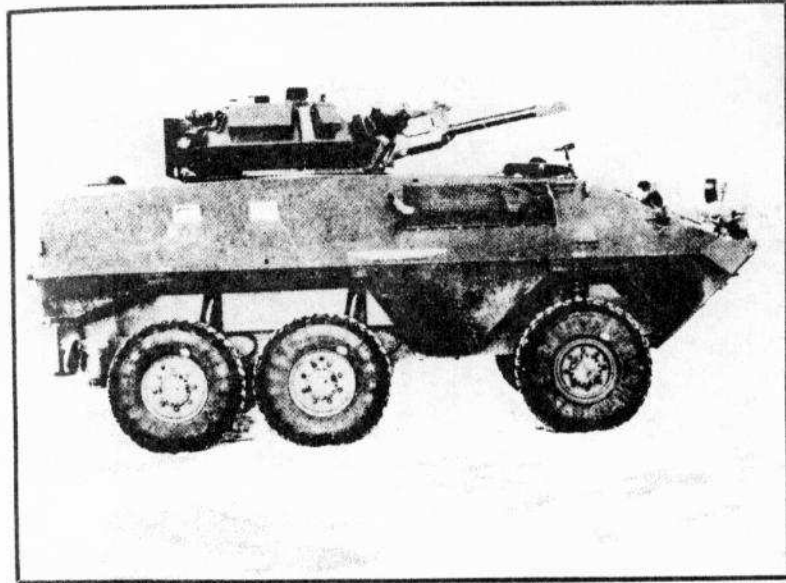
Mildist Calgary	- 2
Mildist Toronto	- 2
Mildist Vancouver	- 2
Mildist Victoria	- 2
Mildist Saint John	- 2
Mildist Halifax	- 2
Mildist Windsor	- 2
Mildist Winnipeg	- 2

Militia Units

BCD Kelowna	- 5
BCR Vancouver	- 5
8CH Sussex	- 5
Elgin R St Thomas	- 5
FGH Winnipeg	- 5
GGHG Downsview	- 5
1 H London	- 5
KO Calg R Calgary	- 5
R de Hull Hull	- 5
Ont R Oshawa	- 5
12e RBC (M)	- 5
PEIR Charlottetown	- 5
QY Rang Toronto	- 5
RCH Montreal	- 5
Sask D Moose Jaw	- 5
Sher H Sherbrooke	- 5
SALH Medicine Hat	- 5
Windsor R Windsor	- 5

Miscellaneous

CFLO Forth Benning	- 2
CFLO Fort Knox	- 2
CFLO Fort Bliss	- 2
CFLO Quantico	- 2
CFLO Warminster	- 2
CFLO Larkhill	- 2
CFLO Bovington	- 2
Editor Canadian Defence Review	- 1
Directeur des Troupes blindées Belgium	- 2



AUGP

