# ARMOUR BULLETIN DES BLINDES


VOLUME 17 1984

## EDITOR'S COMMENTS

It would be a mistake not to write a few lines and acknowledge the widespread support this edition of the Armour Bulletin has received. Since I have had the opportunity to work with the Bulletin, I can think of no other time when such a variety of articles were submitted for print. Volume 17 is clear proof that the Colonel Commandant and Director's requests for support have not gone unheeded.

I would now like to thank publicly those individuals who have provided assistance and support in producing the last few issues of the Bulletin. Firstly, the Commandant who, as Editor in Chief, has ensured that the Bulletin developed into the professional journal of the Corps. Secondly, the Director of Armour's office in Ottawa (Maj Logan in particular) who always seem to come through with timely articles (was it by arm twisting?). Lastly, those here at the School who have helped (Mrs Frances Smith, Capt Paul Ward) develop the final product for printing. Without them, my job would have been much more difficult.

Now, it is time to turn the Bulletin over to a new editor, Captain Peter Haindl. I would encourage all members of the Corps to give him the support that you have me. In that way, the Bulletin will continue to be the Corps' professional journal.

J.A. Stuckart
Captain
Editor

## COLONEL COMMANDANT'S FOREWORD

The past three years as Colonel Commandant have been interesting, informative and busy and I believe I got to know the members of our twenty-two Regiments better than I have ever known them before. The spirit of the Corps membership has been outstanding and the comradeship is second to none. My wife, Pat and I have been treated as members of a great family wherever we have travelled, visiting the Regiments, and one seems to be more on the receiving end rather than the giving side. I have great faith in what you are trying to accomplish in the Corps and in the Army - the term Land Force seems to be disappearing! Too much still has to be done, however there seems to be a glimmer of hope and a return to common sense. I believe the "armoured star" is on the rise, not on the wane!

Based on this belief and your support and understanding, I have agreed to serve in the Commandant's appointment for another three years. I will do my best to keep the Corps in its rightful place in the Army and also in cooperation and support with our brothers in the Combat Arms - the Infantry and the Artillery. It seems impossible to speak intelligently on the Military requirement for the main battle tank and reconnaissance capabilities, unless we include our comrades in arms, the Infantry and Gunners, into our tactical

thinking, since each is dependent on the others for mutual success. History has shown that this has been the "Raison d'être", and the strength of the Combat Arms. Like a pack of wolves we may have strong and different views on many subjects, including those relating to doctrine and tactics; however, when the crunch comes, it is our belief, loyalty, trust and cooperation which we have, one with the other, that goes a long way to winning battles. I'm sure that any soldier who has had battle experience will agree that, when everything else is weighed and rationalized, our cooperation and mutual success stems from this tribalism which is so evident within our regimental system. Having said that, I urge you in the coming year, to consider and encourage joint presentations, field exercises, tactical discussions and combined arms training with our combat arms partners. Our profession starts and stops with one aim, "Knowing How to Fight". First we learn as an individual and the next step is knowing how to fight as a battle team. Without this knowledge, practice and training, we will remain limited in our effectiveness and useless on the battlefield. What I am asking you to consider, is to promote and establish a Corps common doctrine on operational and tactical procedures. The common doctrine then establishes Tactical SOPs which become guides for commanders at all levels in the field or, as I like to call them, "Tricks of the Trade".

At the Association Mess Dinner in Petawawa last September, I presented the Worthington Trophy for the Best Militia Regiment to LCol Ron LeBlanc and his 8th Hussars for the second consecutive year and they deserve the Corps congratulations. The Strathcona's were the winners of the Ram's Head Trophy for being the best Regiment in Annual Gunnery Competition. The standard of gunnery has improved considerably with these annual competitions. It was good news to see a team entered from our militia regiments, representing the Sherbrooke Hussars, the Royal Canadian Hussars and 12e Regiment Blindé du Canada. This is a great start for the Militia to compete for both the Worthington and Ram's Head Trophies and I can only urge the others to take up the challenge, regardless of the obstacles in front of you.

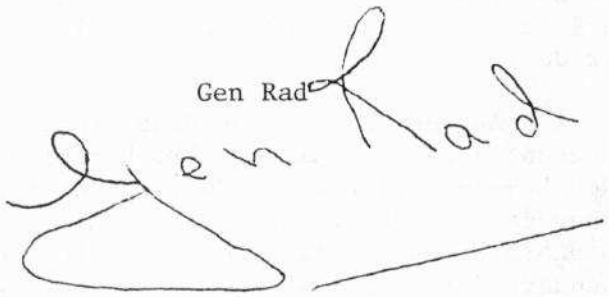
During 1983, two of our Regiments, The Royal Canadian Dragoons and the British Columbia Regiment celebrated one hundred years of service in war and peace. Each regiment had a schedule of events to commemorate the past and look to the future. Our congratulations go out to both Regiments as they enter this second century. The Guild of the Royal Canadian Dragoons has produced a book, "DRAGOON", which is "A Centennial History of the Regiment 1883-1983", written by Brereton Greenhous. It is a comprehensive and interesting story which reads easily from year to year through the Regiments first century. It is well illustrated with camps and photographs giving the reader a pictorial review of the Regiment's first hundred years in peace and war. For

those who enjoy history, who are regimentally inclined, who like soldiers and soldiering, I recommend "DRAGOON" as it covers fully the day to day events which take place in a Regiment's life. I look forward to continuing my visits to the Regiments in the coming year, and will end this foreword by repeating a verse written by J. Mason Knox many years ago -

It is not the guns or armament
Or the money they can pay.
It's the close cooperation
That makes them win the day.
It is not the individual
Or the Army as a whole,
But the everlasting teamwork
Of every bloomin soul.

Keep your head down!

Gen Rad



## DIRECTOR OF ARMOUR'S FOREWORD

In July 1983, when I took over as the Director of Armour from Col Clive Milner, I was very grateful for the opportunity to serve the Corps in this capacity. Col Clive has guided the Corps with a steady hand, a ready smile and a strong resolve to lead it to the best of his ability. He has done a good job. I know that I speak for all of us in congratulating him on being awarded the OMM. Good shooting Clive Old Buddy.

This being my first trip into the "Big HQ", I am amazed at the volume of traffic into my office. The Corps is very active in many areas. The RCD participated as part of the CENTAG team which won the CAT 83 Competition. The Strathcona's won the Cougar Gunnery Competition. The 12 RBC Cyprus tour was successfully completed. The 8CH(M) won the Worthington Trophy and the 8CH very efficiently hosted the RCAC Association Conference in September.

I visited the Militia Concentrations at Valcartier, Petawawa and Borden. My staff visited the other concentrations. I was

impressed with what I saw and the troopers I spoke to on training. You are moving into an interesting area of field training. I recommend that everyone who has a hand in preparing and conducting training, take ample time to study in detail "how to fight". I will say more on this subject later.

I was most impressed with the aggressive attitude at the Militia CO's Conference in Sep. Your concerns are my concerns. Together we tasked the staff to seek out solutions and I expect results. I look forward to a full day for our conference in 84.

There are many problems on my desk but I have an efficient staff dedicated to Armour business. They are a small staff on paper but when you look at different organizations under a microscope you find Armour Corps soldiers. Everyone is asked to help when needed and that it is often - "Yes Jack, that is really why you were posted to that strange job". I have made these statements to put your minds at rest that we are organized and ready for staff problems and also to lead into the main subject of my foreword.

My message is not exactly a call back to basics but it is a suggestion that all of us need to openly discuss, study, challenge and write about Armour Warfare. We must be confident about "how to fight and win". This requires a constant diet of the subject. To be a combat effective and operationally ready Corps we must know how to fight as part of an all arms team. I urge you to put aside the weighty problems of mobilization, PML's, manpower shortages, money for new tanks, new mess dress, blues, puttees, MITCP, brown suits, the training system, bilingualism, ORCDP, OCDP, Merit Boards, etc and prepare yourself to fight as an Armour Corps soldier.

I'm talking about sand tables, cloth models, TEWTs, CPX, War Games, etc. All of these things cost little except time. We need to talk and write about tank and recce warfare, i.e. tanks in the attack; on the objective; moving to and from fire positions in defence; counter attacks, fire control; resupply; communications, regrouping; recce tactics to gain information; etc. These are just a few of the subjects which need to be second nature to everyone of us - Regular and Militia.

Use the Bulletin to air your views and help others with your training ideas on these subjects. Tell us about technological improvements which will give us the fighting advantage we need to win.

As I write my first foreword I have been taken off the firing line by Starlight for a few months. I look forward to joining you in tactical discussions in the near future.

R.S. Billings
Colonel
Director of Armour

BIOGRAPHICAL SKETCH OF

COLONEL R.S. BILLINGS

DIRECTOR OF ARMOUR

Colonel Bob Billings was born in Kingston, Ontario, is married and has two sons and a daughter. He attended school in Kingston and served there in the Canadian Army Militia for two years.

Colonel Billings enrolled in the Canadian Army Regular in September 1956 in the Royal Canadian Armoured Corps. Under the Regular Officer Training Plan he underwent university training at Royal Military Colleges in Canada and obtained a Bachelor of Arts degree in History. His first regimental posting was to the Lord Strathcona's Horse (Royal Canadians) in Calgary. In 1962 he was sent to Fort Rucker, Alabama, USA to become a helicopter pilot. A year later he returned to his Regiment in Calgary and then went to Cyprus as Operations Officer in the Reconnaissance Squadron. After returning to Calgary he went with the Strathcona's to Iserlohn Germany where he became second-in-command of C Squadron. From there he was posted to Soest as a Liaison Officer with the Headquarters of 4 Canadian Infantry Brigade Group.

In 1967 Col Billings returned to Canada to attend the Canadian Land Forces Command and Staff College in Kingston. After graduating he was promoted to Major in 1969 and posted as a Squadron Commander to the Royal Canadian Dragoons in Gagetown. He later became Deputy Commanding Officer and in 1970 served at the Combat Arms School in Gagetown as an instructor in Armour Tactics Company.

Col Billings was posted on exchange duties to Headquarters 1 British Corps in Bielefeld Germany in 1971. After three years he returned to Canada on promotion and went to Headquarters Mobile Command as Senior Staff Officer Operational Training. In July 1977 he was appointed Commanding Officer of 8th Canadian Hussars where he commanded the Regiment in Petawawa and Cyprus.

On relinquishing command in July 1979 he returned to Kingston on the staff of the Canadian Land Forces Command and Staff College. After three years he was promoted to his present rank and attended the National Defence College for one year. In July 1983 he was assigned his present duties as Director of Land Combat Development and Director of Armour at NDHQ in Ottawa.


# CORPS UPDATE

# 1983 COUGAR GUNNERY COMPETITION

BY CWO K.H. MAYBEE

This year the annual Cougar Gunnery Competition took place during RV 83 at Camp Wainwright. The site selected for the competition was area L at the south-east corner of Wainwright, within a 5 minute drive of the LdSH(RC) semi-permanent bivouac site. This was particularly advantageous to the Strathconas who, as host regiment were responsible for the administrative and logistical support to the competition. The aim of the competition was to improve the overall standard of Cougar Gunnery by:

a. improving firing technique;

b. enhancing fire control at the crew and troop level; and

c. enabling participating crews to meet, measure themselves against others and to appreciate each other's skills.

There were a number of differences between this year's competition and that of 1982 in Meaford. The main difference was that the competition was held during an RV year allowing many of the troops to already be in location and the remainder of the participants able to take advantage of RV air transport to get to Camp Wainwright. A crew trophy was competed for, for the first time - there was a larger unit representation (six troops vice three); 12eRBC did not compete because of UN duty in Cyprus; the Militia were included and a composite team from SE(M) competed as the first Militia troop to do so. Finally, the competition was designed as a fire and movement exercise in the form of a three bound battle run with the undulating ground of Wainwright providing a more realistic and difficult setting for the event.

Area L was ideally suited for the competition as it provided three bounds or firing points and an area target. The bounds were such that targets could not be seen between them and individual call-signs could not engage any targets but their own from the first two bounds. Mobility in the area was excellent. Troops were required to move by leap frog to engage individual direct main armament and MG targets on the first two bounds. They then moved together as a troop to the final bound to engage more direct engagement targets and a semi-indirect target.

A total of 14 teams participated: 6 each from the LdSH(RC) and 8CH, one team from the Armour School, the defending best troop champion, and the composite team from secteur de l'est militia. The control staff

arrived in Wainwright on 27 May and began to lay out the range 29 May. The competiton ran from 29 May to 02 Jun 83 with firing on 1/2 Jun 83.

By May 31 it was decided not to use the remote controlled pop-up targets as probems were experienced with the control box. Although the system worked, its reliability for 14 battle runs could not be guaranteed.

Troops drew lots to determine their sequence through the battle run. All runs went smoothly with troop turn-around time averaging 40 minutes. There was one main armament misfire. When the smoke cleared and all the points had been added, substracted, multiplied and divided the Strathconas had clearly taken the lions share of trophies:

The Rams Head Trophy - best Regiment - LdSH(RC)

The Director's Trophy - best squadron - LdSH(RC)

The Colonel Commandant's Trophy - best troop - LdSH(RC); and

The White Trophy - best crew - 8CH.

STATISTICS

In the best regiment competition the final results were:

| | | | |
|---|---|---|---|
| (1) | LdSH(RC) - 36 main armament tgts @ 60 pts | = | 2160 |
| | - 89 MG tgts # 5 pts | = | 445 |
| | - 52 area tgts # 10 pts | = | 520 |
| | | | 3125 |
| (2) | 8 CH(PL) - 27 main armament tgts # 60 pts | = | 1620 |
| | - 70 MG tgts # 5 pts | = | 350 |
| | - 47 area tgts # 10 pts | = | 470 |
| | - Bonus pts | = | 30 |
| | | | 2470 |

In the best Squadron competition the results were:

- A Sqn LdSH (RC) - 1760

- B Sqn LdSH (RC) - 1365

- A Sqn 8 CH(PL) - 1240

- B Sqn 8 CH(PL) - 1230

In the best troop competition, the first three troops were separated by only 75 points. In the best crew competition, the results were even closer with only 35 points separating the top three crews. The best news for the Corps was a Militia crew which placed third and had the highest score on MG shooting. Expressed as a percentage of highest possible score, shooting accuracy was as follows:

Best troop 55%, 2nd place 50% and 3rd place 49%; and best regiment 43%.

DIRECT FIRE ACCURACY

Analysis of the direct fire position of the competition indicated the following:

a. In 1983, the Corps accuracy was approximately 51% compared with 70% in 1982 and 40% in 1981;

b. The 1983 winning troop had 66% accuracy as compared to 83% in 1982 and 60% in 1981. The second place troop had 60% accuracy. Only 2 of 56 crews engaged and hit all their direct fire targets;

c. In 1983, the best regiment fired at 50% accuracy as compared to 75% in 1982 and 53% in 1981.

INDIRECT FIRE

Statistics dealing with this phase of the competition indicated the following:

a. The Corps demonstrated an average accuracy of 84% compared to 88% in 1982 and 66% in 1981; and

b. Six of 14 troops competing scored 100%. There were only three troops which scored 60% or less, thus bringing down the average; the best regiment fired at 86% compared to 93% in 1982 and 75% in 1981. The second best unit fired at 78% compared to 90% in 1982 and 75% in 1981.

MG SHOOTING

MG shooting continues to show a low percentage of target hits. However, it is felt that the Corps capabilities are not reflected in

the scores as the use of falling plate targets remains unrealistic. There was no doubt in the minds of the control staff that the majority of crews can bring MG fire to bear accurately on the target area. In addition, approximately 50% of the C5 MGs jammed during firing and cocking levers of others came off in crew commander's hands. The Corps demonstrated an accuracy capability of 18% compared to 23% in 1982; and the best troop in MG shooting fired at 29%, the best crew in MG shooting at 70%.

TIMINGS

Phase 1. Direct fire main armament engagements and MG engagements on Bounds 1 and 2 were limited to a total time of 90 secs at which time a command to cease fire was given. No time penalties were assessed on bound three with each crew having two main armament engagements to complete in 90 secs;

Phase 2. A total time of 4 minutes was given each troop to complete the semi-indirect shoot. This proved to be ample time for this engagement.

The standard of accuracy is considered quite good in view of the obvious limitations and the increased number of troops participating. Particularly interesting were the following observations:

a. many crews experienced difficulty in hitting the close-in main armament targets (500M);

b. targets that were sky-lined were more difficult to hit than those silhouetted against a solid background as range estimation was difficult;

c. generally, range estimation needs to be greatly improved;

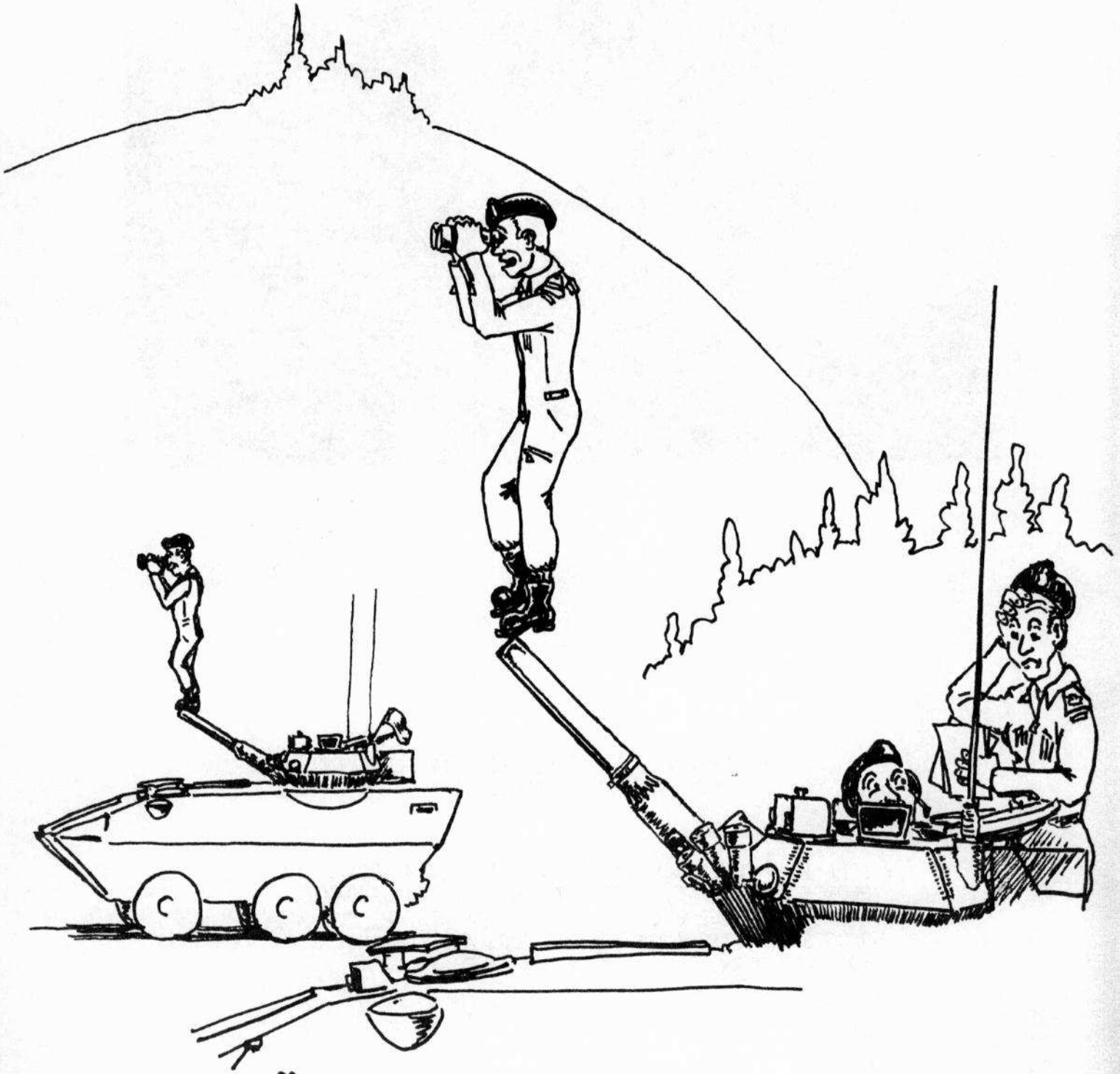
d. those troops following SOP's and Drills performed better than those who did not; and

e. The C5 MG proved to be unreliable as a weapon system (suggestions are welcome as to how we can overcome the C5 MG problem for next year).

This year's competition was a true test of the crews involved. The layout of the competition range was a quantum leap forward in degree of realism and presented crews/troops with a more difficult scenario than in previous years when firing was conducted from a static pad.

With the addition of Militia teams this year, the competition was truly a Corps event. The Regimental and Corps spirit demonstrated throughout the competition is proof of the importance of retaining this worthwhile event. Staffing has already begun for the 1984 competition. The

location and host unit will be discussed and finalized during the RCAC Association Conference in Petawawa in late September 1983. Regardless of the location the 1984 competition will be equally as challenging as it was this year and the Corps looks forward with great anticipation to another great reunion of armour soldiers.



"YOU'RE RIGHT! IT'S NOT IN THE RULES!"

JW Egan 6 83

FORT GARRY HORSE RECCE SQN 1960-1961 REUNION
CFB GAGETOWN 26 APRIL 1983

(L TO R): LCPL (NOW CWO) JACK ROTHENBURG, TPR (NOW SGT) GEORGE PEPPERDINE, CAPT (NOW COL) J.A.R. GARDAM, TPR (NOW LT) GEORGE BOYKO, TPR (NOW MISTER) DOUG SHUTE, TPR (NOW WO) JIM GOOD AND TPR (NOW WO) DAVE BYRNE

*There will be a 25th Anniversary Reunion in April 1986. For those interested, contact Lt G.L. Boyko, 403 Sqn, CFB Gagetown, Oromocto, N.B. E0G 2P0*

# RESTORED WHIPPET TANK RETURNED TO CFB BORDEN MUSEUM

BY CAPT H.R. EGENER

In a brief ceremony, Brigadier-General L.M. Salmon, Commander Central Militia Area, returned the 1918 Whippet Tank to Brigadier-General R.D. Leach, Base Commander CFB Borden. Also attending were Colonel R.S. Billings, D Armd, and Chief Warrant Officer Perron, Corps CWO.

The 1918 Whippet Tank had arrived in Canada shortly after World War One and eventually was transported to CFB Borden during the 1930's. With the development of the Worthington Tank Park, the Whippet took its rightful place as one of the more unique AFVs in the park. With the passage of time the Whippet was starting to show her age. Large cracks had appeared in her armour and vandalism had resulted in further ugly damage.

In October 1982, CFSAOE Vehicle Company provided a Leopard ARV to lift the 14 ton tank onto a lowbed for transporting to the Militia Training Centre AVGP Hangar. During the next eight months, militiamen employed servicing the AVGPs, volunteered spare time to gut the Whippet, remove the two engines, replace the floor and control mechanism and finally repaint for presentation. A plexiglass door was installed to allow visitors a clear view of the fighting compartment and driver's station and controls. On completion, the Leopard ARV once again was called upon to pull the much lighter Whippet Tank into the museum hangar. The Whippet took up its last resting spot beside the much younger Centurion.

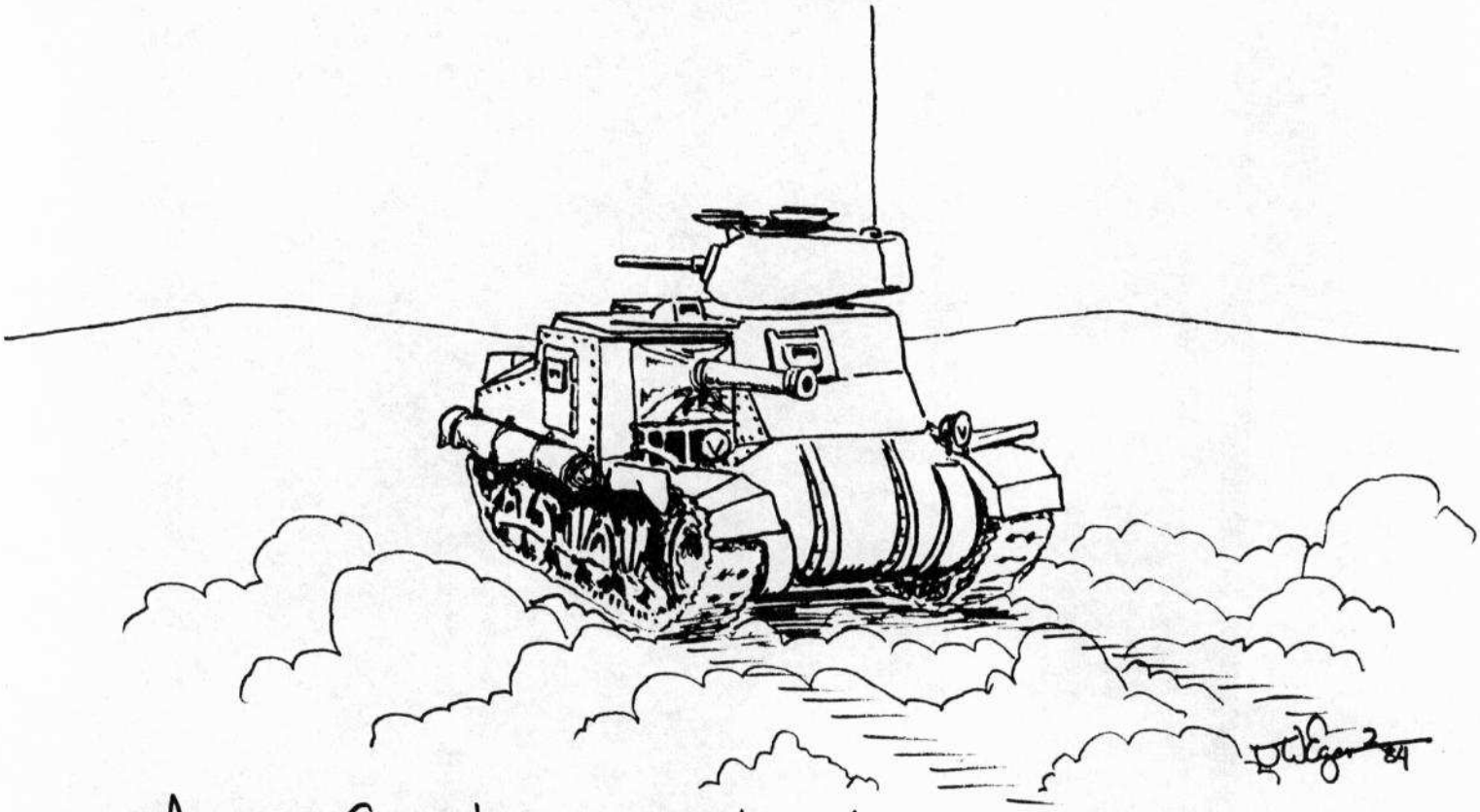
Brigadier-General Leach in his concluding remarks extended his thanks to the militiamen and the Armour Corps and their dedication and hard work in restoring the Whippet. All visitors to CFB Borden are most welcome to view the Whippet and other AFVs contained in the Base museum and vehicle hangar.

ARMOUR TRANSITION PLAN WRITING BOARD 10-13 MAY 83

ARMOUR SCHOOL, CFB GAGETOWN

FRONT ROW (L-R): LCOL G.J. O'CONNOR, LCOL L.P. MORIN, LCOL I.D. BARNES, LCOL W.J. COUPLAND, LCOL R.N. LAWRENCE, COL C. MILNER, LCOL G.I. MATHIESON, LCOL D.J. GRAHAM, LCOL R.E. ACREMAN, LCOL D.G. TAYLOR

REAR ROW (L-R): CAPT J.A. STUCKART, MAJ J.A. LUTES, CAPT V. GELDART, MAJ P.R. HOODSPITH, MAJ W.H. LOGAN, MAJ D.W. PROSSER, MAJ H.M. HIRSCHFELD, CWO J.L. PERRON, LCOL G.C. SOLAR, LCOL G.F. ERVING, LCOL R.B. ROGERS, MAJ W.B. HARRISON, MAJ R.G. MEATING, CWO D.A. BEATTIE



As one Grant commander described the battle:

"The 75 is firing. The 37 is firing but its traversed round the wrong way. The Browning is jammed. I am saying 'Driver advance' on the A set, and the driver, who can't hear me, is reversing. And as I look over the top of the turret and see twelve enemy tanks fifty yards away, someone hands me a cheese sandwich."

# THE MURPHY SWORD

## FIRST IN AOCT PHASE II

by CAPT M.R. McNORGAN

For most of us, phase training was a highlight of our careers. New friends made, new experiences, challenges, set-backs and finally graduation. For a small group there was a bit of icing on the graduation cake by winning the sword. The top candidate of Armour Phase II training is honoured with the Murphy Sword. For a few seconds, the lucky individual is permitted to hold his prize before it is returned to its custodians at the Armour School. The winner is then presented with a scroll to commemorate his achievement. But what exactly is the Murphy Sword and what are its origins?

From a technical point of view, the question ie easily answered. It is a 1895 pattern Infantry Officer's Sword. The weight is 1 pound, 14 ounces. It is 39" long over all with a blade length of 32.5". It was manufactured at an unknown date between 1910 and 1936 during the reign of King George V(whose monogram is inscribed on the sword's bowl). The manufacturer's name, Sanderson Bros & Newbould Ltd., Sheffield, is to be found in the blade where it attaches to the handle. The sword knot is black leather with a wooden acorn attached. The material that originaly covered the acorn has been worn away leaving the wood exposed.

The real meaning behind the sword becomes clearer when the scabbard is examined. Engraved in well worn letters is the inscription:

Sword
of
Brigadier William Murphy, CBE, DSO, ED
Presented on Behalf of
The RCAC Association (Cavalry)
To the Outstanding 2nd Practical Phase Officer Cadet (COTC)

Born in Ashcroft, BC, 27 April 1905, W.C. Murphy joined the Army in 1927 receiving a commission in the British Columbia Regiment. His promotions were relatively rapid and by 1937, he had been promoted to the rank of Major. With the outbreak of war in September 1939, he transferred to the Infantry proceeding overseas with the PPCLI. The following year saw him back in Canada on Staff Duties and back in the Armour Corps where he was to remain throughout his career. After a series of staff positions in 5th Armour Division, in May 1942, he achieved command of the 9th Canadian Armoured Regiment (The British Columbia Dragoons). His time in command was cut short however and by March 1943 he had been promoted to Colonel and posted to HQ 2 Canadian Corps. February 1944 saw him a Brigadier in command of 1st Armour Brigade in Italy. This brigade, which consisted of The Ontario Regiment, The Calgary Tanks (now the KOCR) and The Three Rivers Regiment (now 12e RBC) were most experienced and successful organization. The Brigade's performance during the breaching

of the Hitler Line, for example, won warm praise from the Army Commander.

With the return of peace, Brigadier Murphy left the Army leaving behind a legacy of successful leadership. In 1961, his military effects were donated to the RCAC Museum in Camp Borden, Ontario and his sword was presented for the first time on parade on 12 August.

The list of recipients which follows is incomplete and many contain errors. In spite of the military mania for filling out forms, and filing strange pieces of information, no complete and accurate list of winners seems to exist. The information in this list was compiled from many sources. Hopefully, the readers of this article will be able to help. If you can supply any information on this subject, please address it c/o the Editor, Armour Bulletin.

## WINNERS OF THE MURPHY SWORD

6101 OCdt R.T. Lewis

6201 OCdt E.G. Thurston

6301 OCdt A.R. Webster

6401 OCdt E.L. MacInnis

6501 OCdt T.A. MacWilliam

6601 OCdt B.G. Clarke

6701

6801

6901 OCdt W.J. Fulton

7001 OCdt H.C. Ross

7101 OCdt B.A. Watling

7201 Lt J.R. Spencer

7301 OCdt R.D. Knight

7401 Lt M.R. McNorgan

7402 OCdt S.P. Johnston

7501 Lt W.R. Allen

7502 OCdt R.S. Richards

7601

7602 OCdt W.D. Federation

7701 2Lt M.G. Macdonald

7702 OCdt R.S. Wlasichuck

7801 Lt M.K. Carswell

7802 OCdt J.G. Gautreau

7901 OCdt M.P. Cessford

7902 OCdt P.J. Atkinson

8001 OCdt C.S.M. Waters

8002 OCdt B.K. Beavis

8101 OCdt G.R. Yakimenko

8102 OCdt B. Leblanc

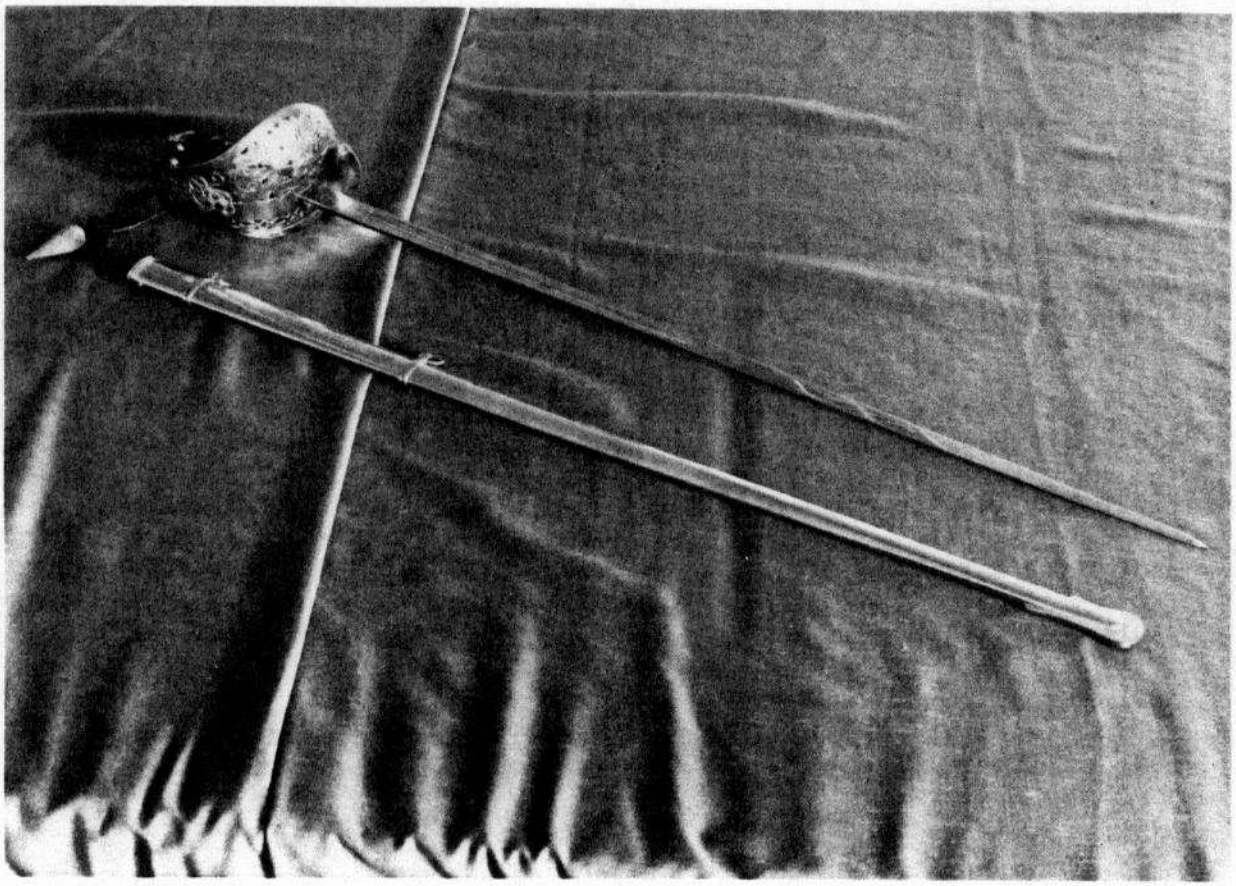
8201 OCdt J.A.A.G. Gauthier

8202 OCdt R.J. Lawson

8301 OCdt J.D. McKillop

8302 OCdt R.A. Erland

In the next edition of the Bulletin, we will look at another of the Armour School Swords. If you have information to contribute on any of the swords, please write to us.



The Murphy Sword

# ARMOURING THE AFV

BY CAPT J.R. GREDLEY

## INTRODUCTION

In a peacetime army, armour protection technology does not get the attention of its brethren, firepower and mobility. Firepower and the intricacies of fire control attract considerable attention through high profile competitions such as the Canadian Army Trophy. Mobility is one characteristic of armour that can accurately be assessed even in peacetime. Every "Black Hat" has his opinion of these two subjects. Yet, to many soldiers, armouring an AFV is simply a matter of welding together a sleek shape and leaving it at that. This article will outline a soldier's view of the analytical and engineering considerations that go into the armour design of an AFV.

## STATING THE REQUIREMENT

The first step in the process is establishing the requirement, one that often proves to be the most difficult. The statement of requirement (SOR) must clearly specify the role of the AFV, the threat it will face and what level of protection is to be afforded to the various components of the vehicle. Furthermore, the SOR must establish dimensional and weight limits.

The role is fundamental. Will the AFV be expected to take on enemy MBTs both offensively and defensively, or will it only be expected to fight from the relative safety of prepared defensive positions? Will it be a battlefield taxi or an infantry fighting vehicle? Or will it simply be a general purpose armoured runabout for use by support troops? Once the role is established, then the threats it must face can be properly assessed, leading logically to the required level of protection, and the dimensional and weight limitations.

The most restrictive aspect of the requirement are the dimensional and weight limits. The practice of retro-fitting tanks is an example of the relative ease of upgrading firepower and mobility to keep pace with technology. But the dimensional and weight limits establish an inflexible framework that the tank will have to live with for its entire service life. Upgrading protection of existing vehicles is invariably done with difficulty at the expense of mobility.

Unfortunately, the pursuit of the ever changing requirement is as difficult and common a problem for the engineer as pursuit of the enemy will be for the soldier.

## ENGINEERING CONSIDERATIONS

At the present time, there are three materials that are available and practical for AFV constructon; steel, aluminum alloy and composite armours. They all have their advantages and shortcomings, and one or more may be used on a given AFV.

Steel is by far the most common armour material. The technology and raw materials are well known. Steel in the form of Rolled Homogeneous Armour (RHA) and Cast Armour is relatively cheap and effective against kinetic energy projectiles. It is easy to fabricate and repair, and its structural service life is, for practical purposes, unlimited. It is unfortunately very heavy. The weight problem can be mitigated by the use of high strength steels, such as Electro Slag Refined steel, but the weight saving is achieved by a greatly increased cost.

Aluminum alloys or "light alloys" have been around in light vehicles for 20 years - the M113 family was one of the first practical applications of them. Technology has progressed to the point that fabrication and repair are comparatively easy, although the processes are more expensive than for steel. For a given level of protection against small calibre weapons, aluminum alloys provide a 10% weight saving while requiring approximately three times the thickness of steel. Aluminum alloys are structurally reliable, although metallurgical stresses must be relieved after fabrication or repair to avoid premature failure due to stress corrosion cracking.

Composite armours are the latest breakthrough and some form of them, Chobham armour being the most famous, are on all of the latest generation of MBTs. Depending on the perceived threat, composite armours are generally lighter but a lot bulkier for a given level of protection than the steel equivalent. However, this situation is dependent on the specific composition. Because of its structure, which is alternating layers of various materials, composites are very expensive and there are structural limitations to their use.

Although some or all of the materials can be used on a given AFV, the engineer must be cognizant of the metallurgical, chemical and structural problems involved in joining different materials, such as different coefficients of expansion, Galvanic corrosion and the problems of welding dissimilar metals.

The obvious way to put together an armoured shell is to use vertical walls with horizontal floors and ceilings. This has the attractions of being easy to fabricate and provide a readily usuable box-shaped space. However, this obvious solution is possibly not making the best use of the weight allowance.

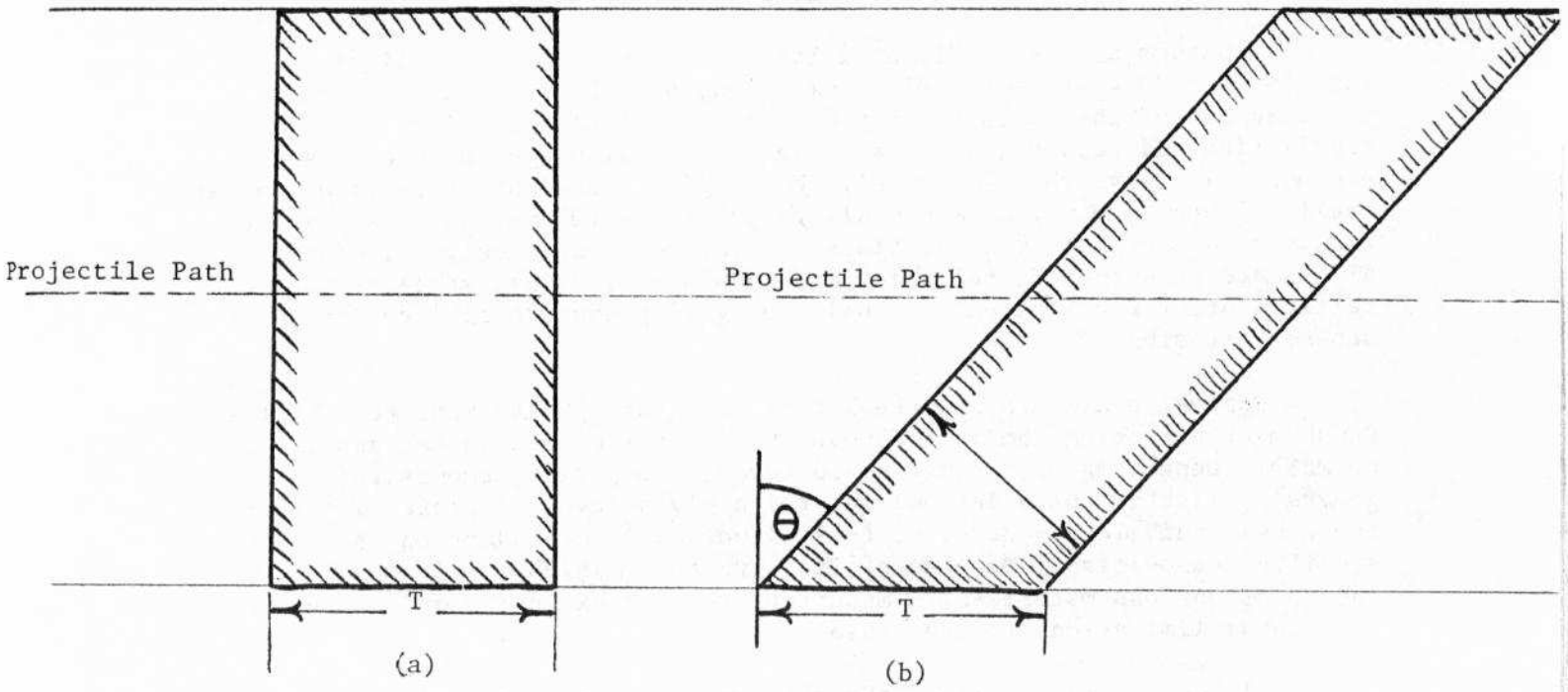



Fig 1

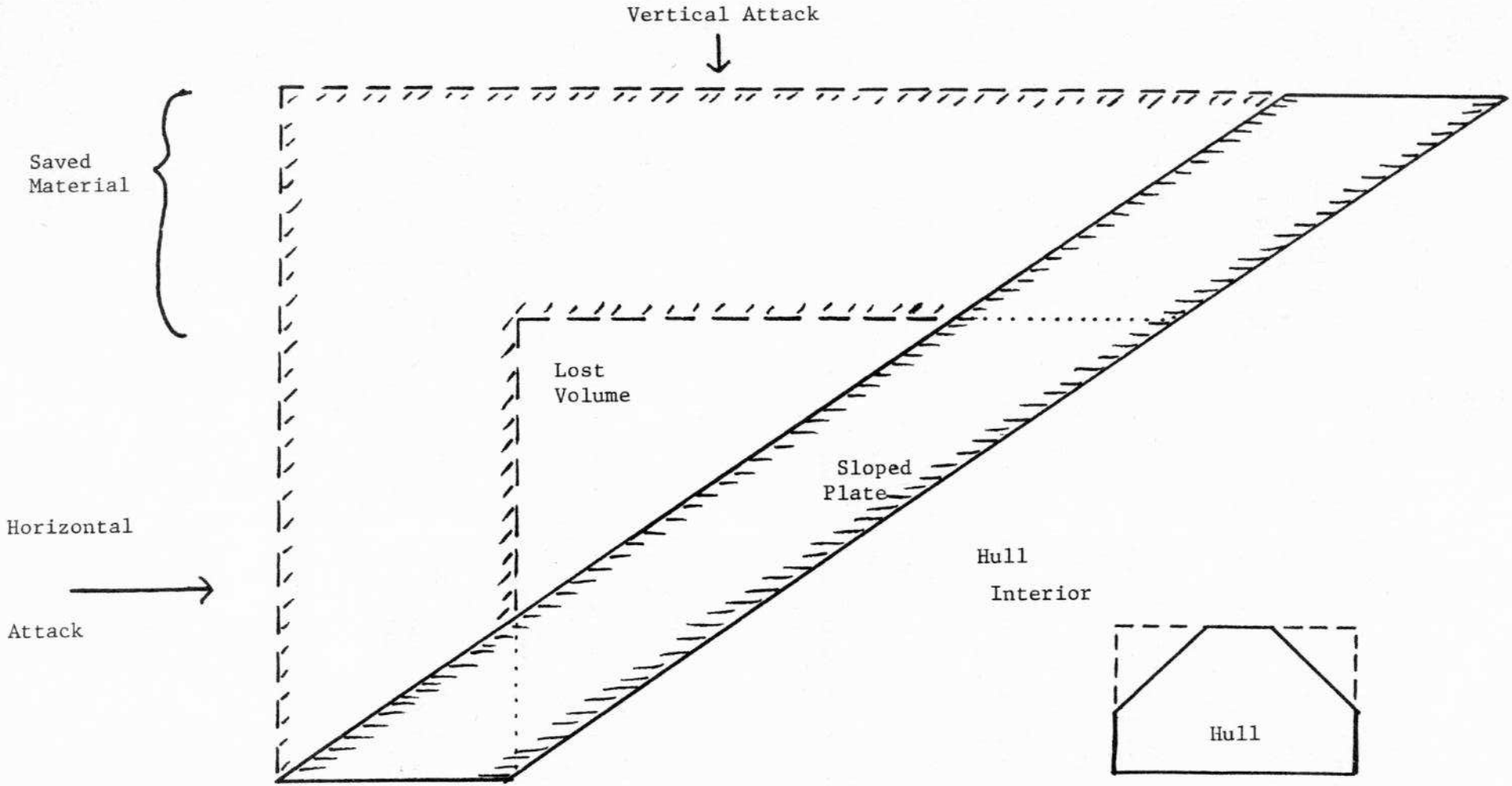

Vertical Attack
Saved
Material
Lost
Volume
Sloped
Plate
Horizontal
Attack
Hull
Interior
Hull

Fig 2

Sloping the armour provides a way of saving weight while maintaining a given level of protection. In fig 1 a, the path an incoming projectile must travel is T, which is equal to the thickness of the metal. In fig 1 b, the path through the plate is still thickness T, but the thickness of the plate has been reduced to t. The relationship between the thickness is $t = T \cos O$ where O is the angle from the perpendicular. It should be noted that the two plates in fig 1 would weigh exactly the same. What the sloped plate has lost in thickness, it has gained in length.

The hull of a hypothetical AFV could conveniently be built in a rectangular shape. Equally, sloped armour could be used to provide protection from both horizontal and vertical attack, replacing the box-shaped structure with a single plate, thus saving material and weight, as shown in Fig 2. Sloped armour has additional benefits. High angles of slope promote ricochet and will cause kinetic energy penetrators to change direction as it enters the armour, hopefully leading to premature break-up of the penetrator.

Against these obvious advantages must be balanced the loss of usable volume which may have to be added on, under armour, elsewhere! Thus, some or all of the weight savings realized in using sloped armour will be lost in making the hull bigger overall to accommodate necessary equipment. Composite armour, which can provide the required protection at a reasonable weight without sloping, may pave the way to smaller hulls.

## CONCLUSION

It has become apparent that wrapping an AFV in armour has become an intricate business. Each proposed increase in slope may save weight, yet it will take away volume. But the increased slope may provide additional benefit by promoting ricochet. Non-essential plates can be thinly armoured. But, will they be structurally sound? Materials can be changed, but at what change in weight and bulk? These are questions that require careful consideration by both the engineer and soldier.

The wide variety of roles and threats facing AFVs demand a detailed and accurate assessment of the necessary present and future protection capabilities. The armour envelope is an important part of overall design that will determine the operational usefulness of the tank. We, the Black Hats, would do well to explore the subject more extensively.

*Editor's Note:*

*The following article has been submitted by CWO J.L. Perron, the Corps Chief Warrant Officer. It is a formal presentation of 60 CWO's, from all environments, of their collective views concerning "The Duties and Responsibilities of WO's and Snr NCO's". This service paper was submitted to the CDS 05 Nov 82. Due to its length, it will be split between Volume 17 and 18 of the Bulletin.*

## DUTIES OF WARRANT OFFICERS AND SENIOR NON-COMMISSIONED OFFICERS WITHIN THE CANADIAN FORCES

### CIVILIANIZATION

General Stewart recently described Chief Warrant Officers as Guardians of military ethos. Ethos is defined as the characteristic spirit of a community, people or system. It necessarily follows then that military ethos as applied to Canadian Forces would be the general perception the group has of itself as a military force in comparison to the world's military society.

We recognize that Government attitudes about military positions and trades since integration have been to more closely align the military man to his civilian or public service counterpart. The harmful effects of the management or business oriented philosophies applied on an Armed Force was given as part of a lecture to the 1981 Chief Warrant Officers' course. The reference for that portion was from such sources as "Crisis in Command", the book on the U.S. Army in Vietnam which alleges the failure of the US Army to cohere under stress, was largely attributed to their adoption of modern business corporation methods. General Dextraze, in his ARTICLE THE ART OF LEADERSHIP, states "Modern Managerial Techniques introduced in the name of efficiency and economy, often tend to demoralize the organization and its individuals".

Fortunately, the Canadian Forces has recognized the shortfalls of the business ethic and has begun the move back to the tried and true military establishment. A military establishment that must possess a uniqueness apart from civilian society and have it's own spinal cord, a viable military way of life. Our consensus is that if we continue to move to the military supervisory system that the comparison of trade and job to civilian occupations has not and will not deteriorate our ability to do the job we have as Warrant Officers and Senior Non-Commissioned Officers.

LEADERSHIP PREPARATION COURSES

We feel that trade oriented courses leading to promotion of Sergeant are quite adequate but, members holding this particular rank are given formal leadership training too late in their careers. In many cases, this happens years after the member assumed the responsibility of a leader. We therefore suggest that the Senior Leaders' Course be given much earlier in an individual's career in order that they be better prepared to carry out their duties and responsibilities. Further, we were somewhat disappointed to discover that a member cannot fail the Senior Leader Course. We strongly recommend that it be made a pass or fail course in order to ensure that the end product is capable of assuming the leadership role. (Since this presentation to the CDS the course is now a pass or fail course).

The problem of approximately seven hundred acting Warrant Officers awaiting qualification course should be resolved. With the reduced requirement to train recruits at Cornwallis and St Jean, this could prove to be an opportune time to create additional Senior Leadership Courses using the staff and facilities of both Recruit Training Centres.

DRESS

The Chief of Defence Staff sets the dress standard for the Canadian Forces. To assist him in his decisions, he has a National Defence clothing and dress committee, with input from Commanders from all Commands, as well as the Canadian Forces Chief Warrant Officer.

To implement his policy on dress, we have the manual of dress regulations for the Canadian Forces, CFP 265. The Commanders of Commands, Bases, Stations and units, are responsible for implementing these regulations. The responsibility to enforce these regulations has traditionally, and rightly so, been the domain of the Warrant Officers and Senior Non-Commissioned Officers of the Canadian Forces. We are proud of this honour, and over the years have done our level best to ensure that these regulations were adhered to. As well, we continue to insist on a high standard of personal dress and deportment.

Over the past few years, however, it has become increasingly evident that we are faltering, for which there are several reasons:

a. First and foremost, CFP 265 has not been amended since 1979;

b. Several changes have occurred that are in the form of messages and are not issued to all holders of CFP 265;

c. Each command may have requirements unique to their environment that other commands may not be aware of;

d. The constant turbulence in changes of dress; and

e. The different interpretation of the regulations between French and English in CFP 265 is not consistent and different dress could result depending on which language is read.

At present Service personnel are totally confused about dress. Recently, WE (60 CWOs) were equally confused prior to and following the formal presentation by a member of the Directorate of Ceremonial Staff. If what we have stated is indeed true, and if the decision is to improve on our standard of dress and enforce dress regulations, then we must clearly have the direction and mandate to do so. We believe that this present turbulence can be overcome by our pledged support in assisting to solve this very acute and real problem area.

LATERAL SKILL PROGRESSION

Last year's course project stressed at great lengths the importance of implementing a "Lateral Skill Progression" Programme. To date, this programme has not been introduced. Let us look at the developing problem for the Warrant Officers and Senior Non-Commissioned officers that we see on the horizon. The reluctance to introduce trades pay or pay for skills, separate from pay for rank, will not only result in Rank Creeping, but will ultimately result in a loss in authority executed today by Warrant Officers and Senior Non-Commissioned officers. This supposition is viewed as a potentially serious problem.

What we really are saying is, if the organization feels it is necessary to pay all the "Indians as Chiefs", that is fine. But out of all the Indians paid as Chiefs, only one of the tribe can wear the headband and execute the authority of the Chief. As you know, presently we are continuing to move in opposite directions. Ultimately, this will result in diminishing levels of authority and responsibility. Our concern on this subject cannot be over-emphasized.

The Vietnam outcome and the Iranian Rescue attempt are recent American experiences that confirm this statement. The Pentagon is now studying the recent war in the Falkland Islands and in Southern Lebanon. Indeed the recent conflicts suggest that as more nations acquire state of the art electronic technology, future battles will be decided on such qualities as innovative leadership, discipline, esprit-de-corps, a proper balance of trade and rank, and intangibles. These lessons are a clear indication that we must come to grips with and review the Canadian Forces position on lateral skill progression.

RANK STRUCTURE - CPL/MCPL

To begin with, we felt that the promotion to Corporal should not be "automatic" but that it should be based on merit and potential,

judged and recognized at the unit and command level. Backed up by a qualifying course to confirm this potential, this rank would become the first supervisory level. This would eliminate the problem that now exists in that a Corporal is not a supervisor, has not been trained as such but in accordance with QR and O, must be treated legally as a non-commissioned officer.

It was also felt that the appointment of Master Corporal in most trades does not fulfill our needs either on a leadership basis or on a skilled tradesman level. We therefore suggest that in those trades this appointment be abolished and that a lateral skill progression pay system be introduced.

The rapid promotion from basic corporal to sergeant in some trades occurs within a four year period. This results in a requirement to effect postings to new geographical locations. This in turn causes a lack of continuity to unit and movement turmoil for service personnel and their families, not to mention the cost to the Crown.

FRATERNIZATION - FAMILIARITY - INTER-RANK MARRIAGES

There is a problem as a result of fraternization and familiarity between subordinates and superiors. This erodes the authority of the Warrant Officers and Senior Non-Commissioned officers when they are required to administer forms of discipline.

Environmental conditions in Her Majesty's Canadian Ships and on small stations make it necessary that senior disciplinary personnel and junior supervisory personnel work, live and socialize continually in close proximity. This had led to the "Familiarity breeds contempt" situation.

The junior supervisor will take advantage of the situation if given the opportunity. While this is more prevalent on ships and small stations, it is also evident to a lesser degree on large Bases where facilities exist that encourage mixed socialization at all rank levels.

The more obvious side of this problem is the inter-rank marriages i.e., the conflict between co-location on posting and the Canadian Forces manning priorities.

WELFARE

It is the responsibility of Warrant Officers and Senior Non-Commissioned officers to be acutely aware of the welfare and well being of their subordinates. It is probably the most important vehicle with which the supervisor can win the respect of his subordinates. The tendency to become "civilians in uniform" performing duties on an eight to five basis has restricted the Warrant Officers and Senior Non-Commissioned Officers ranks in the eyes of their subordinates and superiors. It is becoming evident some supervisors consider themselves immune to accepting their responsibility on a 24 hour a day basis.

## UNIT LINE QUARTERING

To add to the difficulty of understanding our service personnel individually, the Base concept of barracks and messes has been introduced in many areas. This has made it very difficult for a Warrant Officer or Non-Commissioned Officer to get to know his personnel in barracks as well as at work. Under this concept, rooms are allotted at Base level on a first come, first served basis regardless of unit. The direct result being that, not only does the Non-Commissioned Officer not know his personnel, they in turn hardly know each other. A very much needed sense of belonging, of unity and of esprit-de-corps has been lost. We therefore suggest that where the Base concept of quartering control exists, it be re-assessed or even abolished so that units can get their personnel in unit areas.

## DRILL

The standard of drill within some units at best could be described as being below the basic acceptable standard, and in some cases, non-existent.

Drill must be considered a vital and necessary function of military life. It should be viewed as the vehicle to instill confidence in supervisory personnel, pride in unit and esprit-de-corps.

It is realized that heavy operational commitments exist that by nature are restrictive to the frequency with which parades can be conducted. However, unit commanders should be encouraged to provide the necessary time to make full use of this vital aspect of military life-style.

All too frequently Warrant Officers and Senior Non-Commissioned officers lack the necessary training and confidence to conduct Drill Parades and are hesitant to become involved, or seek assistance, unless forced into a situation from which they cannot escape.

In order to implement and achieve this goal, a supplement to the Senior Leader Course is required. At present the only supplement that exists is the "Drill and Duties Course" that is conducted in England. This course does not meet the requirements of the Canadian Forces of today. The requirement, then, is for a Canadian "Drill and Duties Course" to be created for selected Warrant Officers and senior non-commissioned officers.

## DISCIPLINE

It has been said from day one that the Warrant Officer and Senior Non-Commissioned Officer are the backbone of the Forces. Every Non-Commissioned officer swears by it and no responsible officer would dare to contradict it. We suggest that the backbone is being weakened by a minority for a variety of reasons.

There is a laxity in the administration of basic discipline in the Canadian Forces today. Infractions of basic discipline such as haircuts, hands in pockets, paying of compliments and other infractions have a direct bearing on the image projected by Warrant Officers and Senior Non-Commissioned Officers.

Over the last decade the quality of discipline within the Canadian Forces has been eroding to a degree that must give us cause for concern. If this condition is allowed to continue it can only inhibit the efficiency of the Forces.

When the cause of this erosion is examined the following areas must be considered. Insufficient manpower to meet the military commitment has created a different approach to the administration of discipline. Supervisory personnel have developed a tendency to overlook minor infractions, in which disciplinary action, if taken, may have resulted in a request for release or remuster. This tendency to overlook minor disciplinary commitments has escalated to include major disciplinary problems. Although this form of "gentle blackmail" is more prominent in the skilled trades, it may, however, effect all branches of the Service.

It was also felt that a certain amount of laxity in discipline occurred in recent years. This was analyzed as being mainly due to sub-unit attitudes towards one another in relation to the application of discipline to members other than one's own unit. This trend has caused young Warrant Officers and Non-Commissioned Officers to give up in their role at applying universal discipline within the Forces and has led many to adopt the "Don't let the Base Chief Warrant Officer see you" attitude. We must ensure that this trend is corrected immediately and that action be taken by the supervisor present on the scene. In extreme cases we will, however, require the co-operation of superiors to ensure that when "hard to crack nuts" are brought before them they are not handled with kid gloves.

Discipline is the ultimate produce of effective leadership. "There is only one kind of discipline - firm and fair". If we do not enforce and maintain discipline, we have failed. If we cannot get our service personnel to salute when they should, to wear their uniforms properly and proudly, to shine their shoes, to be where they are supposed to be, then how are we going to get our troops to fight - and die if need be - for their country?

*TO BE CONTINUED IN VOL 18*

FEEDBACK - LIEUTENANT-COLONEL R.J. JARYMOWYCZ

A Cavalier's Response to 'Equus Bellum'

ARMOUR BULLETIN
VOLUME 15

The Cavalry greets with encouragement the recent article found in the Armour Bulletin (Vol 15). What a refreshing change from the normal whining and lies that are currently printed elsewhere and insist on telling us the boring truths about our failings. At last, a clear thinking apologia that has not been tainted by service in the monastic orders of FMC or NDHQ.

However, the author despite sophomoric zeal, is perhaps hampered by the current limited riding opportunities granted junior officers and therefore harbours a less than optimum appreciation of the role of Cavalry in the modern battle field. May I be allowed to take issue with some of Captain Oliviero's points and thereby hopefully guide him and the growing mass of recent converts.

Firstly, unlike the nags one finds ridden by infantry officers or the horse artillery, Cavalry mounts are referred to as chargers.

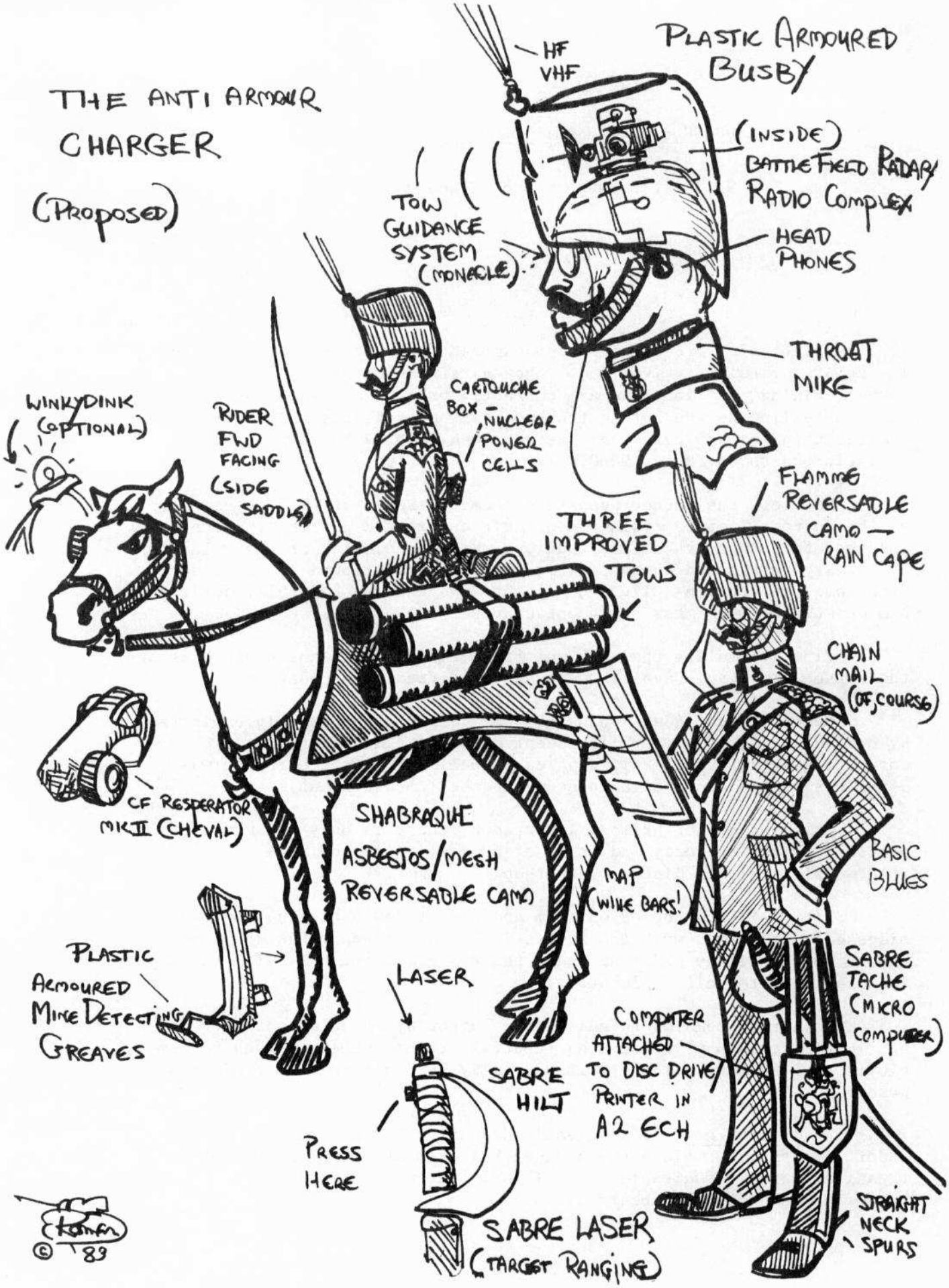
Secondly, not questioning the considerable scholarship exhibited by our author, it is generally accepted that 'equus militaris' is correct, although Vergil did say 'equus bellator' - of course he was using his poetic license (both equus and bellum are nouns).

Thirdly, and of primary importance, there is only one proper option for Cavalry today and that, of course, is in the anti-tank role -- with recce a distant runner-up.

Fitted with a proper uniform and kit, today's Hussar, mounted sidesaddle and armed with the latest in TOW missiles, poses the primary threat to the filthy Red manace and their steel behemoths. (The accompanying diagrams are self-explanatory).

It merely remains to guide your author by explaining the errors of his initial thesis by presenting rebuttals to his other options for employment of Cavalry. These will hopefully urge him to temper his proposal.

Anti-Airborne: It is clearly degrading for any Cavalry to consider Infantry, let alone the neanderthal elements found in the Airborne organizations as a suitable foe. This is perhaps better left to tank regiments and stretcher bearers.


THE ANTI ARMOUR CHARGER
(PROPOSED)
PLASTIC ARMOURED BUSBY
HF VHF
(INSIDE) BATTLE FIELD RADAR/ RADIO COMPLEX
HEAD PHONES
TOW GUIDANCE SYSTEM (MONACLE)
THROAT MIKE
CARTOUCHE BOX — NUCLEAR POWER CELLS
WINKYDINK (OPTIONAL)
RIDER FWD FACING (SIDE SADDLE)
FLAMME REVERSABLE CAMO — RAIN CAPE
THREE IMPROVED TOWS
CHAIN MAIL (OF COURSE)
CF RESPERATOR MK II (CHEVAL)
SHABRAQUE ASBESTOS/MESH REVERSABLE CAMO
MAP (WINE BARS!)
BASIC BLUES
PLASTIC ARMOURED MINE DETECTING GREAVES
LASER
SABRE TACHE (MICRO COMPUTER)
COMPUTER ATTACHED TO DISC DRIVE/ PRINTER IN A2 ECH
SABRE HILT
PRESS HERE
SABRE LASER (TARGET RANGING)
STRAIGHT NECK SPURS
© 83

Flank and Rear Area Security: Again, betrayal of the Cavalry ethic. Flank guard perhaps (Light Cavalry only - Hussars, Lancers, Light Dragoons, Cossacks, Mamelukes) but only as anti-tank elements and certainly not where there is no proper view of things interesting.

Rear area security is a bore and leads to temptation by courtesans and wine bars. This is best left to the more mellow elements in the forces: chappies in Cougars, married adjutants and the Corps of Commissionaires.

Reconnaissance: This is of doubtful usefulness (anyone with Hunter Trial experience knows chargers are far too subtle creatures to be pushed into high fences, infantry squares or noisy gaggles of BMP's). Finally, one must consider the pace of the Brigade falling back on the Channel - one certainly does not wish to lose both forward recce and the Regimental polo team in one fell swoop.

One need not comment on the maintainability/cost paragraphs - discussion of pecuniae is a rather middle-class fixation that does not concern the Cavalry (after all, if they must inquire as to cost, then they ought to scrap the Luftwaffe).

As for that unfortunate reference to body armour - can one really accept author Oliviero's pretensions to being a Hussar? Since he did not mention batmen one assumes he would have the crème de la crème hide behind cuirasses like the heavies. Quite unthinkable.

The only uniform worth considering is obviously Light Cavalry as no one with taste would wish to parade dressed as Dragoons or Guards. We would do well to reconsider the first and third fundamentals of military costume: seduction and utility. A preference for true style leads certainly to the Hungarian look. Breeches à la Brummell ("if I can get into them I won't wear them"); buttons not zippers (invention of capitalists and noisy in dark theatres); and of course, a pelisse that hangs luxuriantly over the left shoulder. One realizes this is the only option; why even the Artillery, in a rare display of intelligent romanticism, adopted Hussar dress as their own.

Quod erat demonstrandum.

In conclusion, while applauding your young dux bellorum (propter suum conatum virginalem intellegere equum militarem) I strongly urge him and the thousands influenced by his bracing article to lobby for a renaissance of the cavalier's proper role on the battle-field. After all, simply because our ruder comrades insist on vulgar mechanical brawls is no reason for gentlemen to throw tradition and breeding to the winds. Kismet, indeed.

Non Nobis Sed Patriae

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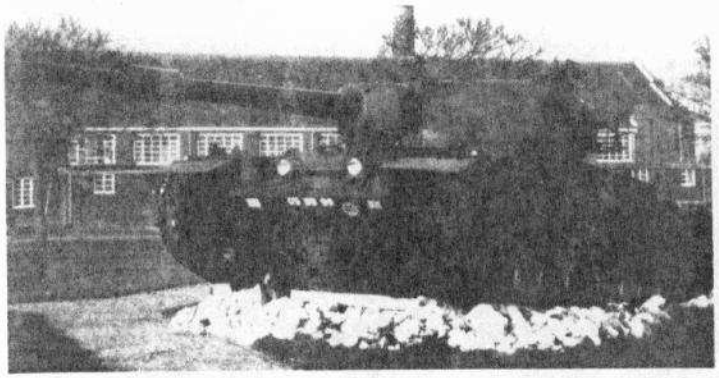

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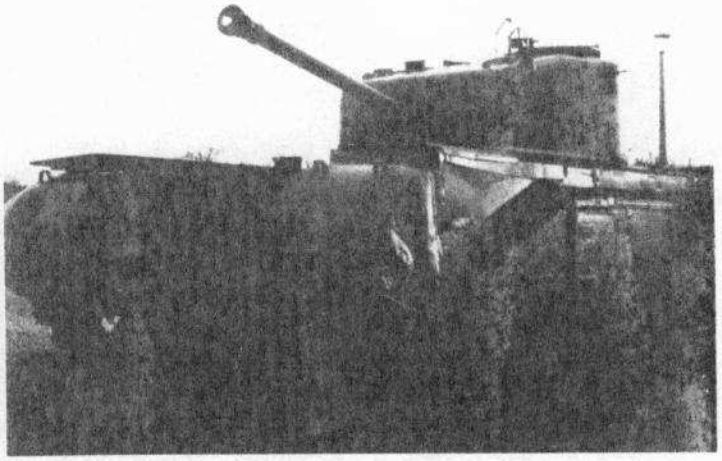

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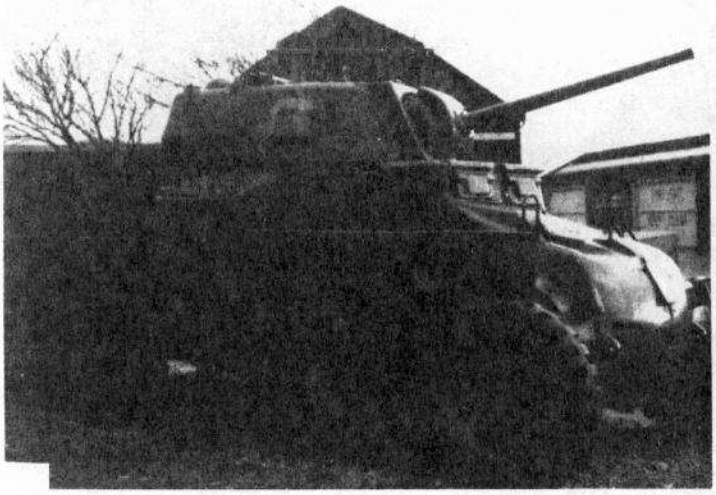

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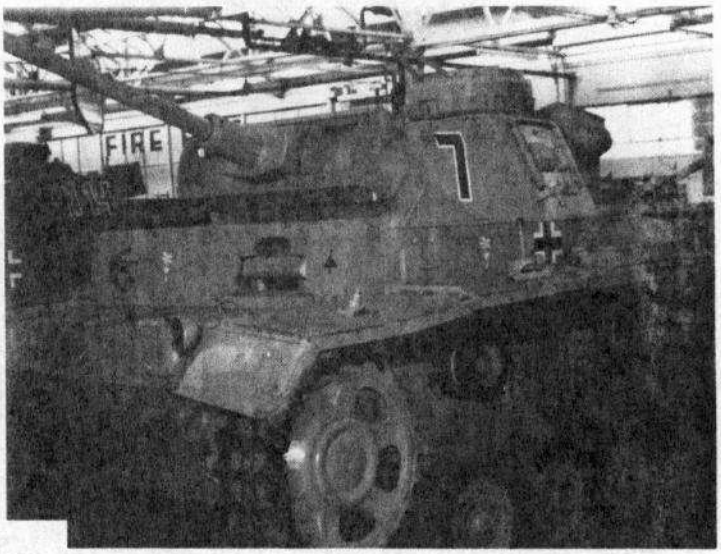


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# ARMOUR IN THE FALKLANDS

*EDITOR'S NOTE:*

*The following article is a reproduction of a presentation given by Major W. Pickering at the annual exchange officer's conference at CDLS. It offers a very concise view of the use of armour by the British in this recent campaign.*

*Major Pickering is currently the Canadian exchange officer serving at the Armoured Trials and Development Unit, Bovington, England.*

## PREPARATION

On Sunday 4 Apr 82 B Sqn the Blues and Royals, Combermere Barracks, Windsor, received a Warning Order to prepare two medium reconnaissance troops, each of 2 Scorpions and 2 Scimitars, for duty with the Falklands Task Force. Third and fourth troops, led by Lieutenants Lord Robin Innes-Ker and Mark Coreth were selected. The initial problem was to retrieve their vehicles, which were in containers in Southampton awaiting an exercise. Once this was done, the vehicles were inspected, serviced and repaired and additional exterior stowage bins installed. One Samson recovery vehicle, with a four man fitter section and a collection of first line spare parts was also prepared.

The crews completed medical checks, drew arctic clothing and carried out refresher training in first aid and gun drills. The troops went with their NBC kit and first line ammunition scales plus 8 days daily ammunition expenditure rate (DAER). Second line spare parts, essential gunnery items, spare optics, and a further 25 days daer and three replacement CVR(T)s followed later.

Before going further, I will briefly describe the vehicles involved.

Scorpion, Scimitar and Samson are all members of the CVR(T) family. They weight approximately 8.75 tons, are capable of 50 mph and have a road range of over 400 miles. They have a very low ground pressure (5 psi - which is less than a man walking) and a high power to weight ratio, which gives them great acceleration and agility. They no longer have an inherent amphibious capability.

Scimitar mounts a 30mm gun and stows 165 rounds of 30mm APDS, APSE (Armour piercing special effect) and HE ammunition. It has a maximum effective range of 2000m. Scimitar also has an II gunner's night sight, a coaxial GPMG and a crew of 3.

Scorpion mounts a 76mm gun and stows 40 rounds of 76mm hesh, smoke and cannister ammunition. Hesh has a maximum effective direct fire range of 2200m and a maximum semi-indirect range of 5000m. Scorpion has an II gunner's night sight and a coaxial 7.62mm GPMG. It has a crew of 3.

Samson is a recovery vehicle with a heavy duty winch and a 3 man crew.

The only other British armoured vehicles deployed to the Falklands were:

a. One RM beach armoured recovery vehicle (BARV) a Centurion chassis fitted with a high superstructure, allowing it to wade to 2.4m. It is used to recover drowned vehicles and push off/haul in landing craft; and

b. Two combat engineer tractors (CET) crewed by personnel from the re wing of the RAC centre. The CET weighs 16 tons. Has good cross country mobility, is inherently amphibous and has a winch and dozer blade.

Not armoured but heavily used in the conflict were 80 RM Volvo BV 202E marginal terrain vehicles.

DEPLOYMENT

On 6 and 7 Apr the CVR(T)s (with three personnel) were loaded onto the Ro-Ro Cargo ship MV "Elk" and the crews boarded the SS "Canberra". Both ships sailed from Southampton on 9 Apr.

During the voyage south the crews conducted refresher training, concentrating on fitness, first aid, tactics and the theory of gunnery.

On 17 Apr they arrived at Ascension Island and moved ashore for training, including live firing and final preparations, much of it cross loading between ships of stores and equipment. While at Ascension the officers/NCOs gave lectures to all the major units on the capabilities of CVR(T) and how they might be used.

On 27 Apr the crews and vehicles boarded the LPD HMS "Fearless". Modifications were made to the vehicles to permit deep wading. "Fearless" sailed on 10 May in convoy with "Canberra", escorted by two frigates.

At this stage I will digress and discuss from the Armoured point of view, the terrain and enemy on the East Island, where both troops were to see action.

TERRAIN

The Falklands terrain is treacherous to both man and vehicle. The going is swampy and marshy, even on the high ground. Although there are no major rivers, the small streams are difficult to cross because their banks are weak. Large piles of rocks, boulders and gravel, known as "Stone runs" scar the hillsides, sometimes extending for miles. The settlements are connected by rough soggy tracks which are often incorrectly marked on maps and can barely support a Landrover in the dry season.

An added factor was that the operation was conducted in the winter months. Although it was a less severe winter than normal, with temperatures not dropping below -15°C, continuous rain, some snow, frost, poor visibility, 14 hour nights and wet cold conditions added to mobility problems.

ENEMY

The Argentines had 7 Infantry battalions on the East Island, 2 in the Goose Green/Darwin area and the remainder dug in around Port Stanley. They were equipped with 89 mm anti-tank rocket launchers, .50 Browning HMGs, 105 mm recoiless rifles and first generation ATGW. They also had sniper rifles with II night sights, which would later encourage crews to close down.

The Argentine Infantry were supported by 5 batteries of Italian 105 mm model 56 pack Howitzers and a half battery of French 155 mm guns. Available for the ground role were twin 20mm

rheinmetal and 35mm oerlikon AA guns. A direct hit from any of these weapons would have put a CVR(T) out of action. The Argentines had 24 armour plated Pucara ground attack aircraft in the Falklands, armed with 2 x 20mm cannon and other ordnance.

Argentine armour on the Islands was weak. During the initial Argentine landings, they deployed 16 American LVTP 7, a tracked amphibous vehicle that carried 25 Infantrymen. One was destroyed in Port Stanley by two direct hits from RM 66mm and 94mm anti-armour weapons. The LVTP 7 is a large, poorly armed, lightly armoured box. It was found to be too heavy and bogged easily, and was therefore withdrawn to the Argentine mainland. They were replaced by a squadron of 12 French Panhard AML 245 model C, A 4 x 4 armoured car with a 90mm gun. These vehicles were unable to get out of the Stanley perimeter. The Argentines had laid extensive minefields, including anti-tank mines, on the Islands.

On 21 May both troops made an unopposed landing, one troop in support of 40 RM CDO at San Carlos and the other in support of 3 para at Port San Carlos. They waded 50m to shore and had some difficulty crossing a $1\frac{1}{2}$m bank on the beach (Scorpion's maximum step is $\frac{1}{2}$m). Their initial task was fire support. One troop was bothered by Pucara. After the landings the two troops saw little of each other and were employed independently.

For the first two nights both troops were tasked to mount night OPs in the hills around the beach-head. By day, the vehicles were concealed in buildings, emerging for air raids and driving into CET dug trenches from which they engaged aircraft with 30mm and 7.62mm fire.

On 28/29 May both troops moved north with 3 CDO Bde. Third troop escorted a column of 25 BV 202 by night and in driving snow 30km to Teal Inlet while fourth troop advanced with 3 Para, who used it as a taxi service. Both troops then moved to Estancia House. They recced the approaches to Mount Longdon, provided OPs, and engaged enemy OPs. They proved beyond question that CVR(T) mobility was not a problem.

On 2 Jun both troops were detached to 5 Brigade at Bluff Cove. They motored south, with two local guides, across the Central Hill Range. This was terrible terrain that included very soft ground, stone runs and steep slopes, and under the worst possible weather-driving rain, high icy winds and visibility down to 20 yards. The trip was expected to take 36 hrs but was accomplished in $6\frac{1}{2}$ (by night). It was the armoured equivalent to the 3 CDO Bde "ROMP" from San Carlos to the Stanley perimeter. The troops arrived, in time, to reinforce 5 Bde after the disaster in Fitzroy Sound. One troop engaged the attacking Argentine Skyhawks with 30mm and 7.62mm fire, possibly destroying one aircraft. The Samson assisted in evacuating casualties.

Brigadier Tony Wilson, in a press statement, commented "It was a remarkable feat on their part to join the Brigade at that time. I knew at that moment that whatever happened at Bluff Cove they (The Argentines) could never take us out there".

During the skirmishing prior to the final offensive the troops were used to deploy and extract under fire the Scots GD recce platoon during a diversionary attack in the Port Harriet area and as a taxi service for the Infantry.

WIRELESS RIDGE

On 10 Jun, third troop moved North from Bluff Cove across the Central hills back to Estancia House to join 2 Para. During all four phases of the 2 Para assault of Wireless Ridge on the night of 13/14 Jun, the troop provided direct fire support, silencing enemy Infantry, HMG and recoiless rifle positions. In the final stages, after the Artillery Fire lifted, they provided the Infantry with their sole fire support. Wireless Ridge was the only action that saw armour provide intimate direct fire support to the main infantry assault. This certainly contributed to 2 Para's low casualties.

MOUNT TUMBLEDOWN

Also on the night of 13/14 Jun fourth troop shot in a diversionary attack on Mount Tumbledown by a half company of the Scots Gds. It was carried out along the most obvious approach from the south, while the rest of the Battalion assaulted Mount Tumbledown from the west. The diversion drew the Argentine's attention and much of their fire. During this operation a Scorpion hit an anti-tank mine. The crew were uninjured. The troop assisted the half company to withdraw and evacuated casualties while the rest of the Battalion rolled up Tumbledown.

SAPPER HILL AND STANLEY

On 14 Jun, fourth troop led the Welsh Gds up Sapper Hill as the Argentines collapsed while third troop carried the lead elements of 2 Para into Port Stanley.

Both troops sailed on 25 Jun returning to Portsmouth on 14 Jul.

RESULTS

Few lessons were learned but many old lessons were relearned or reinforced. They included:

a. Command and Control. The two troops did not have an armoured command structure (i.e., an SHQ). Because of frequent regrouping, this caused planning, command, control and replenishment problems throughout the operation. In hindsight and if there had been any spare shipping space, a small SHQ would have proved invaluable;

b. Armour - Infantry Co-operation. The troops were initially misused and underused with the Infantry realizing their capabilities too late. Their potential, in particular their firepower and mobility, was not initially understood. Lack of direct fire support at Goose Green and Mount Longdon was later bitterly regretted by the Infantry. By the end of the campaign the capabilities of the troops were better understood, and their direct fire support of the Infantry assaults on Wireless Ridge and Mount Tumbledown proved to be a great success;

c. Leadership, Discipline and Training. The success of the two troops owed a great deal to good leadership, sound minor tactics, good techniques and drills that were intelligently adjusted when required. There was good discipline and initiative. An important factor was that the troops had worked together for over a year and crews were not reshuffled. Morale remained high and action was found to be exhilarating. The RAC individual trades and tactical training structure was validated. Past AMF(L) experience proved most useful;

d. Weapons. Performed well. Each Scorpion fired 50-60 rounds of hesh at ranges of 800-4000m. The 76mm HESH round proved highly effective against ground targets such as trench systems and men behind rocks. One technical problem was encountered, leaking of compressed air from the 76mm recuperator. Each Scimitar fired 100-120 rounds of 30mm HE and APSE. 30mm HE proved very effective against soft targets at ranges up to 3200m, well beyond the maximum effective range of 2000m. The 30mm, as well as the 7.62mm GPMG, was also used in the air defence role and hits were claimed on three Skyhawks, with one possible kill.

The 30mm APDS Patec round was not fired operationally. The 7.62mm GPMG proved exceptionally reliable - one fired 17 boxes in 40 minutes without a stoppage. The majority of targets were engaged at night, and the II sights proved very successful. The availability of laser range finder sights would have improved accuracy, especially of 76mm; 6 Avimo LV10 sights were despatched but never reached their destination.

Power traverse would also have improved CVR's capability;

e. Mobility of CVR(T) far exceeded expectations. It maintained speeds of up to 30mph over bogs and crossed frozen minefields. Each vehicle covered 400 miles, much of it over treacherous terrain under atrocious conditions. The main problem was damage to tracks, sprockets and roadwheels from the stone runs, which incidentally ripped up the rubber tracks of the only other vehicle with good mobility, the BV202. There was only one major assembly failure - a gearbox. The Marlow KE recovery rope proved to be a lifesaver and quickly extracted bogged vehicles;

f. Communications. The Clansman 353 radio performed well under difficult conditions, but spares were lacking;

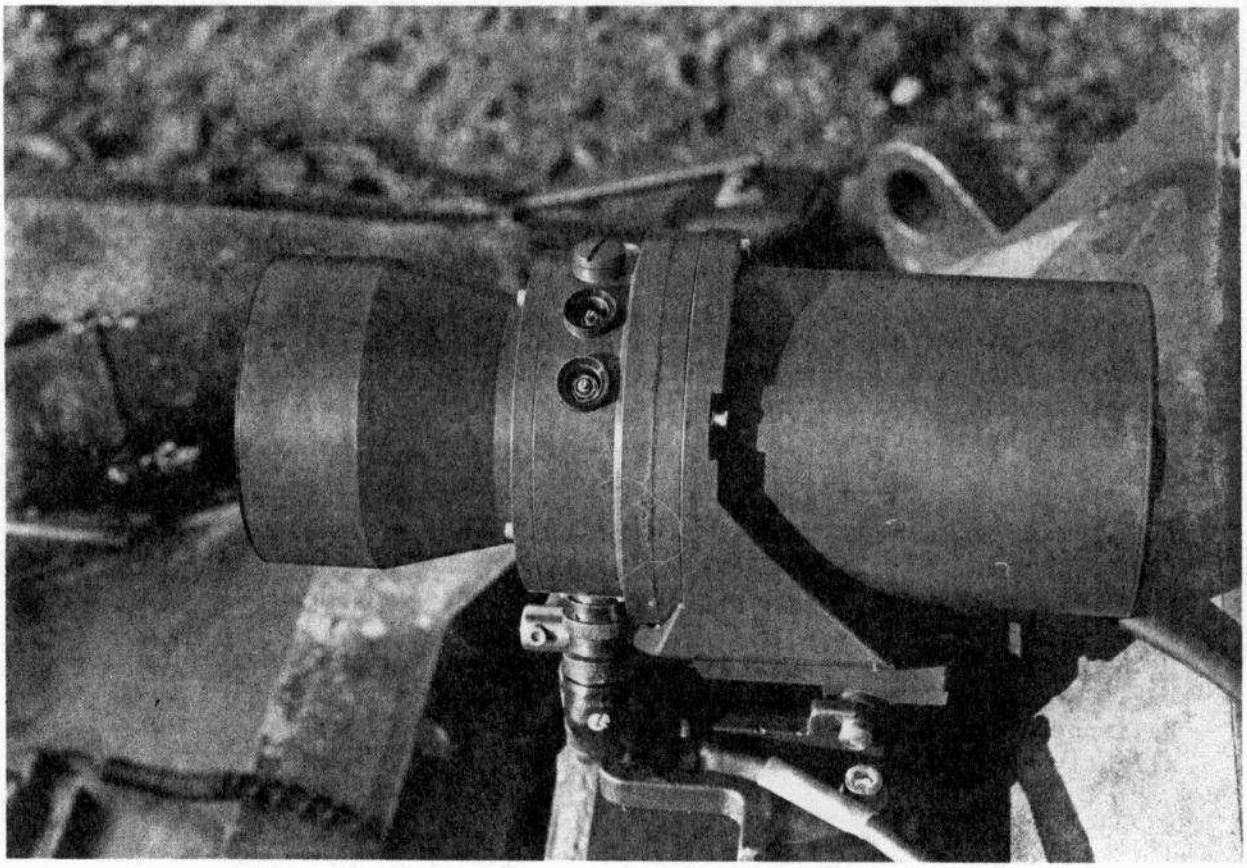
g. Vulnerability. No CVR(T) sustained a direct hit from anti-armour weapons, small arms or artillery. Enemy 155mm and 105mm artillery and 120mm mortar shells fell 2m from vehicles, in soft ground, without injury to crews or damage to optics or ancilliary equipment. A vehicle was blown up by a 13 lb US anti-tank mine fitted with an anti-personnel fuze. It removed both tracks, most of the roadwheels and bent the belly plates. The crew were uninjured; and

h. Administration. The two troops had no A echelon and administration was a problem throughout the operation. Frequent regrouping added to the problem. Food, water and fuel had to be acquired, often on a personal basis from the supported Infantry units who often did not understand the requirement and were often astounded by the amounts of fuel required. The problem was compounded by a shortage of jerricans. As resupply vehicles were not available, the CVRs had to carry all their ammunition on approach marches, followed by ground dumping at fire positions. Some Scorpions carried 140 rds of 76mm. Because there was only one Samson recovery vehicle, heavily laden with first line spares, the supporting REME element could not be split and the troops had to remain in the same Brigade. Brigade adm SOPs did not cater for the provision of major AFV assemblies or spares. There was a 5/6 day wait, for example, for a replacement gearbox.

CONCLUSION

The Falklands land battle was an Infantry operation conducted over terrain that did not favour Armour. Armour played a relatively minor role. If the small armoured element had been properly employed from the start, for direct fire support of Infantry in the assault, Infantry casualties would almost certainly have been reduced. The crews and vehicles performed exceedingly well throughout the operation, under the worst possible terrain and weather conditions. This reflects credit on the standard of leadership, training, discipline and fitness in the household Cavalary and RAC, and also reflects credit on the regimental system. The lack of a proper armoured command and administrative element was a major shortcoming.

**What Is It?** **Answer Page 96**



# POINTS TO PONDER

BY CAPT C.S. OLIVIERO

## *AUTHOR'S NOTE:*

*The following are notes on a talk given by General I. Tal, Israeli Army, at a symposium organized by Schweizerische Kriegstechnische Gesellshaft, Zurich, on the 20th of September 1983. I have taken the liberty of editing the comments in order to make them more readable. The intent of his remarks remain unchanged.*

## *BACKGROUND*

*Gen Tal, who once served with the British 8th Army in Italy, has played an important role in the shaping of Israeli tank policy and has masterminded the design of the Merkava tank. In his presentation he forcibly expressed the following views. Note that these views are based on statistical data concerning 12,000 tanks engaged in recent Middle East wars: 4,000 were casualties.*

## COMMENTS

Tanks must never be used piecemeal or they will be destroyed easily. Decisive actions are achieved when Armour is used en masse. Hence, it is important that tanks be simple, reliable and inexpensive.

Tanks should always fight in a definable group (troop). No communications should be allowed between tanks at troop level, because of ECM. Tanks in a troop should just "follow the troop leader; if he moves, they move; if he fires, they fire in the same direction". No orders should be given. Tanks should be designed to act as part of a group - not as individuals. They should be evaluated as part of a group.

With the advent of SAMs, close air support aircraft are now too vulnerable to use on the battlefield. Their place should be taken by more ground to ground fire support and by the close and massive use of combat helicopters.

APCs are not viable on the battlefield. For mounted attacks, use tanks: for dismounted attacks use Infantry on foot over the full distance of the attack. APCs are "very poor tanks". Very heavy casualties occur when attempts are made to drive them onto the objective.

Over 50% of all hits by all weapons were in the front 60 degree arc. About one third of the remainder (16.5%) were at angles that would be impossible to defeat even by new armours. The turret gets very slightly more hits than does the hull.

With current tank designs, penetrations invariably start fires that cause the vehicle to explode. All of this is mainly due to hydraulic fluids catching fire. The conflagration, which results in temperatures in excess of 1000°C, then ignites the ammo propellants. Most propellant fires begin in this way as opposed to direct hits on cartridges. It is important therefore to stop the chain reaction leading to cartridge explosion. Using electric rather than hydraulic controls is recommended in order to reduce the fire hazard. If fires can be reduced then more tanks would be recoverable. Further, not all crewmen who are wounded would be burnt as is now the case.

Only about 50% of the total weight of modern tanks provides protection. This can be increased to nearer 75% - using not just more armour but also integral parts of the tank, such as the engine, to decrease vulnerability.

Main battle tanks will always be heavy (50-60 tons). "Smaller" is not "better". The silhouette of a tank is not nearly as critical as the silhouette of a hull down tank; otherwise the silhouette does not matter much. An interesting point to note is that it has been shown that no one survives penetration of a small, very heavily armoured tank.

Firepower is measured not just by the gun bore and fire control equipment but more importantly by the number of rounds carried. Some battles have been decided by the number of rounds carried; the losing side being the one which ran out of ammo first.

Mobility is measured by the performance of the troop as opposed to that of a single tank. It is not a result of technological devices so much as it is of leadership. How obstacles are crossed and how fast they are crossed is important. Acceleration is not important except as far as it leads to a good capability to maintain speed on slopes. 17-20 BHP/TON is sufficient.

There are serious objections to reducing crew size below four. Unlike aircraft, the crewmen live with their tank days on end, and have to maintain it themselves. Further, remember that there will be casualties - if a crew is less than four men, the loss of one man would probably result in taking the tank off the road.

SUMMARY

*In summary, General Tal has compiled an excellent short list of comments. He seems to he heavily biased on the side of more armour as opposed to firepower or mobility. I tend to agree, but regardless of your point of view these are the types of issues which should concern all of us. Through discussion and argument we can all learn more about our profession.*

# TACTICAL USE OF SMOKE ON THE MODERN BATTLEFIELD

BY S.V. RADLEY-WALTERS, BGEN (RETIRED)

## INTRODUCTION

A review of military history confirms that smoke was used by the Canadian Army in all types of operations in WWII to provide the tactical commander with an additional means of affording protection for his own troops or to assist him in creating surprise and confusion on his opponent.

The employment of tactical smoke has many applications, since its success will depend on its intelligent use at all levels of command. In past battles it has been used in large scale operations such as the covering of major river crossings, assault landings or the flank protection of a large formation. These smoke screens require foresight and roper planning since large tonnages of ammunition will be required and a combination of weapons may be employed to support the smoke program, such as guns, mortars, rockets, aircraft or even smoke pots which will require prepositioning and maintenance.

At the lower levels of command the tactical use of smoke on targets of opportunity by junior commanders to cover the movement of their troops and vehicles from anti-tank guided missiles and direct-fire weapon systems has a wide application on the modern battlefield. This can range from the throwing of a hand grenade or the firing of a vehicle mounted smoke discharger to provide an instantaneous protective screen at the section or tank level, to the rapid build up of a smoke screen by employing artillery, tank and infantry direct fire weapons on orders of the tactical commander. This type of protection will provide greater freedom of movement on the battlefield, and helps to stabilize a dangerous situation by preventing serious losses of infantry, tanks, and armoured vehicles which have come under heavy enemy fire.

It is of vital importance that continuous research on smoke be carried out among the ABCA Countries, not only to share the benefits of their testing, troop trials and experience but to standardize battle drills.

It is considered that there is an immediate requirement to emphasize the advantages and employment of tactical smoke in our training pamphlets and to encourage its use during troop training and manoeuvres, so that commanders become completely familiar with its advantages and competent with its use and tactical control.

The aim of this article will be to outline the importance of the tactical use of smoke on the modern battle field.

EXAMPLES FROM WWII
OFFENSIVE OPERATIONS

During operations in WW II artillery concentrations and large scale barrages were generally made up of high explosive mixed with a variable percentage of smoke rounds. The smoke was used to blind the enemy's observation of the attack and also to indicate the location of the leading edge of the artillery barrage for the attacking forces. Pre-planned smoke screens which were used to screen flanks or high ground which dominated the axis of an attack were normally established by the artillery and are recorded in unit war diaries since they formed part of the operational fire plan.

Extensive use was also made of artillery green and red coloured smoke rounds to indicate the targets for strike aircraft and heavy bombers in support of ground operations which again are well documented.

Examples on the use of smoke by tank and infantry commanders on opportunity targets employing both direct fire and artillery weapons to create screens during the conduct of past battles have unfortunately not been recorded adequately in unit diaries. Consequently we have lost valuable tactical lessons in the employment of smoke from which to compare past experiences at the combat team level with its application in modern warfare.

Having taken part in a number of operations where smoke was used successfully at the battalion and brigade group levels, the following examples will help to illustrate its importance in offensive and defensive operations.

THE ATTACK INTO CAEN - NORMANDY 1944

a. On the 9th July 1944, the 3rd Canadian Division was attacking along the main highway towards Caen. The leading elements of the 9th brigade consisting of a battalion of infantry supported by a squadron of tanks had reached the outskirts of the city, then the leading tanks came under heavy fire from a number of enemy tanks and self-propelled guns on the right flank, at approximately 1200 yards. Three of the leading tanks were destroyed and the remainder carried out a left flanking action to avoid the enemy fire, however in so doing they became involved in an enemy minefield and the momentum of the attack slowed down.

b. A second squadron of tanks was ordered to move forward and support the infantry and to break through the last line of defences into the city. Before this final attack started, the general area where the enemy tanks were located was indicated to the tank commanders. All tanks were ordered to fire smoke into this area based on the target indication and corrections made by the squadron commander. The smoke was a mixture

of base emission from the 75mm, and phosphorous from the 17 pounder tank guns. The initial smoke screen was created in a matter of a few minutes and then the lead tanks were ordered to advance and start the attack. The artillery forward observation officer was ordered to build up and maintain the smoke screen during the attack and to engage likely enemy positions with high explosive concentrations. The application of smoke on the right flank obviously prevented the enemy from observing the attack properly and in order to get better visibility he abandoned his well camouflaged positions and started moving to other locations in an attempt to find gaps in the smoke.

c. The leading tanks moved quickly to their objectives covered by the supporting ones in the rear employing "Fire and Movement" drills. During this operation which lasted approximately one hour, the supporting tanks were able to identify the enemy which had attempted to move "up wind" from the smoke screen, and in the ensueing engagement, a number of enemy tanks were hit and destroyed and the remainder withdrew, allowing the main highway into CAEN to be cleared of enemy interference. The infantry and tanks then entered the city against intermittent sniping.

d. Conclusion. The use of smoke to blind the enemy tanks and anti-tank weapons and prevent observation onto the highway into CAEN had a direct bearing on regaining the initiative and momentum of the attack. It reduced the number of casualties which would have occurred had the enemy tanks been allowed to engage freely from their well camouflaged positions. It also had the effect of making the enemy tanks move and disclose themselves which put them at a distinct disadvantage. Once they were forced to move their positions, they were identified and successfully engaged and driven out of their blocking positions.

CAPTURE OF FALAISE - AUG 16-17 1944

a. During the late afternoon of 16 Aug 1944, the leading elements of the 6th Canadian Infantry Brigade composed of the South Saskatchewan Regiment and the Queen's Own Cameron Highlanders of Canada with the Les Fusiliers Mont-Royal in reserve reached the outskirts of FALAISE in Normandy.

b. The South Saskatchewan Regiment was supported by a squadron of tanks from the Sherbrooke Fusiliers Regiment. This battalion group attacked along the eastern flank of the main CAEN-FALAISE highway since a previous attack astride this highway had already been stopped by the enemy.

c. All known and suspected enemy locations were engaged with heavy smoke and high explosive concentrations. The city had been bombed and strafed by fighter aircraft (Typhoons) firing rockets. Many buildings were burning as a result and this hampered the enemy's observation.

d. The city of FALAISE is situated along a valley which allows observation across it from the west along the CAEN-FALAISE highway. This meant that the attacking forces were exposed for approximately 1000 yards until they covered this distance to the outskirts of the city where they could then get cover from the buildings.

e. The infantry attacked with "two companies up", supported by the tank squadron and divisional artillery. Shortly after the attack began heavy anti-tank fire came from self-propelled guns and sniping tanks camouflaged along the CAEN-FALAISE highway and from weapons hidden in buildings covering the likely approached into the city.

f. As soon as this engagement started, the leading tanks fired smoke in the general area of the enemy anti-tank fire and ran for cover in the nearest hedgerows. The supporting tanks in the squadron immediately engaged the area with smoke and quickly built up a protective screen, between the leading tanks and the enemy's position.

g. Whilst this was happening the artillery Forward Observation Officer was ordered to maintain the tank smoke screen and neutralize the expected enemy locations with heavy concentrations of artillery. The tanks in the supporting role were ordered to observe the gaps in the smoke screen and engage enemy tanks and any other movement in this area.

h. As the smoke screen was being established the infantry increased their rate of advance and the leading tanks broke from cover and advanced under the protective cover of the screen and artillery concentration and closed towards the outskirts of the city, joining up with their accompanying infantry. Once the battle group reached the buildings on the city's outskirts, a number of violent small unit actions took place and a number of towed anti-tank guns were destroyed and infantry blocking positions in buildings were captured.

j. Two enemy tanks were destroyed as they attempted to withdraw from the CAEN-FALAISE highway, since they were now out flanked, and the remaining survivors were able to escape around the northern flank of the city. The battle went on all night and into the next day. The three battalions of the brigade were engaged in street clearing and house to house fighting using smoke from the tank guns and the infantry 2 inch mortars to assist the infantry to advance from street to street and block to block, until by late afternoon of the 17th of Aug, when the entire city was finally captured.

k. Conclusion. The skillful use of smoke by the tanks and artillery at a crucial period in the attack allowed the advance to continue. In fact because of the screen the entire attack speeded up to gain protective cover over the open ground and quickly closed the gap towards its objective.

m. The infantry, tank and artillery commanders at this stage of the Normandy battle had gained considerable battle experience and the establishment of a quick smoke screen by using the tanks and artillery was accomplished rapidly and with few orders. Junior commanders took the initiative and acted on their own and and moved the troops forward quickly by bounds once the screen began to build up. Those tanks and infantry in supporting positions in rear along with the artillery FOO maintained the density of the smoke screen thereby allowing the forward elements to get on with their main task of closing with and destroying the enemy.

n. In this particular battle most of the tanks had fired their multi-tank smoke dischargers to give them immediate protection once the enemy tanks opened fire. Not only did the immediate smoke assist in blinding the enemy but it afforded protection for other vehicles and infantry in the vicinity who took advantage of the local cover and moved forward quickly to areas where the ground gave them better protection. A whole series of advantages are created once smoke is used and the junior leaders must be trained to grab these opportunities to their advantage to gain the initiative and win the fire fight.

p. When the attack reached the outskirts of the city of FALAISE a considerable amount of smoke still existed in the general area and this condition lasted throughout the hours of daylight. At no time did infantry or tank commanders complain about this lack of visibility since they preferred to move under these adverse conditions where they were relatively safe from direct fire engagements. Smoke has often been termed as a two edged weapon since the direction of the wind controls the smoke screen and it may

create confusion with our troops. Obviously movement is restricted when troops are fighting in smoke. To overcome this confusion troops must be properly trained for these adverse conditions of visibility as they are for night fighting. This will then allow the use of smoke under any conditions. During the Battle of FALAISE most of the city and its avenues of approach were covered in smoke for long periods of time and it is considered that 6th Canadian Infantry Brigade benefitted tactically from this condition. This lack of visibility created greater confusion to the defender who was partially blinded throughout the attack towards the city and once the troops had gained the perimeter it was only a matter of time until it was cleared and captured.

CAPTURE OF BURON - NORMANDY 8TH JULY 1944

a. At 7:30 a.m. on the 8th July 1944, the 9th Canadian Infantry Brigade supported by tanks from the Sherbrooke Fusiliers crossed its start line, heading for its three village objectives northwest of CAEN. The Highland Light Infantry supported by a squadron of tanks attacked the village of BURON.

b. Despite the heavy artillery barrage the enemy resisted the Highlanders attack and fought for every trench and yard of ground. As the battalion group reached the outskirts of BURON it encountered a deep anti-tank ditch which prevented the tanks and other vehicles from crossing. Once this obstacle was reached the armoured vehicles became targets for anti-tank guns and tanks which were firing from the high ground to the south and southwest of the village.

c. A smoke screen was established quickly by the tanks preventing the enemy from inflicting serious casualties although a number of tanks were destroyed before the smoke blinded the enemy. A reconnaissance was made on the anti-tank ditch and crossings were marked by the pioneers. The infantry came under particularly heavy fire and had a terrible struggle before reaching the village. Whilst the obstacle was being crossed the artillery maintained heavy concentrations of smoke and high explosive on the high ground to the south which dominated BURON.

d. Once the tanks had linked up with their infantry the advance through the village continued, however, the resistance at the farthest end of the village became more intense and a new attack was launched with the survivors from the Highland Lift Infantry and the five tanks which were left.

e. A novel use was made with a troop of flails which had

been used for clearing mines. In this particular operation they were used to clear the enemy from the trench system which dominated the back of the village.

f. The attack plan was simple. The artillery maintained heavy concentrations of high explosive and smoke on the high ground which dominated BURON and kept the enemy from observing and engaging the attack with heavy anti-tank weapons. The five tanks led the attack up to the trenches using machine guns and high explosive rounds to keep the enemy neutralized whilst the flails followed immediately to their rear. Once the trench system was reached the flail tanks lowered their booms to their lowest depression and began flailing the trenches under the protection of the tanks and artillery. The infantry who followed closely in rear of the flails jumped into the trench system and began clearing out the enemy.

g. Conclusion. At this stage of the battle the attacking force had been reduced to a small battle team consisting of less than a company of infantry supported by five tanks and four flails. A large number of enemy were killed and captured and the high ground was later captured by this small group. The smoke screen was a tremendous factor to the overall success of this action. The enemy tanks were confused by the smoke and attempted on a number of occasions to come forward to the edge of the screen to observe and engage. On these attmpts their movement gave away their exact locations and a number of enemy PZ MK IV and MK V's were engaged and destroyed.

h. The tanks had exhausted their multi-barrelled smoke dischargers on the initial engagements when they were trapped on the anti-tank ditch and all the smoke grenades which were carried in the tanks had been used. The smoke ammunition in the tanks had been used up during the battle, and the artillery frequently had to replace their holdings in the gun lines as more smoke was requested during this lengthy action. "After action" reports indicated that approximately one hundred rounds per gun of smoke was expended by the artillery field regiment in support of this particular attack. The 2 inch mortars were used to good advantage by the infantry who at times were extremely vulnerable due to the flat ground which gave very little protection during the attack towards the village.

j. Smoke can be considered as a tactical reserve in the hands of a tactical commander which can be employed quickly during the conduct of the battle, especially when the situation becomes desperate and heavy casualties are being taken. Under these conditions, the use of smoke tends to stabilize the situation and gives the attacker time to regroup, reorganize and regain the initiative in the heat of battle.

OPERATION VERITABLE

a. Operation Veritable took place in HOLLAND from 8-10 Feb 1945 in which 30 British Corps cleared the area between the rivers MAAS and RHINE. The Corps was deployed with five divisions up and two of these divisions were Canadian, i.e., 2nd Cdn Inf Div and 3rd Cdn Inf Div.

b. The ground over which the attack took place was extremely difficult since the REICHSWALD FOREST covered an area nine by five miles square and the ground close to the rivers is a flood plain which is wet, flat and intersected with drainage ditches. Further obstacles to movement were abandoned channels, marshes and back waters, often with a considerable depth of water making vehicular traffic almost impossible.

c. The enemy defences were strong and well dug in since he occupied a position of the SIEGFRIED line, which consisted of field defences in the northern sector and formidable concrete which was found further south dotted with many pillboxes. This heavy fortified line dominated the area to the east where the attack was mounted and the area to the north of the corps attack was completely open.

d. A study of this particular operation confirms that tremendous quantities of smoke were used to screen the flanks and as a means of deception to hide the troops during the mounting period.

e. The artillery support for Operation Veritable was intended to be a battle winning factor with over one thousand guns not including anti-tank and Bofors guns supporting the attack.

f. During the entire operation the use of smoke was an important addition to the artillery fire plan. After the preliminary bombardment, a deception smoke screen was fired along the whole length of the front, followed by a complete silence for ten minutes. This screen and

silence was intended for two purposes:

(1) to get the enemy to man his guns and fire his defensive fire plan and then hit him a hard blow while he was thus exposed.

(2) To give sound rangers, and four pen recorders, the opportunity of locating any enemy guns and mortars which fired during this period of silence.

g. Nineteen enemy mortar areas and one hostile artillery battery were located during this period and all were successfully engaged. A similar deception plan was fired later on during the battle which was designed to confirm the enemy artillery locations and bring them back to their guns so that counter battery bombardments would be more successful. In all twenty-three mortar targets were engaged through this method.

h. The opening line of the initial barrage was made up of mixed smoke and HE and this was fired for seventy minutes to allow the assaulting formation to form up properly and then the artillery line moved forward. To help indicate the targets to the advancing troops, one minute before the end of firing on each artillery block, all guns on the front line ceased firing HE. One gun per troop would then fire yellow smoke which indicated no more HE on that line and that the barrage would lift in one minute.

j. The protective smoke screen was fired during the forming up period and during the initial attack, which prevented the enemy from observing the front edge of the REICHWALD Forest. 2 Canadian Division had an exposed left flank which also had to be screened. To protect it, a smoke screen four thousand yards long was fired by two field regiments which lasted for six hours.

k. Throughout Operation Veritable there was a constant threat of observed enemy fire from the right bank of the RHINE interfering with attacks, moves and maintenance on the left flank. To prevent this, smoke screens were laid by pioneer smoke companies using smoke generators. This screen was kept going throughout the entire operation and it was a great success. By the end of the operation 85,000 generators had been used to produce a smoke screen some 30,000 yards long.

m. Conclusion. Operation Veritable is a classic example of the use of large concentrations of smoke controlled at the highest level of command to:

(1) Protect troops during their initial forming up phase;

(2) To protect them from enemy observation during the initial attacks;

(3) To protect an exposed flank; and

(4) To screen large areas of high ground on the right bank of the RHINE using smoke generators which were kept in continuous operation for over three days.

SMOKE IN DEFENSIVE OPERATIONS
OPERATION TOTALIZE - NORMANDY, 7-8 AUG 1944

Operation Totalize was the night attack by 2 Canadian Corps astride the CAEN-FALAISE highway in Normandy on 7/8 Aug 1944. Although the ground provided excellent tank going and had few obstacles apart from the railway it favoured the defence much more than the attack. The villages were strongly built and the woods and hedges which surrounded them and the outlying farm buildings, provided excellent positions for anti-tank weapons sited to cover the open ground.

The enemy appreciated that an attack would be made in this area and prepared three defence lines between CAEN and FALAISE which were thickened up with anti-tank and 88mm guns deployed against the Canadian Corps.

The main tactical problem was how to get the armour through the enemy guns screen to sufficient depth to destroy the anti-tank gun and mortar defences, in country highly suited for defence.

It was decided that the attack would be mounted at night using tanks and infantry mounted in armoured personnel carriers. This plan required careful preparation and training by the troops prior to the operation. It required overwhelming air and artillery support to destroy tanks, anti-tank guns, artillery and mortars and the penetration had to be deep enough to prevent a loss of speed and momentum.

At 2300 hours on the 7th of August the aircraft started bombing on targets marked by flare shells. Half an hour later the armoured columns crossed their start lines on either side of the FALAISE road and picked up the barrage without difficulty. The hundreds of vehicles added their dust to the dense clouds raised by the barrage. It was blinding the drivers already struggling with the general obscurity and contrasted glare of the search lights, and who were only able to see the

nearest tail lights ahead of them which had been turned on as direction aids. This procession crawled in lowest gear at 100 yards a minute towards their objectives 6000 yards away. The columns were guided by Bofor tracers and by tapes and lights which the engineers of the gapping force had laid, and from which maximum benefit was derived during the early stages of the advance. The moon came up about midnight and did much to brighten the night.

The enemy appeared at first to be overcome with confusion, but recovered sufficiently to put down defensive fire with artillery and mortars. He was clever enough to add to the difficulties of a rising ground mist by thickening it up with smoke. This created considerable blinding effect to the advancing columns and the problem of keeping direction became extremely difficult and they went astray at the village of ROQUANCOURT. Instead of passing west of the village, the right hand column took the wrong routes. Three of the leading battle groups got confused in the smoke and lost their bearings in an attempt to bypass the village. These delays meant the loss of protection from the barrage, and the gapping force did not reach the debussing area until 0210 hours 8 Aug which was over an hour after the barrage had finished. Throughout the night radio calls came back over the wireless to increase the intensity of the search lights and to restart and speed up the fire of the Bofors which had stopped at H - 45. Though the leading tanks reported the Bofors effective, the search lights were unable to pierce the smoke and dust cloud which lasted throughout the hours of darkness.

Conclusion. Through the ingenious use of smoke at night the enemy created confusion within all of the advancing columns so much so that precious time was lost during the attack. Units became confused and lost their bearings and separated themselves from their protective artillery barrages. Many objectives were not reached until the following day which meant that the defender had an opportunity to regroup. On subsequent actions which followed he was able to create serious casualties on the follow-up forces which were designed to maintain the momentum of the attack, and break through the enemy defences. FALAISE was eventually captured on the 17th of August.

SMOKE EMPLOYED IN DEFENCE TO SEPARATE AND CONFUSE THE ATTACKER

After the capture of CAEN in Normandy the Canadian Army advanced across the ORNE river and captured the village of SAIND-ANDRE SUR-ORNE. The enemy resistance stiffened considerably and the village was subjected to a number of violent enemy counter attacks by tanks and infantry. On one particular attack smoke was used to confuse the attacker and to separate the leading elements from their direct support. The ground to the north of the village dominated the area held by the defender and excellent observation could be gained. The enemy formed up behind this high ground and attacked the village under the protective cover of his artillery. The enemy forces attacked with their leading elements in a depth of approximately 800 yards. The troops in support of the leading elements remained in hull-down positions on the dominating

"... AND SO, GENTLEMEN, I HOPE THAT I HAVE MADE MY POINT ABOUT THE USE OF SMOKE!"

ground and covered the leading forces as they leap-frogged forward.

The attack was allowed to move within four hundred meters of our forward defended localities and then all weapons opened fire together. The attackers were taken completely by surprise and in a short period of time heavy casualties occurred and the attack was completely stopped. Many of the attacking tanks and infantry attempted to withdraw from this trap with the help of the supporting forces who had remained on the dominating ground since they had good observation and fields of fire.

At this critical stage of the operation the artillery forward observation officer with the defenders was ordered to create a smoke screen on the high ground between the enemy's supporting elements and those attempting now to withdraw.

Conclusion. These tactics were completely successful and prevented the enemy from supporting his forward elements who were now pinned down by direct fire. The enemy lost eleven tanks and many infantry were killed and wounded. The use of smoke prevented him from providing direct support during a crucial period in the battle with the result that the attack failed and many casualties were inflicted on troops who might have escaped had covering fire been readily available to them.

TRAINING FOR WAR

The intelligent use of smoke will save considerable casualties and will allow the tactical commander greater freedom of movement in offensive operations. Before crossing areas which are open and provide good observation for the enemy, unior leaders should bring down smoke to cover their movements forward.

Smoke has often been termed a two edged weapon because the direction of the wind controls the smoke screen and it may create confusion with our own troops. To overcome this disadvantage, training and experience will allow one to use smoke under any conditions. If the wind is blowing directly into the face of the attacker smoke must be fired further in depth and allowed to blow through the suspected enemy positions. Conversely if the wind is behind the leading elements smoke is placed closer to them. The same rules apply when the wind is blowing across the front, and good judgement will be required to place it correctly.

To engage a target the enemy must be able to observe, especially when employing high-velocity weapons and anti-tank guided missiles. Experience has shown that the defender has at least a 5 to 1 advantage over the attacker in the initial engagement. If only neutralizing fire is being brought down by the attacker, the defender can still observe if his weapons are in armoured vehicles or in well-dug positions. Smoke then,

is employed to screen the enemy and it complements our indirect and direct fire programs. It is based on the philosophy that "what the enemy can't see he can't hit". Sometimes it is even better to work directly in smoke and although movement and fire control is difficult it is no worse than night fighting and it gives the attacker the advantage of closing with the enemy and once on the objective the chances are relatively even.

When smoke is used during offensive operations there is an obvious psychological effect on the enemy. Since he cannot observe the forward elements moving towards him, there is an impulse to move his mobile anti-tank weapons thereby disclosing his well-camouflaged positions. It is important then, to have tanks and anti-tank weapons deployed in a supporting role observing the edges of the smoke screen, as these are new areas where the enemy is most likely to move into. In this way the attacker gains the initiative and can close the gap to the objective with fewer casualties.

Tactical commanders should brief the artillery whenever large quantities of smoke are to be used, since there is a logistics problem in getting sufficient smoke to the gun lines. It doesn't take long to deplete the gun's first line holdings, when large quantities are required.

An example of a simple battle drill for the employment of a quick smoke screen is when infantry or tanks are being engaged by anti-tank fire and the exact location cannot be determined quickly. Smoke is fired immediately by the tanks into the general area from where the enemy fire is anticipated. This can be built up quickly by other tanks and infantry direct fire weapons, since the target is indicated to everyone. In the moments that follow it may be possible to pinpoint the enemy's position and he will be engaged with direct fire. If his location is not determined the FOO who has already seen the smoke can engage with artillery smoke. All he requires is a short order from the commander if a correction is required, which states "reference my smoke - go right - 400 and build up". The inter-play between the tanks firing smoke and the artillery is very intimate since the mobile weapons only carry a limited supply whilst the artillery can replenish within its gun lines. Once the enemy has been blinded by the smoke the attack continues, and the FOO turns his attention to the enemy with heavy concentrations of neutralizing fire, to allow the forward elements to move closer to the enemy position and close the range with direct fire when they move into positions closer to the smoke screen. In some situations the tactical commander can wait until the smoke starts to thin out and attack based on a set plan. He also has the option of continuing the advance to the enemy position using the artillery smoke and high explosive fire program to maintain the momentum, and by moving by bounds and employing fire and movement the position is overrun.

The use of smoke should be carefully studied and its employment emphasized with the introduction of guided anti-tank missiles. It is an excellent means of indicating targets to FOOs. This reduces the amount of communications over the radio and gets rounds down on the ground quickly. Communications are then only required to correct the target. As an example, a brief radio communication to the FOO might be "reference my smoke - go right 300 - machine gun and two anti-tank guns at right corner of orchard - neutralize".

The enemy and the ground are two factors which we have little control over. We must try to overcome the enemy by using the ground to our best advantage. To do this, junior leaders must take the initiative and use smoke to indicate targets so that the others in the combat team don't have to wait for orders, to start the engagement. The ability to get neutralizing fire down on a target quickly is one of the most critical factors in neutralizing the enemy and winning the fire fight. Tactical commanders must emphasize the use of smoke in their training in order that the subordinates become proficient in its use.

## TRAINING TRIALS - PETAWAWA 1970

A trial was carried out at base Petawawa during the summer of 1970 using smoke to protect a mechanized battle group against hostile air attack.

The aircraft were ordered initially to attack the force which was moving in battle formation, and the pilots had no difficulty locating their targets and engaging. A second attack was ordered, however, this time the tank and armoured personnel commanders were ordered to fire their multi-barrelled smoke dischargers and smoke grenades to build up a protective smoke screen.

This smoke created problems of visibility for the attacking aircraft and the pilots reported that it was extremely difficult to identify individual targets and lock on to them during their run in attacks. This protective screen allowed the mechanized force to run for cover in the surrounding weeds and hide which made their position difficult to locate.

Although this trial was extremely simple it is considered that smoke will assist ground forces when they are caught in the open and subjected to a surprise air attack. Through the use of light anti-aircraft weapons and the build-up of a quick protective smoke screen a tactical commander may be able to protect his force from suffering severe casualties. It is therefore recommended that further trials should be conducted in this particular area, to establish if smoke used under these circumstances would be effective. If the results were positive then battle drills could be established to enhance its employment.

TYPES OF SMOKE

Various types of smoke were used during WWII and each had different characteristics. The phosphorous which was fired from the 105mm and the 155mm artillery guns created an instantaneous screen, however, on hot days it had a tendency to pillar and the screen dispersed quickly in a strong wind.

The base emission type of smoke from the 75mm tank guns and the artillery 25 pounders took a longer time to build up a screen, however, since the smoke emitted from a round which was lying on the ground rather than from one which had burst this gave an excellent characteristic of hugging the ground especially in conditions of light wind. It was found that a combination of both, normally was found necessary for creating adequate screens. Initially commanders fire phosphorous smoke to provide a quick screening effect, however, once this was done base emission smoke rounds from the other weapons were employed to maintain the screen and thicken it up at ground level. This is an important feature in creating an effective screen since tanks, anti-tank guided missiles and other direct firing weapons are sited just above ground level. Observation must be restricted to ground level, otherwise these weapons will not be neutralized.

It is understood that smoke rounds have been designed whereby the pillaring effect has been reduced and the covering characteristics have been greatly improved over weapons of WW II vintage. The maintenance of the smoke screen is an important consideration and the use of an emitting device allowing the smoke to dissipate slowly at ground level is an important feature which should not be overlooked.

The multi-barrelled smoke dischargers of WW II vintage were effective and saved many casualties, however, a better means of creating a local smoke screen must be found. The requirement is to have a large volume of smoke created in the minimum amount of time and the initial screen should cover an area of at least one hundred meters long at one hundred meters from the launching vehicle. This particular characteristic allows the crew commander some tactical leeway and freedom of action to use the screen as a means of protection as he runs for cover. Since the wind will have a direct effect on the direction of the screen it is important to get the smoke out at least one hundred meters from the vehicle to allow the commander the minimum freedom of action, behind which he will make a snap decision and run for cover. Should the wind be blowing directly towards him this gives him a few seconds to recognize the fact, immediately go into high reverse and not get shrouded in his own screen. This elbow room is important from a tactical viewpoint

and the separation of the screening effect from the launching vehicle is an important factor in the research of any new system.

## POSSIBLE AREAS OF STANDARDIZATION WITHIN ABCA

The use of tactical smoke on the modern battlefield should be an important standardization subject for the ABCA countries. The areas for possible standardization are:

a. Types of smoke to give the best screening effects under all conditions of temperature and weather, i.e., summer, winter, wind, rain, etc.

b. Types of launchers which will provide the most effective screens at the required distances.

c. Battle drills and methods of employing smoke through the cooperation of all arms, i.e. tank, artillery, mortars, infantry and air.

d. Agreement on the colour of smoke which will be produced and used for indicating targets to strike aircraft and other weapons on the battlefield, i.e. green, white, red, etc.

## CONCLUSION

"Surprise" is one of the principles of war, and has been used frequently in the past by good commanders. Napoleon said that "a good General can be defeated but he should never be surprised". The intelligent use of smoke helps to reduce this element of surprise which is always present on the battlefield. With the introduction of sophisticated anti-tank guided missiles it is considered that defensive measures must be found to reduce their dominating effects over large areas. It is believed that smoke can be effective if used tactically against such weapon systems. Research in this direction must be strongly emphasized at this particular time. This problem will be solved only through research and the cooperation of all arms in finding a simple and effective counter measure to the anti-tank guided missile.

## FEEDBACK - CAPTAIN M. CESSFORD

Comments on The Anti-Tank Helicopter Threat by Capt K. McKay

ARMOUR BULLETIN Volume 15

I read with interest Capt McKay's article concerning the anti-tank threat represented in the MI-24 HIND attack helicopter. The points he raises are valid and worthy of study. The threat is real and increasing year by year (already reports of the HIND-F have reached Western sources).

I would, however, like to add a few comments to Capt McKay's article. I am basing these ideas on observations I made while a troop leader participating in the annual "SNAKE-BITE" series of AH/TK exercises which employ elements of The Royal Canadian Dragoons against U.S. Aviation Companies controlled and directed by 444 Squadron. During these exercises the RCD were occasionally augmented with BLOW-PIPE dets, TOW dets, FOO parties and infantry sub-units. I have also had the opportunity to observe the employment of VULCAN, CHAPPARAL and GEPARD attached to Canadian Combat Teams during several NATO fall exercises.

The first point I would like to make concerns the value of recce, both Brigade and Regimental, in countering the AH threat. The Bde recce Sqn will usually be deployed 10-12 km in front of our Forces. These elements are ideally placed to give advance warning or even to disrupt AH ops. Again and again during SNAKE-BITE our recce patrols would catch the enemy AHs setting up "killing zones" or even on the ground in Forward Arming and Refuelling Points (FARPs). The result was three-fold: disruption of the AH plan (including considerable loss of ground), reduction of successful attacks against the combat teams to almost nil and an increase in the losses of AHs.

It is true that the LYNX is ill-equipped to engage HINDs except under the most advantageous of circumstances. Any LYNX replacement should be armed with a weapon such as the US BUSHMASTER or UK RARDEN cannons to enhance its anti-helicopter capability. These weapons would be effective against HINDs up to 1500m away and would provide some support to our Forces (the maximum range of the AT-6 SPIRAL is estimated at 5-8000m).[1]

Another possibility would be the arming of our recce with the BLOW-PIPE. This weapon, used by both sides, proved to be extremely effective during the recent Falklands conflict. It has been credited with destroying 1 SEA HARRIER, several A-4 and PUCCARA attack aircraft and was particularly effective against helicopters.[2] During one SNAKE-BITE exercise, I was an umpire for a BLOWPIPE detachment which moved with our lead recce patrols. It was an unorthodox grouping to be sure but it was effective. This det moved 1 bound behind the recce and from this "overwatch" position engaged numerous COBRA and KIOWA aircraft.

The liaison between the recce and BLOWPIPE det was close and mutually beneficial. This team was never surprised by enemy aircraft and was credited with several kills. And again the enemy was unable to engage our armour cbt teams.

I am strongly in favour of a more generaous distribution of BLOWPIPE. Why can't we form BLOWPIPE sections in our armour regiments, infantry battalions and recce squadrons? Every Soviet Motor Rifle platoon carries 1 SA-7 STRELA, why can't we?

I would now like to discuss the training of our commanders and crews against the AH threat. Perhaps the most important lesson to be learned is the value of tactical driving, emphasizing speed and selection of ground, against the ATGM threat. Capt McKay is correct when he states that the SPIRAL has a high hit probability but this is against stationary targets. However, a LEOPARD moving at 30 KPH or faster, appearing and disappearing into folds of ground presents a different proposition. The Bundeswehr consider half the protection of a LEOPARD to be in its speed (mobility) and I have no reason to doubt this. Our crew training must continue to emphasize tactical driving.

Observation by all crew members must be stressed in training. I was impressed by the importance given this by German armour units. In tank units every observer had the AAMG unlocked and covering an arc. This held true for infantry and recce units as well. This is in contrast to our units in which air observation has not always been emphasized. Crew and tank arcs must become SOP within troops. The techniques described in the Tank Troop leaders manual as "Saggar Watch" must be refined and extended to cover AH ATGMs. Training should include reaction to the observation of the launch of an ATGM. These simple drills can be employed and practiced at the troop level and do provide protection from ATGM. An aid to the detection of helicopters is to switch off during halts. Helicopters advertise themselves by their loud rotor noise, and we should take advantage of this.

Camouflage must be emphasized as well. This has to include reducing any AFV signature such as dust, tracks or whatever. If the enemy cannot acquire us they won't be able to hit us and we can engage the AH at an optimum range and position. Capt McKay makes this point very well in his discussion of passive defence.

Smoke will prove useful in screening helicopters but reaction speed will be important. It appears that white phosphorus (WP) would be most effective as it can quickly be brought into action. Another advantage is the disruption to the IR control system of the AT-4 SPIGOT caused by WP. It is uncertain if the guidance system of SPIRAL is TV guided or LASER designated but WP will assist in distracting or diverting the ATGM. A case may be made for 1 tank, possibly the Tp Ldrs, to move with WP loaded.

Let's now consider the employment of VULCAN or GEPARD within the cbt team. I believe that the key principle must be forward deployment of these resources. We must force the AH to engage at maximum ranges thereby increasing our warning and reaction time. It is interesting to note that in an issue of the Canadian Army Doctrine Bulletin (No. 5), a tendency was observed by war-gamers to leave their Air Defence elements at the end of columns where: "it serves no useful purpose and creates a large target for enemy air attack". We have to keep the AH at its extreme range. I would suggest that the best position for these systems would be directly behind the lead troops or platoons of the combat team, possibly co-located with the SHQ. During the advance, the commander must always be considering the AH threat in his map appreciations. AHs require large open killing zones and commanders can often anticipate areas of likely AH threat.

The considerations will be different in the defence but again I believe forward employment nust be stressed. A Commander, in consultation with his air defence advisors should, site his anti air support to cover likely AH engagement positions (these probably won't be in his killing zones) and as well provide for protection of his other relatively vulnerable air defence resources. The situation in which our tanks are engaging enemy armour head on but are being engaged by AH from the flank is certainly realistic and must be countered as much as possible by anticipation of AH engagement positions. Pre-registered artillery fires using WP and VT ammunition could disrupt AH engagements before they become critical. Tanks must have good alternate positions and where possible, good flank protection. The HIND threat must be considered in every commander's plan for defence.

In closing, I would like to review my thoughts on combatting the AH threat. I believe the following steps should be taken:

a. employment of BLOWPIPE at a much lower level;

b. aggressive and forward employment of all air defence resources;

c. training must include the AH threat and the means (smoke, tactical driving, etc) to minimize it; and

d. training of commanders in employment of air defence resources and tactical considerations involved in anti-helicopter ops.

The above steps will certainly go a long way to redressing the problems caused by the HIND. If we realistically train to counter the threat its effect will be considerably reduced. If we continue to ignore the threat then we will certainly pay the price should we ever meet HINDs on the battlefield. As Capt McKay so effectively put it: "The battlefield will be too late!".

## REFERENCES


1 DAVID ISBY, WEAPONS AND TACTICS OF THE SOVIET ARMY, JANES LONDON, 1981

2 THE LONDON INSIGHT TIMES, THE FALKLANDS CONFLICT, LONDON, 1982


CHARACTERISTICS OF THE Mi-24 HIND
(all info taken from WEAPONS AND TACTICS OF THE SOVIET ARMY)

| | |
|---|---|
| First flown | 1974 |
| Weight: | 10,000 kg |
| Weapons load: | 1275 kg |
| Fuel load: | 1500 kg |
| Fueselage length: | 17 m |
| Height: | 4.25 m |
| Engines: | 2 x 1500 kg |
| Max speed: | 296 kph |
| Cruising speed: | 225 kph |
| Combat radius: | 277 km |
| Service ceiling: | 5500 m |
| Troops: | 8-16 |
| Crew: | 2 |
| Pods: | 4 |
| ATGMs: | 4 |
| MGs: | 1 x 12.7 (23?) mm 4 barrel Gatling gun |

The HIND D is the assault version in general service of the Mi-24 HIND. It features enhanced armour protection, improved avionics and fire-control equipment, a laser range-finder and also a low-light TV. The armament has been changed to a Gatling type MG and the weapon stores may carry SPIRAL or possibly AS-7 KERRY air to ground missiles (the AS-7 uses a laser designator and is carried on MiG-27 aircraft). It is not certain whether the HIND D uses SPIRAL or older ATGMs.

A typical HIND D weapons load will include the following:

a. 4 x UB-32 rocket pods each with 32 x 57mm S-5 rockets with a range of 1200m and armour penetration of 220mm; and

b. 4 x SWATTER-B (SPIRAL) ATGM.

This option can be changed to a variety of rocket, MG and cannon pods.

Little is known of the HIND E/F versions of the Mi-24 but it is possible that these helicopters are armed with air to air missiles giving it good anti-Cobra/A-10 capability.

# THE NEED FOR A RECCE COMPETITION IN CANADA

BY CAPT R.J. HILLIER

## INTRODUCTION

During the early and mid seventies, despite a short hiatus to experiment with light armour tactics, Canadian based armour regiments concentrated exclusively on recce training and operations. Soldiers who reported to their regiments were introduced to recce skills and, during the remainder of their tour, developed a level of expertise in these skills second to none. Tank tactics were discussed over beer.

In Germany, the Centurion was wheezing its way towards use as monuments, hard targets and a place in retired general's hearts. Recce Squadron, with its relatively new and fast Lynx, enjoyed unrivalled popularity. When the Leopard family of tanks was acquired in 1977, the excitement of being involved with a serviceable and reliable gun platform and the problems associated with its introduction tended to eclipse recce squadron operations (perhaps an argument for independent recce squadrons). Conversion to Cougar in the Canadian based units caused much the same impact. Crewmen were again fixated by a large calibre gun and its ability to spout destruction.

Coupled with the requirement for full manning in the Leopard and Cougar Squadrons and the expensive ammunition required was the reality of restricted establishments and financial constraints. Regimentally-controlled recce squadrons were bled by a steady drain of the best people and by cuts in training time and resources. Recce skills suffered because of this steady drain and with this reduction in skill, the lure of employment in recce became somewhat blemished.

Recce training and employment has been enhanced somewhat, recently, by RCD participation in the Bundeswher's Boeselager Recce Competition and, in Canada, by the recce squadron competition conducted at RV 81. Once again the skills that are so essential in war were being taught, practiced and assessed. The intensity developed by soldiers during these competitions with peers who were wearing different badges is surpassed only by that developed in war.

Since 1981, however, the Canadian based recce squadrons have had no competition, although the RCD have continued to participate in Boeselager. The Cougar gunnery competition, with its annual award of the Rams Head Trophy, has continued to mesmerize the Canadian based regiments and the Armour School. A competition that is based on equipment and training only indirectly related to any operational role continues to limit the recce squadron's training. Recce soldiers, crews, patrols, troops and squadrons have therefore been

restricted in their ability to practice skills and tasks directly applicable to their role in war. An annual recce competition for Canadian based armour regiments would redress many of these problems.

The aim of this article then is to outline a possible basic recce competition for Canadian recce squadrons.

DESIGN

Any recce competition must be carefully designed to assess the basic skills that are required in war. No special training or shortcuts should be needed to do well because it must be realized that any competition amongst regiments will cause teams to "train to compete". If the competition is correctly designed and conducted, then training to compete and training for war will be one and the same.

Any competition should therefore stress three areas:

a. physical fitness;

b. recce skills at individual, crew and patrol level; and

c. knowledge of enemy tactics and vehicles.

To achieve proper results, none of these skills should be completely segregated from others or tested alone. The skills should intermingle and compliment one another as they would in war.

PHYSICAL FITNESS

Physical fitness has long been recognized as the basic prerequisite to carrying out other tasks in war. Generally, the higher the level of an individual's fitness, the less susceptable he is to the rigors of war and the casualties from battle fatigue are correspondingly reduced. Recce crewmen, with a requirement to perform efficiently and continuously without adequate rest or recuperation time, must be physically fit.

This physical fitness can be tested with other skills during the recce skills assessment. It can also be emphasized during an obstacle course competition which stresses crew and patrol teamwork. This portion should be a timed run, by teams, through a NATO standard obstacle course such as that constructed at CFB Gagetown. Finishing times would be taken from the last member of the team to finish the course. Scores would run from lowest to highest times on a sliding scale.

Physical fitness can also be evaluated during a night orienteering competition conducted on foot. The course would run a specific length with checkpoints along the way. At some points, teams would be offered two choices in directions and would have to correctly identify Warsaw Pact tactical symbols to pick the correct path. Thus, knowledge of

Warsaw Pact symbols is also assessed. Each team would be given a specific amount of time to finish the complete course and achieve maximum points. A sliding scale of points would then correspond to the finishing times down to zero.

A basic skill such as the ability to survive in water or cross a water obstacle should also be tested. Ideally, this would be incorporated with a tactical situation and involve crossing a river obstacle in a timed swim. This would depend on the time of year that the competition was held, however, and could be replaced by a combination of the military swim test and a specific number of lengths in the indoor pool.

INDIVIDUAL CREW AND PATROL RECCE SKILLS

This portion would assess the primary skills of recce personnel, and would be worth the most points to emphasize its importance. Recce skills should be assessed from individual to patrol level. Thus, with our present vehicle, the driver, observer/operator and crew commander should be evaluated. The driver can be tested on his knowledge of his vehicle - bridge classification, width, height, length, amount of fuel, range, checks for amphibious operation and his ability to negotiate obstacles based on a working knowledge of those characteristics. Tactical driving would be assessed during a patrol advance to contact.

The remaining two crew members would be similarly tested in their areas of responsibility. The operator on opening up drills, voice procedure, encoding and decoding of messages and map reading. The crew commander on map reading, observation, organizing and siting observation posts, requesting and adjusting artillery fire and, above all, control of his crew and vehicle during all tasks, especially the advance to contact.

All crew members would also be assessed on their ability to perform another's responsibility. The driver would be required to encode and decode a message and the operator to negotiate some obstacles as driver. All crew members would be evaluated on HMG and GPMG drills, the serviceability of their personal kit, ability to fire SMGs, practical knowledge of NBC operations, ability to rig expedient antennas, proficiency with the M-72, grenades, Carl Gustav, and emergency First Aid.

The primary test for the entire patrol would come during an advance that would involve conducting a route recce of the brigade's primary axis and then establishing observation onto an objective. The troop leader could be given orders and assessment of the patrol would begin with his orders to the patrol commander. Points would be awarded for those orders, crew and patrol briefings, effectively taking a trace, covering the route within a set time and reaction to a series of controlled events. These events are limited only by our imagination and could include working with radio silence until contact, flanking and higher formation reports that affect the patrols action, action on contact (such as contact with a disabled vehicle) effective all round observation required to spot the enemy and finally, a fire mission followed by a request for the route recce report. The patrol would be evaluated on all of the above plus

tactical movement and alertness. This event would be awarded most of the points in this portion of the competition.

KNOWLEDGE OF ENEMY EQUIPMENT AND TACTICS

Recce squadron's role as the eyes and ears of the Commander demands that a high standard of knowledge be maintained about the enemies equipment and tactics. Recce crewmen must not only be able to identify equipment and units, they must also be able to interpret what is happening and its value to the commander.

The best way to evaluate this area is to start with a standard, comprehensive AFV test of 35mm slides and require both the vehicle name and country of origin to be indicated. This would then be followed by an observation test, using a restricted observation post, aided by binoculars, on an indoor range. The recent set of miniature vehicles (1/100 scale) acquired by Gunnery Squadron would make excellent test aids for this portion. The remainder of this area would be tested during recce or physical training. Warsaw Pact uniforms and weapons are readily available to assist in evaluation. Possible scenarios include finding a knocked out vehicle during the advance to contact. In the vehicle would be a uniformed body carrying a partially burned map. The patrol would have to interpret vehicle tactical markings, rank, arm and unit insignia and map symbols in order to assess the value of their find. The night navigation run could also include identifying, from Warsaw Pact tactical signs, different types of units at each checkpoint.

METHOD OF CONDUCT

The skills that can be assessed in a basic competition are numerous and the actual events, as stated, are limited only by the imagination and energy of the organizer. Once the material to be covered is determined, the most efficient way to conduct the competition must be selected. There are three basic methods:

a. form a neutral team to visit each participating unit and assess at the home locations;

b. rotate the competition from one area to another similar to the Cougar Gunnery competition; and

c. establish one location as the permanent competition site.

VISITING TEAM

The visiting team concept is now followed during assessment of militia regiments for the Worthington Trophy. This method would allow personnel to use their own vehicles and weapons plus would keep extra costs to a minimum. Unfortunately, standardization of these practical tests from one location to another would be very difficult.

REGULAR CHANGE OF LOCATION FOR COMPETITION

This method is presently used for the Cougar Gunnery Competition. It does have the advantage of offering experiences in different types of terrain (from praire in Wainwright to forest in Petawawa), permits the option of having the winning team host the next competition and prevents home ground from becoming a dominant factor. Additionally, the largest possible number of crewmen, tank and recce, would be exposed to the competition.

The annual change of location does not lend itself to a competition that demands a detailed knowledge of the ground. The number of neutral personnel required to run this competition would be relatively large and an extensive amount of time would be required at the selected locations. Cost and disruption to organizations is therefore increased.

SELECTION OF ONE LOCATION (PERMANENT) FOR COMPETITION

With this method, one location would be selected as the permanent site for the competition, an organization tasked to run it and competitors brought in annually. Plans from one year could ease the burden of running the competition the next year and allow improvements to be more readily implemented. Familiarization with the ground could be avoided by local changes and equipment availability could be planned. Utilization of this method would require neutral ground.

CONCLUSION

The conclusions from this article are:

a. introduction of Leopard and Cougar has removed recce training from the limelight and reduced the skills to very basic levels acquired through on the job training;

b. recce skills must be improved to allow recce squadrons to carry out their basic tasks in war;

c. a recce competition conducted at any level would emphasize recce skills essential in war and give recce operations and training much needed impetus;

d. any recce competition should, ideally, match complete recce squadrons against each other;

e. financial and equipment restrictions (hire of lowbeds, aircraft usage, Lynx availability), prohibit squadron level competitions;

f. the competition would be effective for the smallest recce elements - patrols and troops;

g. the competition should assess skills required in war. Training to compete, as eventually will happen, will also be training for war;

h. assessment of the skills should be integrated whenever possible;

j. one neutral location should be selected as the permanent site for the competition; and

k. once the squadron has been run and evaluated, militia recce units and foreign teams could be invited to participate.

RECOMMENDATION

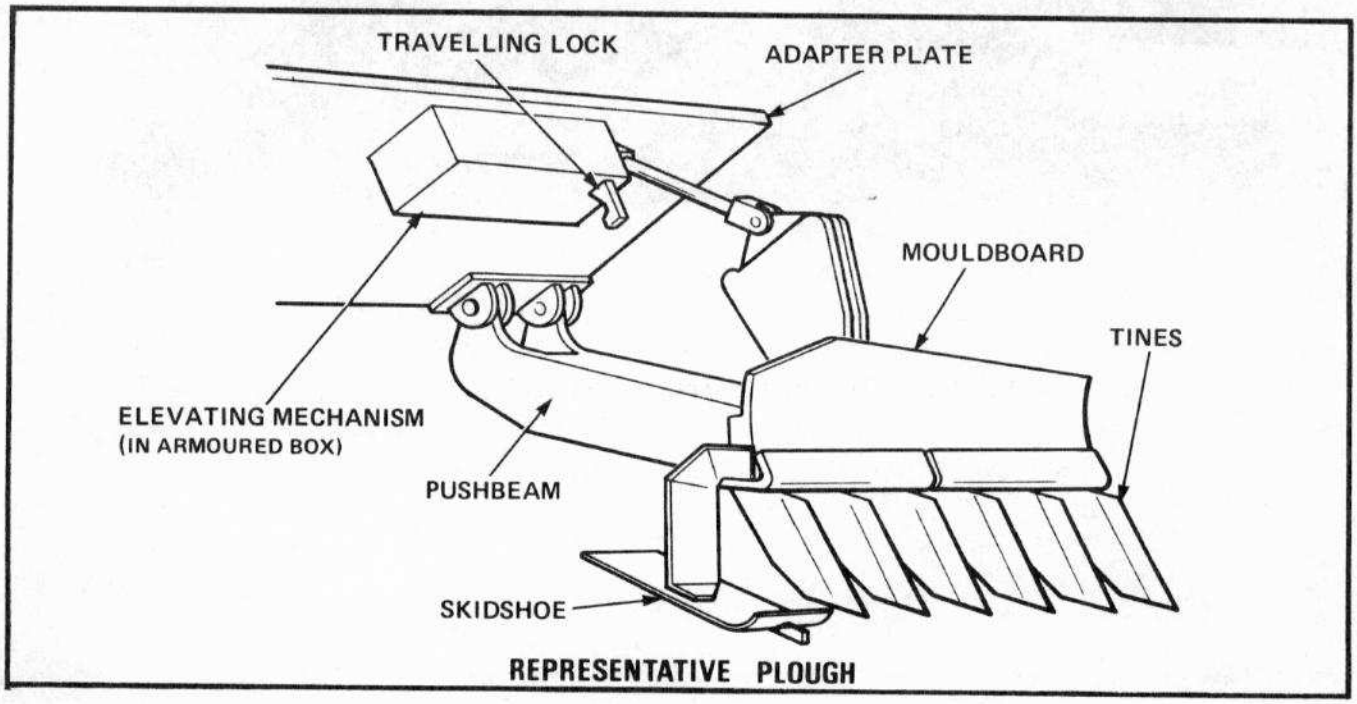
It is recommended that the Royal Canadian Armour Corps organize and conduct an annual recce competition initially at the troop level. SSO Armour, with support from Armour School, could be responsible for running the competition at CFB Gagetown. It is up to the Corps to get Recce back where it belongs - up front!

## MINE CLEARING PLOUGHS FOR LEOPARD

by CAPT N.A. NICKLES

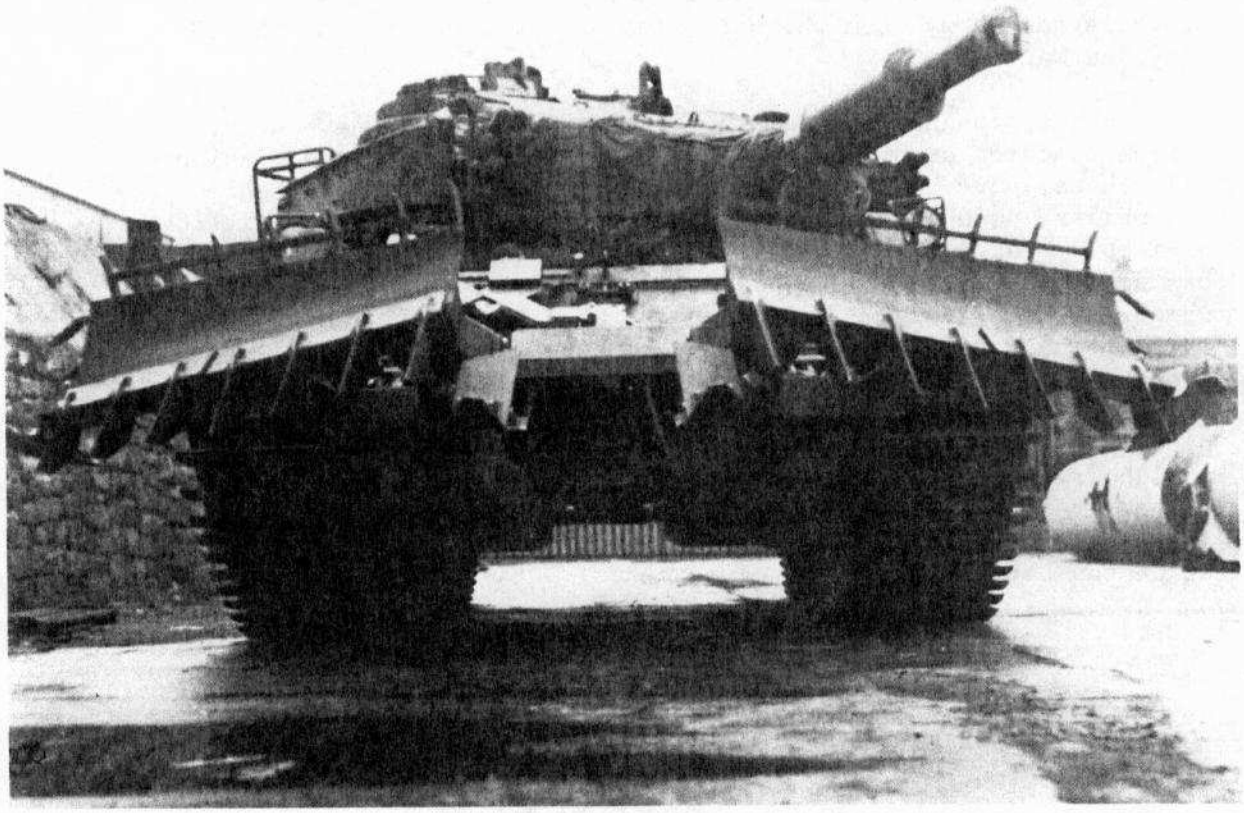
Since writing the article on mine clearing rollers for Volume 16 I am pleased to report that most of the articles' forecasts have happened. The mine roller trials at Gagetown are finished and the results look promising. Approval for the loan of the UK mine plough has been obtained and the minor modifications have been completed. The contract for an Israeli mine plough was awarded in July 1983. It is expected that both ploughs will undergo engineering and field trials in the fall of 1983 and the spring of 1984. The UK plough has been accepted for service in the British Army and should be procured for them in 1984/85. The Israeli plough is a version of the stock Israeli army item which is also undergoing tests by the US Army and Marines.

Mine ploughs, regardless of country of origin have several common features or sub-assemblies. Both ploughs purchased, as do all others, have mouldboard assemblies, contouring or skid shoe assemblies, push-beams attached to an adapter assembly and lifting devices. Starting at the business end, the mouldboard assemblies of the ploughs in the accompanying pictures have a number of tines which rake the ground. The tines are attached to a mouldboard which pushes the spoil (engineer word for "dirt pushed up") away from the side of the tank. Each mouldboard has a device mounted on top of it to prevent spoil and mines from going over the top of the plough and onto the path of the track. Attached to the inside of each mouldboard is a contouring or skid shoe which rides along the surface of the ground and prevents the mouldboard assembly from digging in. An adjusting plate is incorporated into the skid shoe to permit ploughing at depths between six and twelve inches.



REPRESENTATIVE PLOUGH

The plough in front of each track is attached to an adapter plate by means of a large steel beam which also pushes the plough. The adapter attached to the toe plate of the tank by the towing eyes and the lower dozer blade supports. Incorporated into the adapter, in an armoured box, is the lifting device (electro-hydraulic for the UK plough and electro-mechanical for the Israeli model). Manual release cables and electric control cable complete the adaptor assembly. These cables enter the driver's compartment through the left episcope hole in a manner similar to the dozer blade cables.



U.K. Mine Plough Mounted on an AVRE 165

## MINE PLOUGHS

### COMPARITIVE TABLE

| Item | UK | Israel |
|---|---|---|
| Total weight (approx) | 2200 kg | 2500 kg |
| Cleared path (each side) | 1393 mm | 1154 mm |
| Uncleared centrepath (approx) | 1000 mm | 1612 mm |
| Lifting mechanism | electro-hydraulic | electro-mechanical |
| Emergency disconnect | Yes | No |

The mounting of the plough on the tank is a simple procedure requiring only the crew, a lifting boom, (ARV or wrecker) and the tools found on the tank. It is anticipated that mounting time will be approximately 20 minutes. At this time it would be normal to adjust the skid shoe for the desired ploughing depth.

The operation of the plough is accomplished while the crew is closed down. The driver simply pulls the manual release cables (one for each side) to release the travel locks. The ploughs then lower themselves by gravity but are slowed by the hydraulics or the electric motor. The ploughs will then rake the soil and physically lift any buried mines out of the ground. A mine, with cushioning spoil, moves along the mouldboard which is at an angle to the tank's direction of travel. The spoil and the mine are deposited well to the side of the track path. This procedure continues until the minefield is traversed. To lift the ploughs the driver simply employs the electrical control box in his compartment until each side is secure in its travel lock.

The user trial will indicate how effective the ploughs are and hopefully which one is more suitable for the Leopard. However, even before the trial it is possible to predict some performance characteristics:

a. the plough will positively remove a high percentage of mines, including scatterable mines, from the path of a tank;

b. the plough can be fitted with a device to clear scatterable mines on hard surfaces;

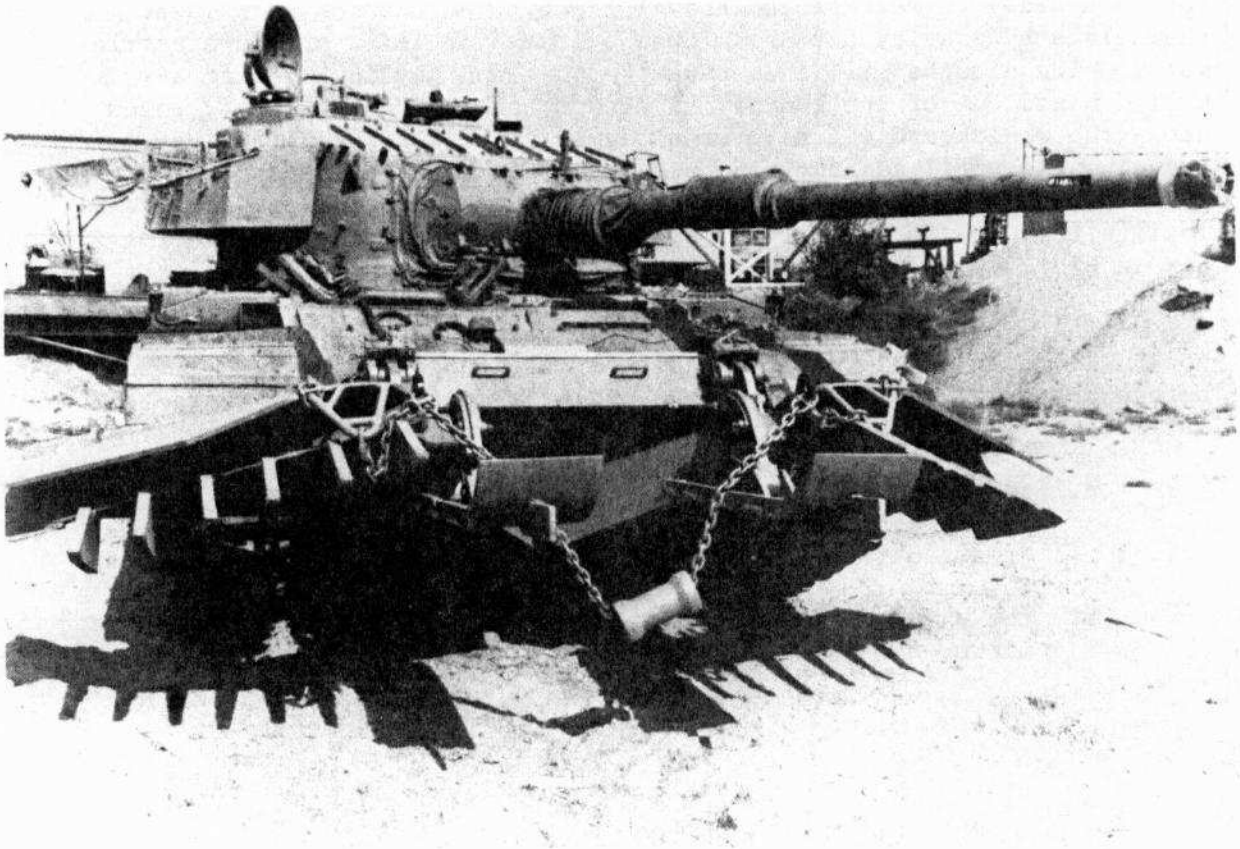
c. the approach angle of the tank will be less. Any device on the front of a tank will lessen the approach angle;

d. the tank will probably only be able to safely plough at a speed of 10 km or less;

e. except for anti-disturbance fuses the possibility of a mine detonation against the plough is small;

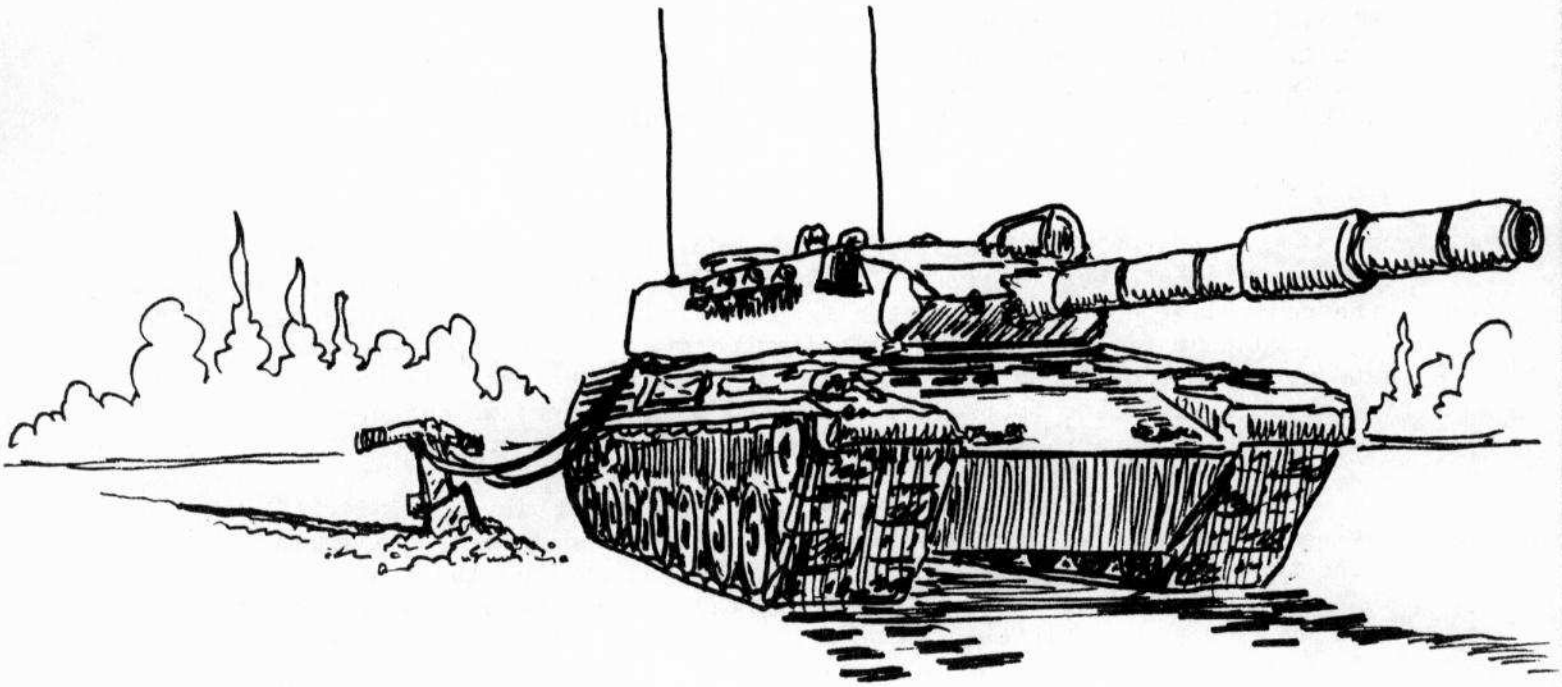
f. top tank speed will likely be unaffected when ploughs are in the travel position.

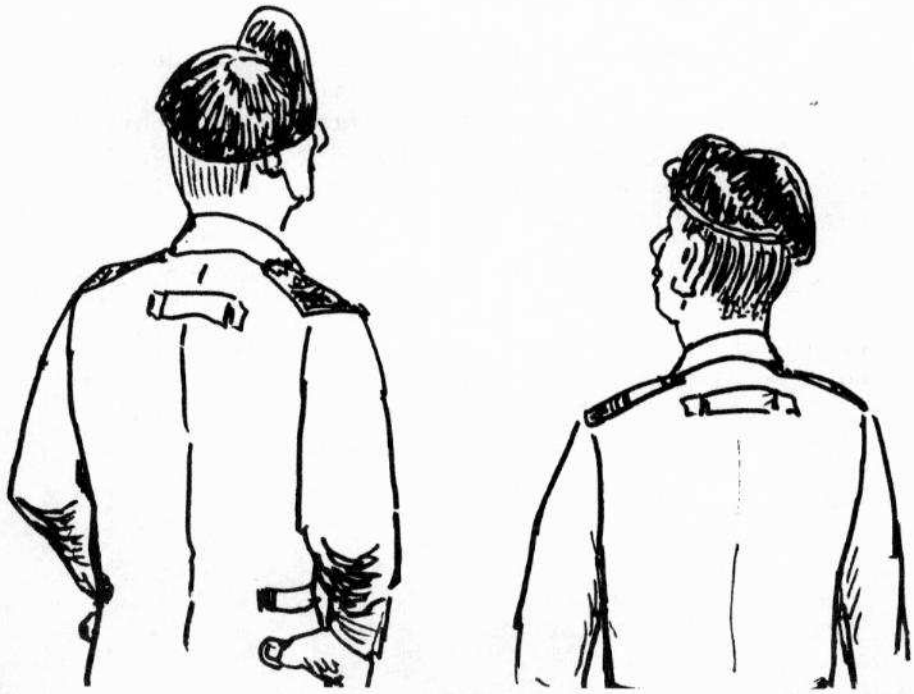
It is proposed to equip each Leopard troop with one mine plough. These devices along with two mine rollers per squadron will give the squadron leader the potential of attempting up to six breaches in any minefield. How is he going to do it? How many tanks will go across before the infantry? Does he want to use the roller only for reconnaissance? Does the infantry cross mounted or dismounted? Does he want to employ a roller and plough together? These questions and many others are as yet unanswered. Whatever the outcome the Corps need not sit back and wait for engineers any longer.



Israeli Mine Plough Mounted on a Centurion

"WHEN WE SAID 'TANK PLOW' I GUESS WE SHOULD HAVE BEEN MORE SPECIFIC."





# THE TANK SEARCHLIGHT ON THE MODERN BATTLEFIELD

BY MAJ G.R. MACLEAN

## GENERAL

### INTRODUCTION

The tactical employment of the tank searchlight has been a controversial issue since its inventory appearance. The practical employment, and techniques that have been developed to apply AFV white light (the gunnery procedures) are workable, if difficult to master, and are not in question. In other words, the primary concern is not the manner in which we teach practical application, but whether, in fact, we should be using the searchlight at all.

### BACKGROUND

Tank searchlights arrived with Centurion. It wasn't long thereafter some clever individual discovered that once the IR filters were removed, the Centurion searchlight provided considerable white light and that fire could be directed effectively out to approximately 1200 m. given ideal conditions. Experimentation with white light began in earnest; we looked to the British army for guidance; we discovered that not only was its employment workable, it was also great fun.

Techniques were soon developed (adopted) to employ white light, giving due consideration for limiting the exposure time of the illuminating tank in a laudable attempt to minimize the obvious inherent danger. Those techniques (dubbed FLICKER and RIPPLE) are as workable now as they were when they were first introduced. (The only significant change affecting the technique is the vastly increased sophistication of potential enemy acquisition, laying and range finding technology. Exposure time by illuminating tanks is now even more critical than in years past).

The use of the searchlight gained such acceptance that the arrival of Leopard saw the system fully incorporated as an offensive device, under armour no less, with the primary night fire control LLLTV camera relegated to its exposed position, bolted to the mantlet. Thus, it has become vitally necessary to assess the rationality of employing the tank searchlight on the modern battlefield.

### THE THEORY

Searchlight techniques are all predicated on the notion that; "if you are quick enough to illuminate and engage, your adversary won't have time to react". As it stands, in theory, this remains as true today as it was when the concept was first proposed and accepted. The

only significant factor in the equation to change is that of TIME. Our techniques presently, as they have from the outset, call for a maximum illumination time of 15 seconds (shuttered searchlight with no after-glow).

This exposure time was arrived at giving due consideration to enemy technology of the day (late 60's). The theory holds that although the bearing to a searchlight's position is quickly worked out, trials have proven that range estimation to the light source is difficult while the light is on, and nearly impossible once it has been extinguished. The illuminating tank therefore has more of an advantage than might be expected, primarily because if the enemy doesn't know the range, he will likely miss.

That is the theory.

THE FACTS

The enemy of the late 60's now possesses vastly improved fire control equipment including IR, II, TI and laser range determination. (The time factor, 15 seconds, has dwindled). A few seconds at most is all that is required to establish bearing and range to any active light source. Any modern tank is capable of establishing line, if not range, in half the time it took 10 years ago.

Establishment of range has never been a truly significant factor in any event. The searchlight is only effective - to 1500 m under ideal conditions, and an enemy tank crew engaging at Battle Range from within that distance has an excellent chance of eliminating the source of light. In fact, this was clearly demonstrated as early as June 1967. Trials conducted by the RAC Gunnery Wing at that time proved that tank crews could achieve 50% hits using DOT 1 (Battle Range) within 5 seconds.

MORE FACTS

Good camouflage can effectively minimize II detection, IR paint will minimize detection by like means, and TI can at least be partially defeated by a tank in a good fire position with minimal exposed heat sources. An illuminated searchlight negates the effect of all the foregoing precautions; even after it has been extinguished, your position has been compromised and you will be subject to determined II, IR or TI detection with predictable lamentable results.

The FLICKER and RIPPLE techniques are extremely difficult to master. Application is at best difficult with success depnding upon detailed preparation of range cards, finely tuned control and the utmost

in co-ordination. The techniques are extremely difficult to apply within even the 15 second limit. Reduced exposure time would further exacerbate control and co-ordination problems increasing the degree of difficulty markedly. Reduced exposure time, even by 5 seconds, would render the techniques effectively impossible to apply with any degree of success.

Although we do not have the means to definitively measure enemy target acquisition capability, it is safe to assume that his increasingly sophisticated fire control equipment will enable him to determine, at least bearing, in well under 10 seconds. Given the extremely flat trajectory of modern FS projectiles, ranging is not necessary. The simple application of Battle Range will provide excellent results under 1500 m.

Fifteen seconds of exposure would be tantamount to suicide. Ask any crewman, familiar with his equipment, how confident he would feel applying our techniques and you will receive a uniformly apprehensive reply. Clearly, a tank illuminating for 15 seconds on today's battlefield would be fortunate indeed if his light were not extinguished for him in rather dramatic fashion.

WHEN?

Under what conditions can one foresee the use of AFV white light? Presumably only:

a. when indirect illumination is not available. (Tanks should not be committed to battle without indirect fire support);

b. when II or other passive means is not available. (Every tank is equipped with passive means; when conditions are so bad LLLTV is ineffective, the searchlight is most unlikely to fare better);

c. when no effective anti-tank fire can be expected. (What then the worry? Gear up!);

d. when not concerned about compromising one's position (When indeed?); or

e. when the NVP allows (Under what conditions would a commander seriously consider allowing active light to be directed from defended positions?).

Unquestionably, circumstances will seldom if ever conspire to permit, let alone mandate, the use of the tank searchlight.

WHY?

Why then retain the searchlight? Why indeed was it obtained in the first place ? In answer to the latter, one can only surmise that little serious consideration was given to the matter when the Leopard purchase was being rushed through. Was it simply accepted, at the time, that the tank required a searchlight? Centurion possessed the potential; Leopard surely must follow. Produce improvement; place it under armour.

The former question is as difficult. Given such an unlikely role, particularly with the advent of such effective passive means as the NFCS, why retain it? Some thoughts:

a. It is an extremely expensive piece of hardware, and now that we have it, why dismiss it entirely? (Should the capability be maintained despite the implausible nature of its employment?)

b. There are yet other uses for the light aside from reading West German road signs from extended distances. For instance:

(1) it can be used effectively under extremely unfavourable conditions to maintain direction by night. Tanks located in turret down positions, on flanks or center line, illuminating briefly along fixed lines, can assist a manoeuvre element in maintaining direction; or

(2) given the right conditions, tanks located in protected ground are capable of providing indirect illumination by bouncing white light off low cloud cover. The technique can be effective, but again, why not mortars or artillery?

Certainly, powerful arguments for retention of the light it would seem are few.

WHAT NOW?

Clearly, the only logical conclusion to be drawn is that the searchlight has outlived its usefulness on the modern MBT. The extraneous uses outlined in para 22 can hardly justify its retention. It might be suggested that consideration be given to removing the searchlight (possibly useful on Cougar - APC ops, crowd control?). Since the LLLTV has essentially rendered the searchlight obsolete, it might be suggested that the camera physically replace the light in its sheltered cubby-hole. Although no doubt technically feasible, this major modification might prove prohibitively expensive. Furthermore, the NFCS itself is verging on obsolescence. It is only a matter of time before improved II and TI will function within primary sighting systems. By the time

such a transfer was effected, the NFCS itself might be ready for the shelf.

RECOMMENDATIONS

As an immediate but interim measure, it is recommended that:

a. References A and B be amended to reflect the realistic employment, however limited, of the tank searchlight. In brief; retaining only fixed line fire under the most unusual circumstances and extraneous uses such as outlined at para 22; and

b. Reference C be amended deleting Practice # 27 (AFV White Light) and allocation of the ammunition thus saved for Practice #29 (NFCS).

In the longer term, it is recommended that the tank searchlight be removed and the prospect of placing the NFCS camera under armour be investigated.

Reference: A. CFP 305 (1) The Armoured Regiment in Battle
B. CFP 305 (3) Tank Troop Leaders Manual
C. CFP 305 (13) Armour Open Range Practices

# BUTTONS AND BOWS

BY LCOL (RET) B. TAYLOR

Someone once said "Clothes makes the man" and the Canadian military roared their agreement. Thus began a love-hate relationship that continues to this day - between the Services and their suitings! It is a subject dear to military officialdom, it even finds its way into the messes, canteens and clubs of the Services. Nothing is more likely to stir hot blood over cold beer at Happy Hour than arguments about dress regulations, irregulations, changes, interpretations or misinterpretations. So while this article may well cause apoplexy to the dress regulation bureaucrats, it might find an adherent or two from the Happy Hour mob. Likely less than half because dress and its wrinkles arouses emotion like no other military subject. Regiments can be split over trousers versus overalls. Flat buttons versus round buttons on mess kit have caused otherwise good friends to become life-long enemies. In sum, "buttons and bows" bulk large in the body corporate (even corporeal) of the military.

Despite unification which included an abortive attempt to make everyone look the same, "buttons and bows" has to start back in the good old days of three services. Then you had to be colour blind not to tell a soldier from a sailor from an airman. "Be different" was the cry and all three services revelled in it. Despite some reluctant regard one for the other, service rivalries reigned supreme. "Stop soldiering on the job you ---" from a petty officer to an able seaman did not imply that the latter was drilling but rather that he was a lazy so-and-so! Any soldier or airman could match or top that one easily, to the detriment of the Navy. In the halcyon days of World War II it was remarkable how Canadian Youth, once garbed in one or other of the services uniforms, assumed instantly different personalities. Perhaps "clothes do make the man" after all!

"Those magnificent men in their flying machines", the Royal Canadian Air Force, lavished most of their love and affection on their airplanes. Officers were happiest when they were flying them and the airmen happiest when they were fixing them; in the case of the latter, armed with greasy tools and wearing even greasier coveralls. Once out of the hangar and into his drab light blue, the airman from the neck down looked mostly like all his fellow airmen. However the wedge cap was his saving grace and the instrument through which he could express his personality. The match (or mismatch) of wedge cap and head offered an almost infinite combination of illegal angles along every conceivable axis. And the cap itself added at least another dozen options with dimples, crushings, sewings, etc. Many station warrant officers went to early graves having tried in vain to get the airmen to all wear their "wedgie" at the same angle. Their task was not made easier by the Air Force Officers' tendency to do about the same with their "flat" caps. The "fifty-mission" look, with the crushed sides, became almost de rigeur for the pilot. Added to which the angle of wear had to be anything but straight and level.

While RCAF "buttons and bows" revolved around headgear, the Army ranged over the whole ensemble. The Army, as even the Air Force knows, is not a corporate whole but rather an aggregate of tribes, regiments or corps. At least that was so until unification, but leave that for the moment. Each of the tribes in their dim and distant past had developed a full set of "buttons and bows" which they wore on their scarlet or blue or even green with considerable élan. With the introduction of khaki, as much as possible of the colour and distinction of the red and the blue, etc., was carried over. A disinterested observer might have assumed that the aim was to make everyone look as little alike as possible. From dress caps in every colour of the rainbow to shoulder flashes ditto to an infinite variety of badges and badges of rank to web belts in surrealistic colours and even different putties, the Army literlly did their own and very separate "thing" from head to toe. Overseas contacts with the famous 8th Army of Field Marshal Montgomery added some new fillips - scarves, "brothel creepers" and corduroy trousers. Even within regiments not everyone dressed the same. There is the apocryphral story of two subalterns eyeing each other warily until one said "Good God, we're both dressed the same; I'm senior, you go back and change". That seems to typify the Army's light hearted spirit and almost total unconcern for uniformity. It should be noted here that two of the best armies ever fielded by Britain were indeed Montgomery's with its scarves and desertboots and Lord Wellington's of an earlier century. His Lordship's views on dress were succinct, practical and totally irregular, "so long as he takes the field with a good musket and 60 rounds, I care not what colour his trousers". So the colourful and breezy Canadian Army of World War II travelled in good company past and present!

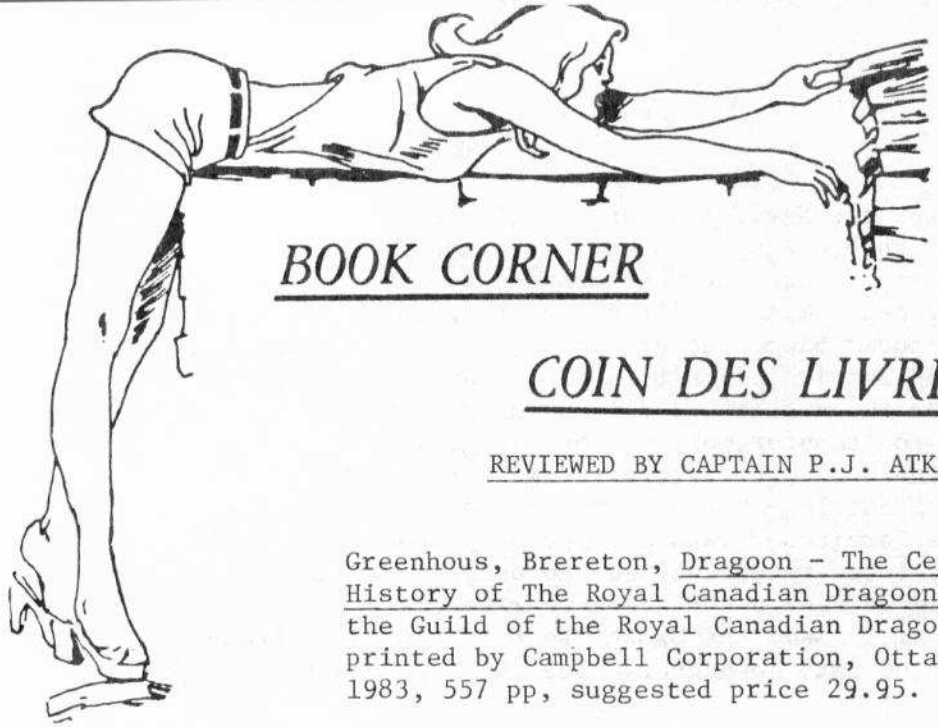
The Royal Canadian Navy started life by joining a world-wide fraternity of dark blue and gold. Perhaps this is why they liked unified green so little. It put them at odds with the rest of the club. A World War II naval officer always managed to look elegant when he came ashore. To impressionable Halifax girls he must have looked like a rich yachtsman with his snowy white cap cover, starched collar and jacket from Gieves. His sailors seemed to be equally popular amongst the ladies. Perhaps the natty bell bottoms had their attraction but more likely the skin-tight "jumper" helped. The girls could surely see what they were getting, if the sailor wore his usual "tiddley jumper" (boughten) as opposed to "pusser slops" (the issue). As the Air Force doted on planes, the Navy doted on its ships (or boats) and in those days, every sailor wore his ship's name on his "cap tally". His sleeve was also an interesting record of how long he had served and what he did aboard ship. Naval officers disdained any such extravagance. So modest were they that some of their medals used to disappear under the lapel of their jackets. A pristine hankie for show in the breast pocket was allowed and often matched by one up the sleeve for blow - the mark often of a Royal Navy-trained Canadian who sometimes brought along an English accent as well. If this short recitation about Navy "buttons and bows" seems preoccupied with sex, it shows only envy. I am sure also, no World War II RCN officer or rating will object!

Unification overtook the Navy, Army and Air Force in the late 60s. More with a whimper than a bang. No where was its effect more demonstrably a yawn than in the area of "buttons and bows". The unveiling of the "jolly green jumper" excited a vast apathy. The Navy mourned the loss of their blue, the Air Force, once they were sure that the wedgie would survive, didn't fuss, the Army found they could live with the colour and cut (after all anything beats fuzzy battle dress) but wanted to transfer most of their regalia from the khaki to the green (as they had done before - remember?). The unificationists fought a losing battle - but bit by bit, yard by yard, the "buttons and bows" of the Services returned. The only group that could be pursuaded for example, to wear the unified cap badge were the Generals. And we are told it took a CDS order to make that happen. Incidentally, that badge nicknamed "the Crash" features an eagle tranfixed by two swords crashing onto an anchor. See why orders were necessary?

Women's liberation or whatever, a rewarding feature of service in the "green" Force is the presence of increasing numbers of women in the "green" too. Creating uniforms for them appears to bring out the best and the worst in the design business. Perhaps the problem was that two different sets of designers worked on the same ensemble, for example, one chum producing an overly tight skirt that prevented the girls from marching while another designer produces a boxy jacket suitable for a portly grandmother but not for a willowy twenty-three year old. Someone got it all together with their mess kit - you feel almost certain that he (or she) will be drummed out of the corps.

The name tag, although neither a button or a bow deserves passing mention. It arrived on the scene with unification as if, having tried hard to dress everyone the same, someone feared we'd never be able to tell them apart. Orderly rooms and pay offices like them - all they have to say now is "What's yer last three" and they have you tagged (ugh!). To a generation brought up on knowing their men, it seems an abomination. To the recruit with two left feet it means no escape from being identified by the merciless master corporal "Pick up the step - - - you idle - - - Bloggins!". To everyone else, it's something to pin on your uniform somewhere around your right breast pocket if male or around your right - - - if female. The dress regulators hate that difference!

Where will we go next in the exciting world of "buttons and bows" - new colour uniforms (how about dark blue, light blue, etc), some breakthrough in berets, corfam boots and shoes (that one is not likely, it would impoverish the shoe polish industry). One thing is sure that the best laid plans of the bureaucracy for "regulation" and "standardization" will provide a challenge to the blyth spirits. Hopefully the Airman will still find a way to express himself with his wedge cap, the Brass Bound Fusiliers will still continue to wear their badges sideways (they did it at Dettingen!) and hopefully the Navy will continue to ignore the whole business and pursue the girls! Perhaps they have the best idea of all, past, present and future!



# BOOK CORNER

# COIN DES LIVRES

REVIEWED BY CAPTAIN P.J. ATKINSON

Greenhous, Brereton, Dragoon - The Centennial History of The Royal Canadian Dragoons 1883-1983, the Guild of the Royal Canadian Dragoons (Canada) printed by Campbell Corporation, Ottawa, Ontario, 1983, 557 pp, suggested price 29.95.

"Dragoon, the Centennial History of the Royal Canadian Dragoons" is much more than a regimental history, it is the story of a Regiment as it developed with its country. The author, Brereton Greenhous, has left no rock unturned in telling the story of the Regiment. It is the tale of a Regiment in transition from horse to tank with emphasis on the people involved. The anecdotes of various Dragoons interspliced throughout the book are what makes Dragoons unique from previous Regimental histories.

Brereton Greenhous was able to dig into the personal lives of many individuals through his extensive research of diaries and personal papers. He writes of characters like George Bellamy, Canada's own Flashman, and horses like "Teddy the Grey" the last Regimental "charger".

The story is not only of the Regiment's proud achievements but also at the dark days, in the early 1900's, when the ranks of the RCD were depleted by desertion.

In the concluding chapter of his book, the author quoted an ex-Commanding Officer of the Regiment when he wrote, "A Regiment is born by the stroke of a pen, but it can only grow in stature and prosper because of the soldiers who nourish and feed it, lead it and care for it". The book "Dragoon", is the story of those soldiers.

Dragoon is a worthy edition for the libraries of anyone in the Corps interested in unique Canadian military history.

## COMING YOUR WAY ..... SOLUTIONS

1. a. *Early prototype of the Conqueror*
*120 mm gun*
*British 1954-61*

b. *Churchill Mk VI A22E*
*75mm gun*
*British 1943*

c. *Valentine "Archer"*
*17 pdr SP gun*
*British 1944*

d. *Panzerkampfwagen VI - Tiger*
*88 mm gun*
*German 1942*

e. *Boarhound T18E2*
*USA 1943*

f. *Panzerkampfwagen III*
*50 mm gun*
*German 1942*

2. "WHAT IS IT"? SOLUTION

*The piece of equipment shown on page 51 is a thermal scanner. It is employed to improve the night fighting capability of the Leopard C1. The scanner was trialed at CFB Gagetown by Trials and Evaluation.*

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