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Situation of the Canadian Military Forces Overseas, Winter, 1943-4 : I

Progress in Equipment (February 1942 - December 1943).

1. This Report deals with the equipment problem of the Canadian Army Overseas during the period between 22 Feb 42 (the date of Report No. 62, the last dealing with this topic) and 31 Dec 43. The demands of other and more urgent subjects have prevented the preparation of a report dealing with equipment during the past twenty-two months. The period has witnessed many important changes and developments in this field.
2. Only weapons and vehicles are considered in this Report. No attempt has been made to deal with matters of provision of Engineer and Signal Stores, etc. Digests of the state of equipment of the Canadian Army Overseas as at 30 Jun 42 and 31 Dec 43 are attached as Appendices "A" and "B". It should be borne in mind that totals for December 1943 apply only to Canadian formations remaining in the United Kingdom. Complete and up-to-date returns for formations in the Mediterranean theatre are not as yet available.

SOME GENERAL TRENDS

3. Reference to Reports Nos. 46 and 62 will indicate that the basic problem of the Canadian Army Overseas during the first two years of the present war, so far as equipment was concerned, was the replacement of weapons of 1914-18 pattern with modern weapons developed during the period prior to the outbreak of war in 1939, but produced for a long period in insufficient quantities. This inadequate production was the result of the fact that British industrial preparation for war was on a much lower scale than that of Germany, while Canadian preparation in its turn was on a lower scale than that of Britain. The consequences may be traced in Appx "B" of Report No. 46, which shows that after two years of war the Canadian Army Overseas was still seriously deficient in such basic essentials as modern field guns, light A.A. guns and anti-tank guns. Five months later, as indicated by Appx "A" of Report No. 62, the expansion of British, Canadian and United States production had brought material improvement, but certain grave deficiencies remained. It is, of course, true that in the case of those units not held ready for an immediate operational role, it was not of vital importance that issue of equipment be complete. Brigadier J.H. MacQueen, D.Q.M.G., C.M.H.Q., who read this Report in draft, points out further that "had Canadian formations undertaken active operations, they would have been made operationally complete with the most modern equipment available" (Memorandum to Historical Officer, C.M.H.Q., 13 Oct 43).



4. During the period dealt with in the present Report, the problem may be said to have entered a new phase. The necessity of "making do" with the weapons of the last war is now a thing of the past, and such basic deficiencies as those just mentioned no longer exist. But whereas the factories have now produced, in general, quite adequate supplies of weapons of 1939 pattern those weapons have themselves in some cases become obsolescent as the result of developments during the present war. The problem today is increasingly one of re-equipment with new and more powerful weapons designed on the basis of battlefield experience subsequent to 1939. A convenient example, and an important one, is afforded by changes in anti-tank weapons. Whereas as recently as 1942, Canadian formations were still anxiously awaiting the completion of their establishments of 2-pounder anti-tank guns, this weapon has now been replaced by the more formidable 6-pounder, while a still newer and heavier gun, the 17-pounder, has also been issued on a considerable scale. These changes reflect developments in armoured fighting vehicles. The 2-pounder and the Boys rifle might be used with success against the tanks of 1939-40, but more effective weapons are required to stop the heavier Mark IV and Mark VI tanks employed by the Germans in more recent campaigns. Whereas the majority of the tanks available to Lord Gort in the campaign in France in 1940 were armed only with machine-guns (a few having 2-pounders)(1), Allied tanks today are normally armed with the 75-mm. gun or the 6-pounder and some will carry 90-mm. or 105-mm. guns. There are also developments in field gunnery, where changing techniques of assault have brought forth a new class of artillery - the self-propelled gun - heavily armoured and mounted on a tank chassis.

5. Thanks to these and other developments, the problems of Canadian production of war materials have also passed into a new phase. In 1940-42, when almost all forms of equipment were desperately short, Canada undertook and realized a very large programme of production involving light and heavy weapons and equipment of a great variety of types. It appeared to be widely assumed that the Canadian Army Overseas, as well as the forces in the Dominion, would be equipped from Canadian sources (at least so far as the commoner articles were concerned) while Canada would also supply her Allies with arms on a large scale. These expectations have not been realized in quite this form, although Canadian production has expanded enormously and has certainly had some influence on the course of the war, and very large quantities of Canadian-made arms and equipment have been placed in the hands of the Canadian Army Overseas.

- 1) "...the British armoured forces in the theatre of war amounted to seven divisional cavalry regiments equipped with light tanks, one regiment of armoured cars of an obsolete pattern, and two battalions of infantry tanks, the latter, except for twenty-three Mark II tanks, being armed each with one machine-gun only" (Lord Gort's despatch of 25 Jul 40 : Supplement to the London Gazette of Friday, the 10th of October, 1941.)



6. The change in the aspect of affairs has been due in great part to the influence of the shortage of sea transport and the importance of using the available tonnage to the best advantage in a war which is being fought in all parts of the globe. This has made it necessary to supply the armies in the various theatres, as far as possible, from sources close to the scene of operations, and to develop local productive capacity to the greatest possible extent in those operational areas (e.g., India and Australia) where it was formerly low. The global allocation of war materials has been effected through the medium of Munitions Assignment Boards set up in LONDON and WASHINGTON in the spring of 1942; and while Canada, desiring to supply her own forces so far as may be from her own factories, has declined to pool her production completely with that of the United Nations at large, she has necessarily been bound to a large extent by the general Anglo-American policy. (The work of the LONDON Munitions Assignment Board, and the Canadian relation to it, will be dealt with at length in a subsequent Report.)

7. The result has been that the Canadian Army Overseas has continued to receive supplies from British sources to a rather greater extent than had been anticipated at an earlier time, though much Canadian-made equipment has also been received. Economy in shipping has been effected by supplying the Canadian Army in Britain in some particulars from British factories, while Canadian-made equipment has been shipped to theatres in Africa and the Pacific. In recent months, indeed, with the further development of Allied productive capacity, Canada has faced the possibility of some of her products becoming a drag on the market; and a partial re-orientation of her programme has taken place in consequence, the manufacture of certain items of army equipment (the 6-pounder anti-tank gun and the Valentine tank are examples) being suspended and a somewhat larger proportion of the Dominion's industrial effort being directed to the construction of ships and aircraft. (2)

8. Only in the case of certain items, referred to as of "continuing Canadian provision", has the Canadian Army been supplied directly, and entirely or mainly, from Canadian sources. Examples are vehicles, certain heavy Engineer earth-moving and tunnelling equipment, and articles of clothing. It must be added that, in addition to these items supplied directly, the Canadian Army has also received great quantities of other articles of Canadian manufacture through L.M.A.B. channels under special arrangements. Current examples are Canadian Sten guns and Canadian No. 4 rifles.

(2)

" Certain of Canada's major production objectives have been reached. Late in 1942 substantial quantities of every item of war equipment for which Canada had received orders in the first 2½ years of the war were being delivered. This does not mean, however, that there will be any slackening of the overall effort, but rather a change in emphasis. Some programs will be reduced, others expanded. There are some rather drastic reductions in ground army stores on the one hand, but on the other greatly increased demands for naval vessels, guns and equipment, combat aircraft and radiolocation equipment". (Canada at War, No. 26, July 1943, p. 26). For further details, see the speech of Hon. C.D. Howe, Minister of Munitions and Supply, in the Canadian House of Commons, 11 Jun 43. More recently, it appears, even the shipbuilding programme has been reduced : Canadian Press News, LONDON, 15 Jan 44.



9. Apart from those factors already noted, there have been definite tactical reasons for abandoning any general attempt to equip the Canadian army with Canadian-made material, and in particular with material of distinctive types. If it were certain that the whole five divisions of the First Canadian Army would be employed together in a single theatre, such a policy would be practicable; but in recent months the possibility of the employment of individual formations in scattered theatres has been visualized, and the possibility became reality with the incorporation of one Canadian infantry division, one Canadian army tank brigade, and some ancillary troops into the Eighth British Army for the Sicilian campaign. And even though, as operations go forward on the mainland, the Canadian component in Italy is now in process of becoming a Corps, it is still improbable that the entire First Canadian Army will be employed as a single force. Such projects have necessitated assimilating Canadian organization more closely to British establishments, notably in the case of the armoured division; and it has become quite essential to maintain general uniformity of equipment with the British Army.

10. A far-reaching reorganization of the Canadian Army Overseas was notified in January 1943 (C.M.H.Q. Administrative Order No. 2, 10 Jan 43). The basic principle was stated in this order as follows:

2. This reorganization is based upon British organization and war establishments to facilitate co-operation between formations and units of British and Canadian Armies.

The most important single feature of the reorganization was the adoption of the new British organization for the armoured division. This involved the abandonment of an organization based upon two armoured brigades and the adoption of one based upon one armoured brigade, one infantry brigade and a strengthened artillery component. The major part of the reorganization was completed before G.H.Q. Exercise "SPARTAN" in March (see Report No. 94).

11. On the heels of this exercise came a mobilization programme which placed formations in the following order of priority for mobilization (C.M.H.Q. file 1/Mob/1, C.M.H.Q. to H.Q., First Cdn Army, 2 Apr 43, note):

- 1 - 1 Cdn Inf Div
- 2 - 3 Cdn Inf Div
- 3 - 1 Cdn Army Tk Bde
- 4 - 5 Cdn Armd Div
- 5 - 1 Cdn Corps Tps
- 6 - 2 Cdn Inf Div
- 7 - 2 Cdn Corps Tps
- 8 - First Cdn Army Tps
- 9 - G.H.Q. Tps and L. of C. Units

Mobilization, in unit terms, is thus defined in the pamphlet Unit Mobilization, Canadian Army Overseas, 1943:

The process of mobilization is the completion of the unit to War Establishment in personnel, and the obtaining of all items of its war outfit (i.e., war equipment, clothing and necessities, and medical equipment) i.e., the completion of the unit to such a state that no serious deficiencies exist that would impair its operational role.



2 Cdn Div was placed low in the scale of priority as a result of the reorganization necessitated by its heavy losses at DIEPPE. 4 Cdn Armd Div, it will be noted, was not included in the original scheme, and was not mobilized until the autumn of 1943 (Mobilization Order No. 91, 7 Oct 43).

#### EQUIPMENT OF 4TH CANADIAN ARMoured DIVISION

12. Since Report No. 62 was prepared, 4 Cdn Armd Div has arrived in the United Kingdom. Units of this formation began to land in September 1942 (A & Q Diary, H.Q., 4 Cdn Armd Div) and continued to arrive until autumn 1943 (see Report No. 110, para. 17). This division's fortunes in matters of equipment have differed very greatly from those of 3 Cdn Inf Div and 5 Cdn Armd Div. It is to be remembered that the latter two arrived overseas with a very incomplete scale of issue, whereas 4 Cdn Armd Div brought "an average of approximately 75 per cent of the AFG 1098 scales of equipment" (C.M.H.Q. file 4/Progress/1/5, 8 Oct 42, G.O.C. 4 Cdn Armd Div to Senior Officer, C.M.H.Q.). (For state of equipment of 3 and 5 Divs, see Reports Nos. 46, 54, 59, 62.) In some items one hundred per cent complete scale of issue accompanied the units overseas. This was notably true in the case of signal equipment. The most serious deficiency existed in "A" vehicles, and this shortage has existed in less aggravated form throughout the period covered by this Report. The first issue of Ram tanks took place in November 42 (General Report from First Cdn Army, week ending 21 Nov 42, C.M.H.Q. file 4/Progress/11). At present 4 Cdn Armd Div is approaching completion of its AFG 1098 scale of Equipment (Equipment State of Canadian Army in the United Kingdom as at 31 Dec 43, file 13/Equip State/1/5).

#### WEAPONS

13. RIFLES. The period under review has seen the adoption of the newer Rifle, No. 4, Mark I, and the replacement of the previously authorized No. 1, Marks III and III\*. The No. 4 Rifle, designed to simplify manufacture, began to be available in quantity from British sources late in 1941, and the question was at once considered whether the Canadian Army Overseas should be equipped with this weapon (Letter, Senior Officer, C.M.H.Q. to Cdn Liaison, H.Q., C.C.M.A., 17 Dec 41, file 1/Rifle No. 4/1). Meanwhile, attempts were made to reduce shortages in the supply of No. 1 Rifles, especially in the Reinforcement Units, resulting from increased rifle establishments. (Cf. Report No. 62, para. 19) Field units were largely complete. By 31 Jul 42 the shortages in 5 Cdn Armd Div and 1 Cdn Army Tk Bde had been eliminated (*ibid.*).

14. It was decided in July 1942 to equip all armoured formations in the United Kingdom with No. 4 Rifles (Memorandum, D.Q.M.G., C.M.H.Q. to D.O.S., C.M.H.Q., 3 Jul 42, file 1/Rifle No. 4/1). This re-equipment proceeded very satisfactorily and by November 1942, in order to standardize the rifle and thereby to reduce the variety of parts held as spares, the policy was adopted of arming all First Cdn Army with the No. 4 (Letter from Senior Officer, C.M.H.Q. to Secretary, D.N.D., 12 Nov 42, *ibid.*) Canadian production



of this rifle had now reached the stage where considerable shipments were being made overseas. During June and July 1943, large quantities were received from both Canadian and British sources and on 17 Jul 43 the weekly progress report from C.M.H.Q. noted: "All Pd units now equipped Rifles No. 4 to 100% W.E." (Cable GS 1694, Canmilitary to Defensor, 17 Jul 43, file 4/Progress/1/5). The Equipment State of the Canadian Army in the United Kingdom as at 31 Dec 43 shows a considerable surplus in the supply of rifles, including some No. 1 rifles (Appx "B").

15. PISTOLS. As early as 1940 it had been determined that Canadian personnel would carry the .380 pistol, rather than the heavier .455. Supply in quantity of the former did not appear until June 1942. In that month substantial issue of .380s was made, and the .455, previously issued as a temporary measure, began to be withdrawn proportionately (Cable GS 2459, Canmilitary to Defensor, 24 Jul 42, file 13/Min Rets/1/2). Since then all .455s have been replaced by .380s --- procured, for the most part, from sources in the U.S.A. The AFG 1098 scale of issue of these weapons was materially reduced in March 1943; those pistols deleted from establishments were to be replaced by Sten machine carbines (Equipment Policy Letter No. 39, 20 Mar 43, file 1/Equip Pol Ltr/1). In June 1943, the Bren L.M.G. having been declared a personal weapon, pistols were "withdrawn from the firers of single Bren guns", so that a further reduction in establishment was effected (Equipment Policy Letter No. 57, 11 Jun 43, file 1/Equip Pol Ltr/1). There is now an adequate supply of pistols (Appx "B").

16. MACHINE CARBINES. The situation existing on the date of Report No. 62 with regard to Thompson sub-machine guns underwent a radical change in August 1942. In that month the establishment for the weapon was changed in the infantry division from 643 to 1,094, and in the armoured division from 1,412 to 1,573. This change in establishment created a new demand for 5,445 weapons. In other words, an establishment which had been almost complete was suddenly converted to one 52% deficient. It became apparent that production facilities of the Thompson were not adequate to meet the increased demands for automatic weapons by the Allied forces. The need for some weapon other than the Thompson was indicated, if shortages were to be met in reasonable time.

17. British authorities had, in fact, developed an alternative weapon --- the Sten machine carbine. It fires 9-mm. ammunition (as do many enemy weapons); the Thompson uses the heavier .45-inch ammunition. The individual soldier can, accordingly, carry much more Sten ammunition. The Sten has many other advantages over the Thompson. It is much lighter in weight, much less complicated, a great deal cheaper (3), and it can readily be produced in large quantities. It has been called a "Woolworth weapon".

(3) Cost as at 4 Aug 43, Sten £2.10.0, Thompson £25.10.0. (information from O.S.(W), C.M.H.Q.).



18. A total of "approximately 350" Stens was issued to the Canadian force engaged at DIEPPE (Major-General J.H. Roberts to Adv H.Q. 1 Cdn Corps, 30 Oct 42, 2 Cdn Div file 2DS(G) 1-1-23-1, at present in custody of Historical Section, C.M.H.Q.). This was the first occasion on which the Canadians used the Sten, and many adverse reports were received upon its performance. A particularly detailed and scathing account came from the Cameron Highlanders of Canada :

Useless for infantry. The gun is not strongly constructed and is too unreliable for assault work. The welding snapped on one gun. A second would not fire. A third jammed on the second mag. The barrel blew off the fourth. No favourable reports have been received on this weapon.

(Cameron of C. "Report on Weapons and Tactics", 1 Sep 42: copy in H.Q. First Cdn Army file 8-5-1/Ops, vol. 1, at present in custody of Historical Section, C.M.H.Q.)

Careful investigation, however, considerably reduced the effect of such testimony as this. Major Way, the officer charged with reporting on the matter, after interviewing a large number of Canadian participants in the operation, arrived at the following conclusions:

Information obtained by interviewing personnel as regards the failure of the Sten at Dieppe clearly points out that

(i) The troops had had insufficient experience with this weapon before using it in an action against the enemy.

(ii) The weapons were issued at such a time as to allow the troops no opportunity to check them or to familiarize themselves with what were to be their personal weapons. They should have been cleaned, fired and all magazines checked before going into action.

(iii) From the evidence given, it appears that Stens and magazines were not checked and inspected adequately before issue to units.

These facts show that neither men nor weapons were given a fair chance at Dieppe.....

(Copy of Report by Major Way, dated 10 Oct 42, in file 2DS(G)1-1-23-1 from H.Q. 2 Cdn Div.) (4)

19. With respect to the Camerons' report, note should be taken of the evidence of Major (now Lt.-Col.) A.T. Law, the senior surviving officer of this unit, who told the present writer that during the training preceding the

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The author of this Report was Major C.F. Way, R.C.O.C., attached as T.S.O. 3 to the Department of Armaments Design at CHESHUNT, Herts.



DIEPPE operation ammunition for practice was not available, and in consequence the only person in the unit who actually fired a Sten was the C.O., Lt.-Col. Gostling. He added that Sten magazines were provided ready-loaded, and that the fact that they were improperly loaded was responsible for many of the difficulties encountered (Report No. 89, Appx "G", para. 7).

20. In the light of such evidence as this, it was not considered that DIEPPE experience warranted rejecting the Sten. In October 1942, 1,048 carbines were issued to the Canadian Army Overseas (Equipment State of Canadian Army in the United Kingdom as at 31 Oct 42, file 13/Equip State/1/4). Deliveries have continued since that time. The Equipment State of the Canadian Army Overseas as at 30 Jun 43 showed a considerable deficiency in machine carbines. The shortage was not, however, a serious one. It was found chiefly among units within C.R.U.; what minor deficiencies existed in the field formations had been corrected (Cable GS 1373, Camilitary to Defensor, 12 Jun 43, file 4/Progress/1/5). By 31 Dec 43 the shortage of Stens among Canadian units remaining in the United Kingdom amounted to 10,377 (still largely confined to the Reinforcement Units), and this was somewhat offset by 557 Thompsons (Appx "B").

21. In June 1943, Sten carbines of Canadian manufacture were adopted as standard for the Canadian Army Overseas, although it was recognized that British weapons would be issued until sufficient Canadian stocks became available (Equipment Policy Letter No. 57, 11 Jun 43, file 1/Equip Pol Ltr/1).

22. It was, however, the Thompson machine carbine, not the Sten, with which 1 Cdn Div and 1 Cdn Army Tk Bde were armed when they proceeded to the Mediterranean theatre (Equipment State of Canadian Army in C.M.F. as at 31 Oct 43, file 13/Equip State/1/4). The Sten is not in use in the Middle East and replacement of parts would have presented a serious problem.

23. BREN LIGHT MACHINE GUN. The Camerons of Canada, who expressed so low an opinion of the Sten at DIEPPE, reported of the Bren L.M.G. on the same occasion that it was a "very accurate and efficient weapon" ("Report on Weapons and Tactics", cf. para. 18, above). This appears to express the general opinion of the Bren gun held by personnel of the Canadian Army. Since June 1942 establishments have been greatly increased, and for a time sources of supply were not quite adequate to meet increased demands. Mobilization entailed a very careful check of equipment by units affected; many guns were described as "beyond local repair" and were sent to the Canadian Ordnance Depot at CROOKHAM. They were later placed back in stock. The mobilization plans also encouraged the British authorities to allot additional numbers of Brens to the Canadian Army Overseas, and by April deficiencies amounted to only 19% of total war establishment. The Equipment State of the Canadian Army in the United Kingdom as at 31 Dec 43 shows that deficiencies are now virtually eliminated (Appx "B").



24. To increase the effectiveness of the Bren as an anti-aircraft weapon, the 100-round magazine equipment was introduced in January 1943. With the authorization of the 20-mm. gun, the establishment of 100-round Bren equipment was deleted, although some 1,260 are still held by units in the United Kingdom (Equipment State of Canadian Army in the United Kingdom as at 31 Dec 43, file 13/Equip State/1/5).

25. LEWIS LIGHT MACHINE GUN. The Lewis light machine gun, a weapon of the last war, is no longer a major item on the AFG 1098 of the Canadian Army Overseas. It has been almost entirely replaced by the Bren (Appx "B").

26. VICKERS MEDIUM MACHINE GUN. The Vickers medium machine gun to date has primarily played the role of a defensive weapon. Consequently, the present emphasis upon offensive training and action has perhaps tended to curtail the usefulness of this weapon. However, experiments have been conducted with a mounting device which allows this gun to be fired from a carrier. 1 Cdn Div took some of these new mounts to Sicily.

27. As a result of the reorganization authorized in January 1943, Machine Gun Battalions disappeared from the Canadian Army Overseas and were replaced by Divisional Support Battalions organized in three Brigade Support Groups. Each of these Groups consists of a Headquarters, a Heavy Mortar Company, a 20-mm. A.A. Company, and a M.M.G. Company, the last-named armed with 12 Vickers guns. The effect of this reorganization was to reduce the total of M.M.Gs. for an infantry division from 48 to 36. This reduction, plus an adequate and readily available supply from the British market, has allowed for considerable reserve (Appx "B").

28. 20-MM. GUN. A new anti-aircraft weapon has been introduced into establishments of the British Army in the form of a 20-mm. gun. British Forces at present use both Oerlikon and Hispano-Suiza types. Supply of 20-mm. equipments for Canadian brigade support groups has been a major problem, but it is expected that early Canadian shipments will relieve the situation (Equipment State of Canadian Army in the United Kingdom as at 31 Dec 43, file 13/Equip State/1/5). Present policy indicates that Canadian forces will ultimately use a 20-mm. weapon of Canadian manufacture, the Inglis gun. In any event, the 20-mm. gun, whatever its make, will doubtless fill the need for an adequate anti-aircraft weapon. (Documents on file 1/20 MM. Guns/1/2.)

29. To provide defence for vehicle convoys against air attack, 250 3-ton lorries (134") will be fitted with quadruple 20-mm. guns (Equipment Policy Letter No. 92, 3 Dec 43). This weapon, the 20-mm. quad S.P., was demonstrated in LONDON on 14 Jan 44.

30. TWO-INCH MORTAR. The total establishment of 2-inch mortars in the Canadian Army in the United Kingdom, as at 30 Jun 42, amounted to 616 (Appx "A"). With the addition of a new division and the increase through reorganization of the number of units which used this weapon, the total at 30 Jun 43 stood at 1,348 (Equipment State of the Canadian Army in the United Kingdom as at 30 Jun 43, file 13/Equip State/1/4). As at 31 Dec 43 a deficiency of 192 existed against an establishment of 962 among Canadian formations in the United Kingdom, but British and Canadian supplies were expected to make up the shortage (Equipment State of Canadian Army in the United Kingdom as at 31 Dec 43, ibid.).



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31. THREE-INCH MORTAR. In battle the British had discovered that the smoke projector fitted on carriers was less efficient than a mortar mounted on the same vehicle. As a result they began to replace these projectors with the mortar early in 1943, and 3-inch mortar carriers are being received from Canada. There is no shortage of these mortars. As at 31 Dec 43, 247 weapons were held against a total establishment of 204 (Appx "B").

32. Experience at DIEPPE directed attention to the fact that the British 3-inch mortar was seriously outranged by its German counterpart. Attempts are being made to increase its range. Reports from SICILY indicate that in spite of this disadvantage, it is a very valuable and extremely destructive weapon (cf. the evidence of Lt.-Col. (now Brigadier) B.M. Hoffmeister, Seaforth of C., "Canadian Operations in Sicily", C.M.H.Q. file 24/SICILY/1).

33. HEAVY MORTAR. In December 1942, a C.M.H.Q. Equipment Policy Letter detailed the issue of heavy mortars of either 4.2-inch or 120-mm. calibre to the Infantry Brigade Support Companies (now Support Groups). Each was allotted 12 of these mortars, as and when supplies became available (Equipment Policy Letter No. 13, 17 Dec 42, file 1/Eqpt Pol Ltr/1). By the end of December 1942, receipts from British Ordnance Depots totalled five 4.2-inch mortars, but these were not issued, as the Support Companies had not been set up. With the reorganization of the Army in January 1943, these companies came into existence, thereby creating a demand for 132 heavy mortars (36 per infantry division and 12 per armoured division). The authorized AFG 1098 for Infantry Brigade Support Groups was not published until March 1943. This reduced the scale of issue from 12 to 8 weapons per group. This decrease was in accordance with British policy. As at 31 Dec 43, there was a surplus of 58 weapons over and above a total War Establishment of 66 for the Canadian Army in the United Kingdom (Appx "B").

34. The heavy mortar in use by the Canadian Army Overseas is the British-produced 4.2-inch weapon. This has already been used by Sask.L.I. (1 Cdn Div Sp Bn) in SICILY. However, an alternative weapon called the "Finnish" or 120-mm. mortar is undergoing development in Canada, and this weapon may come into use at a future time.

35. ANTI-TANK WEAPONS. Thanks largely to increasing Canadian production, the deficiency of Boys anti-tank rifles, mentioned in Report No. 62, was progressively reduced during 1942. However, during that year radical changes in anti-tank policy took place. The experience of Allied troops in the various theatres of war, especially North Africa, raised the question of the effectiveness of the Boys in an anti-tank role. Canada was devoting considerable productive effort to the manufacture of this weapon, and it was of primary importance that she be "in the picture" as regards future policy in order to avoid producing an unusable surplus of weapons. Accordingly, in order to find out the trend of official British opinion, the Senior Officer, C.M.H.Q., wrote to the War Office on 16 Mar 42, requesting enlightenment on the proposed anti-tank policy of the British Army (C.M.H.Q. file 1/A.Tk.Rifle/1, Senior Officer, C.M.H.Q., to Under-Secretary of State, War Office, Attention D.S.D.(W)). The answer contained outlines of proposed changes: it was intended, it was explained, to introduce the 2-pounder anti-tank gun into infantry battalions in lieu of Boys rifles, and to replace the 2-pounder in Anti-Tank Regiments, R.A.,



with the newer 6-pounder as soon as supply of these weapons made it feasible. Mention was also made of an experimental projector which might replace all remaining anti-tank rifles, the E.Y. rifle and the No. 68 grenade (5) and possibly the 2-inch mortar (*ibid.*, 30 Mar 42, D.S.D.(W), War Office to Senior Officer, C.M.H.Q.).

36. This new anti-tank device was described as a shoulder controlled weapon, mounted on a monopod, designed on the spigot principle with modifications necessary to reduce the recoil. It weighs about 31 pounds, and measures overall approximately 3 feet. Two straps make it possible to be carried on one man's shoulders (*ibid.*, 21 May 42, Senior Officer, C.M.H.Q., to N.D.H.Q.). It fires a bomb designed to penetrate armour. This weapon was ultimately developed to a point meriting its production in quantity, and first supplies became available in October 1942. It was named the Projector, Infantry, Anti-Tank. The first Canadian allocation of the P.I.A.T. was received in December 1942 (C.M.H.Q. file 1/PIAT/1, 4 Dec 42, Cable GS 4051, Canmilitary to Defensor).

37. During succeeding months supplies of the P.I.A.T. were delivered to the Canadian Army Overseas from British sources. However, owing to a serious shortage of ammunition, the decision to replace the Boys with these new projectors was not taken until April 1943 (C.M.H.Q. file 1/Equip Pol Ltr/1, 9 Apr 43, C.M.H.Q. Equipment Policy Letter No. 41). The AFG 1098 of units affected has not as yet been changed. This changeover necessitated some revision of a policy initiated in December 1942. In that month the Boys .55 anti-tank rifle had been withdrawn from all units equipped with 2-pounder anti-tank guns or awaiting equipment with 20-mm. guns. This change had reduced establishments of Boys rifles by 1,322 weapons. In effect, a deficiency of 565 weapons had become a surplus of 1,193. The Boys was, however, to be retained in the fighting vehicles of Armoured Car and Reconnaissance Regiments and Infantry and Mortar battalions "and by units which will not be issued with 20-mm. guns". (*ibid.*, 7 Dec 42, Equipment Policy Letter No. 12). The decision to withdraw the Boys from the units mentioned (in December 1942) had been affected by the expectation of receiving large numbers of 2-pounders, 6-pounders and 20-mm. guns in short order. The hoped-for supplies of 6-pounders and 20-mm. guns did not appear, and consequently the Boys was re-issued to the units equipped with anti-tank guns and those who were to receive 20-mm. guns. The re-issued Boys was to be replaced with the P.I.A.T. on a pro rata basis as supplies made it practicable. (C.M.H.Q. Equipment Policy Letter No. 41, 9 Apr 43). There were no notable shortages of the projector by 31 Dec 43 (Equipment State of Canadian Army in the United Kingdom, file 13/Equip State/1/5). The surplus stock of the Boys

(5)

The E.Y. rifle is a .303-inch rifle with a cup fitted to the muzzle which is designed to hold either a No. 68 A.Tk. grenade or the 36M. grenade. By firing a ballistite cartridge rather than ball ammunition, it is possible to project this grenade a considerable distance with a reasonable degree of accuracy against A.F.V. Supply of P.I.A.T. ammunition, which was a difficulty for some time, is now such that this rifle and its accessories have been withdrawn from establishments of the Canadian Army Overseas.



anti-tank rifle is being evacuated to British Ordnance Depots.

38. It is worth while to note that Canadian reports from SICILY are to the effect that the P.I.A.T. is very effective against enemy tanks, subject to the reservation that it is necessary "for the PIAT crew not to fire until they can literally almost see the whites of the enemy's eyes" (Report from Capt. E.H. Pritchard, Edmn. R., C.M.H.Q. file 24/SICILY/1).

39. In the DIEPPE operation the Boys rifle was found very useful, because of its heavy calibre and extreme accuracy, for dealing with snipers who were "dug in" behind light protection. It will also penetrate light armour at short range. Presumably for these reasons, some of these weapons were taken by 1 Cdn Inf Div to SICILY.

40. The intention (mentioned in Report No. 62, para. 13) of re-arming Anti-Tank Regiments, R.C.A., with the "new and powerful" 6-pounder gun, was duly carried out. During the summer and autumn of 1942, 6-pounders were issued in large numbers (see references in First Cdn Army General Weekly Reports C.M.H.Q. file 4/Progress/11). As early as January 1942 it had been decided to replace all 2-pounders in Cdn Corps with 6-pounders (Report No. 62, para. 13) and a new War Establishment, effective 15 Mar 42, contained the provision that the armament of an Anti-Tank Regiment, R.C.A., would be sixty-four 6-pounders (C.M.H.Q. file 5/A.T.Reg/1).

41. Very shortly, however, a still more powerful anti-tank gun, the 17-pounder, began to be available, and in consequence Anti-Tank Regiments were armed with a mixture of 6-pounders and 17-pounders. War Office policy as notified on 6 Apr 43 was that the proportion of guns within regiments should be "one-third 17-pdr to two-thirds 6-pdr" (memorandum by D.S.D., file 1/Org Arty/1). In the following July it was announced that British anti-tank organization in Infantry and Mixed Divisions would be based upon a regiment of four batteries, each of two troops of 6-pounders and one troop of 17-pounders (memorandum dated 4 Jul 43, ibid.). For a time, Canadian units were upon a somewhat different basis, the Anti-Tank Regiments of 2 and 3 Cdn Inf Divs having each three 6-pounder batteries and one 17-pounder battery. 1 Cdn A Tk Regt (1 Cdn Inf Div), which is employed with the Eighth Army in Italy, was organized on the British basis of composite batteries (Senior Officer, C.M.H.Q., to N.D.H.Q., 7 Sep 43, ibid.). Subsequently 2 Cdn A Tk Regt was likewise reorganized (C.M.H.Q. Administrative Order No. 136, 23 Sep 43).

42. For the Anti-Tank Regiments of 4 and 5 Cdn Armd Divs and Corps Troops, and in addition for 3 Cdn A Tk Regt (3 Cdn Inf Div), still another anti-tank weapon was authorized. This was the U.S. 3-inch gun (self-propelled) on tank chassis (Equipment Policy Letter No. 92, 3 Dec 43, file 1/Equip Pol Ltr/1/2). The Anti-Tank Regiments of the armoured divisions and Corps Troops will consist of two 17-pounder batteries and two 3-inch M-10 S.P. batteries. In the case of 3 Cdn A Tk Regt, this formidable self-propelled weapon is to be exchanged for tractor-drawn 6- and 17-pounders, when its special assault task has been performed. As at 31 Dec 43 this unit held the 16 S.P. guns authorized for it (Equipment State of Canadian Army in the United Kingdom, file 13/Equip State/1/5).



43. For the 2-pounders withdrawn from Anti-Tank Regiments other uses were found. C.M.H.Q. Equipment Policy Letter No. 5, dated 28 Sep 42, announced that 2-pounders would be issued to "Infantry, Motor Bns and Recce Regts", on a basis of six guns to each infantry or motor battalion and twelve to each reconnaissance regiment. With the increasing availability of 6-pounder equipments, however, the 2-pounder disappeared even from the establishments of infantry anti-tank platoons. C.M.H.Q. Equipment Policy Letter No. 59, dated 9 Jun 43, advised that 2-pounders issued to the units above mentioned would be withdrawn to reserve and replaced by 6-pounders on the same scale (subsequently increased from six to twelve guns in the case of motor battalions). The 2-pounders would be withdrawn as 6-pounders were issued. By mid-July, nevertheless, 2 and 3 Cdn Inf Divs and 5 Cdn Armd Div were complete in 6-pounders (Telegram GS 1694, Canmilitary to Defensor, 17 Jul, C.M.H.Q. file 4/Progress/1/5). Canadian units were complete to establishment in 17-pounders by 30 Jun 43.

44. Experiments are at present being conducted with a high-velocity 2-pounder gun - the "David". This weapon uses a very powerful charge to fire a "composite-rigid" shot, the outer shell of which disintegrates on impact, penetration being made by a small tungsten carbide bullet. It seems unlikely, however, that this gun, which is a Canadian development, will replace anti-tank weapons at present in use. (See C.M.H.Q. file 1/2 Pdr/1).

45. FIELD ARTILLERY. During the period under review there has been a constant flow of 25-pounder equipment from British and Canadian sources. References to issues of 25-pounders to 1 Cdn Div (e.g., in General Report from First Cdn Army for week ending 22 Aug 42) indicate the replacement of the 18/25-pounders originally issued to the division in 1940 (Report No. 46, para. 6). By 30 Jun 43, holdings of tractor-drawn 25-pounders were virtually complete (Equipment State of Canadian Army in the United Kingdom, file 1/WOC Stores/1/3), but as at 31 Dec 43 there was again a considerable deficiency (Appx "B").

46. There have been two special developments in Field Artillery equipments. The first arose from the decision to provide one of the two Field Regiments in each Armoured Division with self-propelled 25-pounders. These weapons are "Sextons" - 25-pounders mounted on Ram tank chassis - and are produced in Canada (Equipment Policy Letter No. 92, 3 Dec 43, file 1/Equip Pol Ltr/1/2). The Equipment State of the Canadian Army in the United Kingdom shows 23 Cdn Fd Regt (4 Cdn Armd Div) as possessing its full complement of 24 Sextons. 8 Cdn Fd Regt (5 Cdn Armd Div), formerly 8 Cdn Army Fd Regt, was represented as at 1 Nov 43 as holding 18 against an establishment of 24 Sextons (Vehicle Situation, Canadian Army in the United Kingdom, file 13/Veh State/1); these, however, were left behind along with all other heavy equipment when the division proceeded to the Mediterranean theatre. For a description of the self-propelled field piece, see Report No. 88, para. 7 and Appx "A", serial 26.

47. The second development was the introduction of an American self-propelled field piece - the 105-mm. M 7 gun on a Sherman tank chassis, called the "Priest". Like the 25-pounder, the 105-mm. is a gun-howitzer, but is larger, and uses seven different propellant charges, the British piece firing only four. There is no firm War Establishment for



these equipments, but they are to be issued to five Field Regiments (including the three Regiments of 3 Cdn Div) for a special "Beach Assault" role (cf. para. 42 above). On completion of this role, normal tractor-drawn 25-pounders will again be issued (Equipment Policy Letter No. 92, 3 Dec 43, file 1/Equip Pol Ltr/1/2). Provision is to be from British sources. As at 1 Dec 43, the Canadian Army Overseas held 60 "Priests" (Appx "B").

48. MEDIUM ARTILLERY. The position of equipment in the Medium Artillery Regiments has improved since the preparation of Report No. 62. New units arrived in the United Kingdom throughout 1942. In line with War Office policy, 7 Cdn Army Fd Regt was converted to 7 Cdn Med Regt (C.M.H.Q. Administrative Order No. 171, 2 Dec 43). There are now six Canadian Medium Regiments overseas, of which three are in Italy. Deficiencies of 5.5-inch gun-howitzers amounted to 16 guns as at 30 Sep 43. No figures are as yet available for the three regiments in Italy, but by 31 Dec 43, those units remaining in the United Kingdom possessed their full allotment of 16 guns each (Equipment State of Canadian Army in the United Kingdom, file 13/Equip State/1/5).

49. LIGHT ANTI-AIRCRAFT ARTILLERY. The shortage of L.A.A. weapons mentioned in Report No. 62 persisted throughout 1942. In October the six Light Anti-Aircraft Regiments overseas were only 50% complete in Bofors 40-mm. guns. Canada was at that time producing about 200 of these weapons per month, but shipping allotments were such that the guns were not being despatched to the Canadian Army Overseas (Minutes of meeting between Lieut-General A.G.L. McNaughton and D.C.I.G.S., 13 Oct 43, file 1/Conf/12). Strong requests for more guns were made to the L.M.A.B. In consequence, supplies became available in increasing numbers and deficiencies were made up by March 1943, despite the fact that establishments had increased until the total for the Canadian Army Overseas was 519 guns. All nine regiments overseas now had their full complement of 54 guns each (General Report from First Cdn Army for week ending 20 Mar 43, file 4/Progress/11). It is of interest to note that in October 1943, 61% of 40-mm. equipment was of British origin, the remainder being Canadian (Memorandum, D.Q.M.G., C.M.H.Q. to Historical Officer, C.M.H.Q. 13 Oct 43, cf. para. 3 above).

50. The general trend towards self-propelled artillery pieces is reflected in the notification given in December 1943, that L.A.A. Regiments would convert one troop per battery to 40-mm. self-propelled equipments (Letter, 71-3-5/SD, H.Q., First Cdn Army, 11 Dec 43, C.M.H.Q. file 1/Org Arty/1). The Equipment State of the Canadian Army in the United Kingdom as at 31 Dec 43 shows that 42 40-mm. S.P. lorries were already held (Appx "B"). The Morris 30-cwt. 4x2 lorries at present being supplied will eventually be replaced by Ford 3-ton lorries.

51. HEAVY ANTI-AIRCRAFT ARTILLERY. The situation with respect to 3.7-inch anti-aircraft guns has improved considerably in the last year. In June 1942, of a total establishment of 28 weapons, deficiencies amounted to 24 (Appx "A"). By November 1942 all establishments were complete, and have been maintained in that condition (C.M.H.Q. file 13/Equip State/1, Equipment State of the Canadian Army in the United Kingdom as at 30 Jun 42, 30 Nov 42, 31 Dec 43). There is still only one Canadian H.A.A. unit in the United Kingdom (i.e., 2 Cdn H.A.A. Regt).



THE CHURCHILL

52. The Churchill was the first tank ever taken into action by a unit of the Canadian Armoured Corps. This was at DIEPPE on 19 Aug 42. It has since, however, been withdrawn from units of the Canadian Army, because, as an Infantry tank, it did not meet the requirements of Armoured Brigades. Army Tank Brigades have disappeared from the Canadian Army Overseas.

53. The introduction of the Churchill to the regiments comprising 1 Cdn Army Tk Bde is recorded in Report No. 62. Throughout the spring and summer of 1942 it was used by this Brigade in a series of exercises, the most important being "BEAVER III", on 23 Apr 43 (see Report No. 70). The difficulties experienced with this vehicle in previous training became most apparent in this exercise, and "A Brief History of 1st Canadian Army Tank Brigade", prepared by H.C. of that formation (C.M.H.Q. file 24/Formations/1), contains the following comments on the Churchill's performance in it :

The Brigade commenced the exercise with 139 Churchills of varying quality. During the five days that the brigade was on the move, an average of 135 miles was put on each tank: 119 of these tanks were reported as "X", or "Z" casualties - that is at one time or another during the five days almost 90% of the tanks were reported "off the road" with either a major or a minor breakdown. The terms "Breakdown", "Z" casualty", "stragglers", "limpers", and several others describing these tank casualties became household words, and names "oil seals", "gear boxes", "clutch", "amal drives", and "stuck starter" were added to the vocabulary of a great many, these being the major faults encountered.

54. In an attempt to overcome the apparent lack of mechanical reliability encountered by the users of the Churchill, the War Office detailed a system of "re-working" this vehicle, and many of these modified tanks were issued to 1 Cdn Army Tk Bde following Exercise "BEAVER III"; some of these "re-worked" models participated in the DIEPPE operation. The evidence of Major C.E. Page, C.A.C., recently repatriated from Germany, substantiates the statement earlier made in The Times (LONDON) (21 Jul 41) : "They were heavily armoured, giving the maximum of protection to their crews...". Major Page commanded "B" Sqn, 14 Cdn Army Tk Bn, during the DIEPPE operation. He states that no Churchill tank was pierced by enemy fire, nor was any man wounded inside a tank, despite the fact that many were immobilized shortly after landing and consequently subjected to heavy enemy fire (Report No. 107, Appx "B" para. 10).

55. The Churchill, despite its effective protection, was not considered a success, and shortly before DIEPPE, at a time when Canadian tank production plans were much under discussion, Lt.-Gen. A.G.L. McNaughton despatched to the Vice Chief of the General Staff, for the information of the Minister of National Defence, a personal telegram containing an appreciation of the tank situation in 1 Cdn Army Tk Bde, and his proposals for future policy concerning the equipment of this Brigade :



....1 Cdn Army Tank Bde -- now equipped with Churchills on loan from War Office as an interim arrangement pending supply of Ram tanks from Canada. It has been intended to retain Churchills until after 4 and 5 Cdn Armd Divs were equipped with Rams. 1 Cdn Army Tank Bde has been in the U.K. for 13 months and is fully trained to very high efficiency. Against establishment of 178 tank state today is as follows: original model 121, re-worked tanks, 37, new model 24, total 182. Of these 63 are non-runners including 24 for which spares are not available. Despite every effort it has proved impossible to keep the Churchills in running order, first due to certain vital defects in original design and second due to impossibility of obtaining spare parts. I am informed by H.Q. Royal Armd Corps that situation will continue to deteriorate for some months before we can expect increased availability of spares and re-worked or new model tanks. Another serious factor is that personnel have lost confidence in mechanical reliability of Churchill and on this account am most anxious to replace them with re-worked or new model and then and as soon as possible, with Ram II or preferably M.IV.

(C.M.H.Q. file 1/AFV Gen/1/2, 11 Aug 42, Cable GS 2812, Canmilitary to Defensor).

56. Throughout the remainder of 1942 and the first three months of 1943, the newer model Churchill, Mk. IV, was issued to the Brigade and the older tanks, which "had covered many miles and were generally in very poor condition" were withdrawn. Although the Brigade was not "committed to action" until the last day in Exercise "SPARTAN", it did make several long marches and "the improved Churchill with a better organized Ordnance Coy made all the difference" (C.M.H.Q. file 24/Formations/1, History of 1 Cdn Army Tk Bde).

57. In March 1943 the Churchills were withdrawn from 1 Cdn Army Tk Bde, the only Canadian formation which had possessed them, and replaced with Ram II's (C.M.H.Q. Equipment Policy Letter No. 40, 20 Mar 43).

#### THE RAM

58. For some general notes on the Ram, see Report No. 62, paras. 31-33. 1st Cdn Army Tk Bde was not the first formation to receive this tank. 5 Cdn Armd Div had received some Rams in March 1942 (5 Cdn Armd Div Weekly Progress Reports, C.M.H.Q. file 4/Progress/1/4). The decision to equip 5 Cdn Armd Div with Rams had been made as early as 1941, and it is to be noted that the production target of the tank industry in Canada for 1942 was 1155 Ram tanks (see Report No. 62). It would appear therefore that hopes had been entertained of completing the War Establishment of the Division before December of that year. However, the numbers of Ram tanks arriving in the United Kingdom during 1942 were not such that this intention could be realized.



59. The failure of Canadian tank production to meet the demands of the Overseas Army in 1942 can be attributed to two factors. The first is directly associated with the actual manufacture of tanks. Canadian tank industry leaned very heavily upon the U.S.A. for the supply of essential components, the Ram being built on the American M.3 chassis; and when it was learned in October 1942 that the United States had reduced the allocation of transmissions (gear boxes) by 40% (C.M.H.Q. file 1/AFV Gen/1/3, 12 Oct 42, Cable Vehicles 1136, Defensor to Canmilitary), it became apparent that delivery of the first 1,000 Rams would not be complete until mid-December (*ibid.*). In the same period the Canadian tank factories were called upon to produce 25-pounder self-propelled guns on Ram chassis. In effect, this meant that for each S.P. gun produced, one Ram tank the fewer would leave the assembly line. The second cause was shortage of shipping. Even though the total number of tanks produced was not as great as originally planned, many of those earmarked for export to the United Kingdom were left at seaboard owing to the non-availability of cargo space. Thanks to the success of anti-U-boat operations and other causes, the shipping situation improved early in 1943, and in consequence a greater proportion of Canadian output was shipped overseas from January onwards. The result was that by 1 Jun 43, 1,147 Rams were in the hands of the Canadian Army in the United Kingdom (C.M.H.Q. file 1/Tk Cruiser/1, Ram Tank Situation as at 1 Jun 43). These were sufficient to complete the establishment of Canadian armoured formations overseas. (6)

60. It was not enough that the Canadian Army should be provided with a complete establishment of tanks. If the Canadian armoured formations were to acquit themselves successfully in operations, it was essential that their "A" vehicles be of battleworthy standard. It appeared, however, that the Ram II did not fulfil this requirement. In particular, its armament was now considered inadequate. Although the 6-pounder was a much heavier weapon than that carried by British tanks only a few months before, military opinion now tended to favour a still heavier piece such as the 75-mm. gun mounted by the U.S. Sherman tank which had been so successful in North Africa (see below). In addition, a great many mechanical and other modifications to the Ram had been found necessary. An undated memorandum by Colonel H.A. Guy, D.D.O.S. (E), C.M.H.Q., evidently written in March 1943, listed a total of 113 major and minor modifications which had been suggested, and called attention to the desirability of the General Staff establishing a priority list for dealing with these (C.M.H.Q. file 1/AFV Gen/1/3). The list reveals that increased protection at several points had been recommended.

61. In order to equip the Canadian armoured formations with battleworthy tanks, then, it was necessary either to produce a new tank (a very long process) or to undertake radical modifications of the Ram, including particularly arming it with a 75-mm. gun. On 3 Jun 43 a meeting at H.Q. First Cdn Army considered the situation:

(6) This figure includes 130 en route from Canada.



...General McNaughton said that nothing in any report which had been brought to his attention indicated that the Ram II was not capable of being modified so as to become a completely battleworthy tank. He said that of the important modifications, the provision of a 75-mm. gun was essential, and a suitable A.A. weapon, was of high priority. The meeting unanimously agreed.

(Minutes of meeting, C.M.H.Q. file 1/Tk Cruiser/1).

The policy notified to N.D.H.Q. after this meeting was that 600 of the available Rams would be reserved for operational use by one armoured division or tank brigade if required before the main target date tentatively set for First Cdn Army's probable employment; and these tanks "would have all necessary modifications including 75-mm. guns completed earliest possible date and after sufficient running in would be held in stock on immediate availability basis". The balance, approximately 1000 Rams, would be used for training requirements of C.A.C. units and reinforcements; they "would have only minimum modifications", but for gunnery training purposes 100 of them would be armed with 75-mm. guns and allotted to units and firing ranges. N.D.H.Q. was further told:

...For full scale equipping of First Cdn Army against main target date McNaughton desires M4 type tank armed with 75-mm. gun and powered with either Wright radial or Chrysler engine...

(Cable GS 1309, Canmilitary to Defensor, 5 Jun 43, file 1/Tk Cruiser/1).

62. Subsequently, however, it was decided to equip the Canadian Army Overseas completely with M4 (Sherman) tanks; and in consequence it became unnecessary to make the alterations to Rams detailed above, with the possible exception of re-arming 100 tanks with 75-mm. guns for training purposes. (Memorandum, "Provision of Tanks and Self Propelled Arty for Cdn Army Overseas", 4 Aug 43, ibid.).

63. It should be noticed that an important element in the Ram situation in 1943 was the extreme difficulty of providing physically for the modifications which were considered desirable. General McNaughton in a telegram to the C.G.S. dated 29 May 43 observed that "extensive modification requirements ... have swamped our B.O.W." and referred to "inability to secure contractors to help out" (GS 1245, Canmilitary to Defensor, C.M.H.Q. file 1/Tk Cruiser/1). In view of these facts, and of the "many advantages" of the M4 tank, General McNaughton wrote further:

...It seems likely that we will be forced to conclusion that M4 should be provided for any formations required for operations, and that Ram should now be reserved for training only...



64. An interesting detailed comparison of the Ram and the Sherman was made by a committee assembled by Brigadier R.A. Wyman, commanding 1 Cdn Army Tk Bde, a formation which had used both vehicles. Its report (31 May 43 : copy, C.M.H.Q. file 1/Tk Cruiser/1) made the point that "The general suitability of the Ram II does NOT meet the requirements of a first line operational tk. Its disadvantages are far more numerous than its advantages in comparison with the Sherman..." Among the points of detail made were the superiority of the 75-mm. gun to the 6-pounder, and the facts that "The Sherman ... is superior on rough going or hill climbing and better for general cross country work" and that "the Sherman is an easier and much less fatiguing tk to handle than the Ram". The Sherman's traversing mechanism and firing controls were both described as "more satisfactory", while "From experience, it is estimated that the vision from a Sherman is infinitely better than from a Ram". Both protection and escape arrangements in the Sherman were considered to be superior; and the point was made that whereas in the Sherman "the controls are very convenient", "in the Ram the controls are so situated that the driver becomes very fatigued after driving for a short distance".

65. The Ram will not be employed in operations as a cruiser tank. Tank design has made great strides since this vehicle left the drawing-board. It has played, however, and will still play, an important role in training the armoured formations of the Canadian Army Overseas. Moreover, nearly 500 Rams are being made available to the War Office for use as Assault Vehicles, Royal Engineers (cf. Letter, A.C.I.G.S. to Senior Officer, C.M.H.Q., 30 Nov 43, file 1/Tk Cruiser/1/2 Others will be converted to a recovery role.

#### THE SHERMAN

66. The "General Sherman", which is repeatedly referred to above, actually appeared in the Canadian Army in the spring of 1943, when this tank was issued to 1 Cdn Army Tk Bde (now 1 Cdn Armd Bde). This formation had had Rams for only a few weeks when it was decided to despatch it to the Mediterranean, along with 1 Cdn Inf Div, for Operation "HUSKY". With this in view, the brigade moved to Scotland for training late in April, and was there equipped with Shermans ("A Brief History of 1st Canadian Army Tank Brigade cf. para. 53, above). It used these tanks in the subsequent campaign in SICILY.

67. The Sherman (American M4 Medium Tank) is a 30-ton tank of United States design and manufacture, a direct development of the M3 types called by the British Army the "General Lee" and "General Grant". It may be said to represent a fusion of the best features of U.S. and British tank practice: American mechanical excellence and heavy armament, but with the latter mounted as in British A.F.Vs. The Grant and Lee were armed with a 75-mm. gun, but mounted it on the starboard side of the hull, where it had extremely limited traverse and could not be used when the tank was in "hull-down" position. The Sherman mounts the 75-mm. gun in the turret after the British manner. The chassis is



an improved version of the M3, while the hull is much more streamlined and the profile more compact. The War Office now proposes to instal a 17-pounder gun "in a proportion of Sherman tanks", i.e., 15 per armoured regiment (Memorandum, A.C.I.G.S. to Senior Officer, C.M.H.Q., 17 Dec 43, file 1/Tk Cruiser/1/2).

68. The Sherman made its appearance in the Eighth British Army in the Middle East in the late summer of 1942. Mr. Churchill has described the manner in which "the admirable Shermans" were acquired. He was in WASHINGTON with President Roosevelt in June of that year, when news came of the British reverse in LIBYA and the loss of TOBRUK:

...Nothing could have exceeded the delicacy and kindness of our American friends and Allies... Their very best tanks - the Shermans - were just coming out of the factories. The first batch had been newly placed in the hands of the divisions who had been waiting for them and looking forward to receiving them. The President took a large number of these tanks back from the troops to whom they had just been given. They were placed on board ship in the early days of July, and they sailed direct to Suez, under American escort for a considerable part of the voyage.

(Speech in Parliament, 11 Nov 42: The End of the Beginning, War Speeches by the Right Hon. Winston S. Churchill, C.H., M.P., 1942 (LONDON, 1943), p. 219.)

69. These tanks played a material part in the Eighth Army's great victory at EL ALAMEIN in October, 1942, and in the subsequent Allied successes in the Mediterranean theatre generally. It appears to be a matter of common consent that the Sherman is the most generally satisfactory tank yet produced by the Allies. Reports so far received of its employment by 12 Cdn Army Tk Regt in the Sicilian campaign indicates that the unit was well satisfied with its performance, and particularly with its 75-mm. gun. (See "Extracts from Memoranda concerning Canadian Operations in Sicily", C.M.H.Q. file 24/SICILY/1.) 5 Cdn Armd Div took no heavy equipment to the Mediterranean theatre. Issue of Sherman tanks is presumably to be made in Italy.

#### THE PROBLEM OF FUTURE CANADIAN TANK POLICY

70. Although the Sherman is evidently to be the operational tank of the Canadian Army Overseas in the immediate future, it must be substantially modified to meet the fast-changing conditions of modern tank warfare. Just how extensive the modifications will be can be ascertained by reference to Situation Report No. 17, British Army Staff (APV), dated 20 Nov 43 (C.M.H.Q. file 38/BAS Repts/1/4). The list of approved modifications included in that report contains some 67 items.

71. During 1942, plans were made for the production in Canada of a tank which would be an improvement on the Ram and would form, it was hoped, part of a co-ordinated North American production programme. The vehicle finally decided



on, and christened the "Grizzly", was an M4 type tank using a 75-mm. gun or the higher-velocity T13 (76-mm.). This was in accordance with the views of General McNaughton as notified to N.D.H.Q. in Telegram GS 2690, Canmilitary to Defensor, 2 Aug 43 (C.M.H.Q. file 1/AFV Gen/1/2). With a view to production of this tank, the Canadian Government by 20 Jan 43 had placed orders for 80% of the materials required for the production of 1200 Grizzlies by February 1944 (Telegram GSW 170, Defensor to Canmilitary, for McNaughton from Stuart, 20 Jan 43, C.M.H.Q. file 1/AFV Gen/1/3).

72. Following considerable discussion between the British and Canadian authorities during the summer of 1943, policy crystallized as follows. The War Office agreed to equip with Shermans from U.S. production all four existing Canadian armoured brigades and the two armoured reconnaissance regiments. Canadian tank production capacity was to be divided between the M4 A1 (Grizzly) which was to be produced at the rate of about 50 per month to a total of 250, and the self-propelled 25-pounder, production of which would be increased to 150 per month.

73. Before the Grizzlies were completed, however, the need for A.A. Tanks led to the decision to convert these vehicles to an anti-aircraft role by substituting the "Skink" turret (see para. 75 below). The 250 Grizzly chassis originally called for are now nearing completion, but since latest requirements are for 360 A.A. tanks, an additional 110 chassis must be produced (Cable GS 8, Defensor to Canmilitary, 6 Jan 44, C.M.H.Q. file 1/Tk A.A./1).

74. Subsequently, however, Canadian production will centre on the T20 series, a new class of American medium cruiser tanks which it is believed will be superior to the Sherman, but which are still undergoing trials. When this design is agreed upon, Canada will "taper off" production of the S.P. 25-pounder. It is anticipated that Canada may ultimately produce the T20 at the rate of about 150 per month. (Telegram GS 2181, Canmilitary to Defensor, Stuart from Montague, 3 Sep 43, file 1/Tk Cruiser/1).

75. Aside from Cruisers (Infantry tanks having now disappeared from the establishment of the Canadian Army Overseas) certain specialist tanks are required. As shown in Vehicle Situation, Canadian Army in the U.K. as at 15 Nov 43 (file 13/Veh Rets Prov/1/3), requirements for these tanks at that date were as follows: Command and O.P. tanks, 91; Recovery tanks, 36; A.A. Tanks, 124; Light Tanks, 192; Rear Link Tanks, 4. Few Tanks are shown as actually held in any of these categories. Command and Rear Link tanks will be Shermans of British provision; O.P. tanks are to be either Ram II or Sherman. Command and O.P. tanks are provided with wireless and are not designed for a fighting role. Recovery tanks are being provided from converted Ram I and II tanks; their function is to assist "ditched" tanks. A.A. tanks will eventually be the Canadian "Skink" or Grizzly chassis, mounting four 20-mm. guns; as an interim measure Crusader or Centaur A.A. tanks will be used. Light tanks of Stuart model will replace a proportion of carriers in armoured regiments and armoured reconnaissance regiments and will come from British supply. Bridge-laying tanks are no longer required. (Equipment Policy Letter No. 92, 3 Dec 43, file 1/Equip Pol Ltr/1/2.)



# MISCELLANEOUS TANK TYPES

76. In Report No. 62 (para. 32), reference was made to tanks of American type being used by 5 Cdn Armd Div as a temporary expedient. In addition to the Lees mentioned in that Report, a certain number of Grants were subsequently issued. 23 of these tanks appeared in the Equipment State for 31 Aug 42 (Cable GS 3226, Canmilitary to Defensor, 12 Sep 42, file 13/Min Rets/1/2). These American tanks were used by 4 Cdn Armd Div after its arrival in the United Kingdom. On 1 Nov 43, only one Grant remained on charge; there were also seven obsolete M2A4 tanks in stock (Vehicle Situation as at 1 Nov 43, file 13/Veh State/1). Stuarts are now once more required as Light tanks for certain units (para. 74 above).

## TANK SITUATION BY FORMATIONS, DECEMBER 1943

77. The chart below illustrates the state of equipment of Canadian formations in the United Kingdom at the end of 1943. It derives from Vehicle Returns as of 31 Dec 43 (C.M.H.Q. file 13/Veh State/1) and does not include 1 Cdn Armd Bde or 5 Cdn Armd Div, which are in the Mediterranean theatre. 3 Cdn Div is included, by virtue of its present role as an assault division.

FORMATION	3 CDN DIV		4 CDN ARMD DIV		2 CDN ARMD BDE	
	W.E.	HELD	W.E.	HELD	W.E.	HELD
TKS CRUISER (SHERMAN)	68	--	271	44	144	11
TKS CRUISER (RAM II)	--	51	--	266	--	211
TKS LIGHT	11	--	63	4	--	--
TKS COMMAND	53	--	27	--	--	--
TKS RECOVERY	3	--	9	--	6	3

## CARRIERS

78. The Universal Carrier still retains its place in the Canadian Army, but establishments have been decreasing in recent months. This item has been supplied almost entirely from Canadian production. As of 31 Aug 43, units of the Canadian Army Overseas were in possession of 2359 Ford-produced Canadian Universal Carriers, as against only 143 Carriers of British manufacture (Return, 9 Sep 43, file 13/Veh Rets Prov/1/2). The total establishment for both the Field Army and units under C.M.H.Q. at 1 Dec 43 was only 1103 Universal Carriers (Vehicle Situation as at 1 Nov 43, file 13/Veh State/1).

79. It is expected that Carriers now being shipped from Canada will be equipped with the 95-horsepower motor, rather than the older 85-horsepower. But those of the latter type in the United Kingdom will not be modified (Equipment Policy Letter No. 92, file 1/Equip Pol Ltr /1/2). 3-inch Mortar Carriers are now in good supply, and there is an overall surplus in the Canadian Army Overseas, although the majority of the vehicles were still held in stock at 1 Dec 43 (Vehicle Situation as at 1 Dec 43, file 13/Veh State/1).



### WHEELED ARMoured FIGHTING VEHICLES

80. The position of the Canadian Army Overseas in the matter of Armoured Cars and related vehicles has very greatly improved since Report No. 62 was written. Nevertheless, vehicles now held will in many cases be replaced by improved types at an early opportunity.

81. Wheeled A.F.Vs. at present used by the Canadian Army Overseas are almost all of Canadian manufacture and are of three main types. The first of these is the General Motors Light Reconnaissance Car, known as the "Otter". This vehicle was first received from Canada in the spring of 1942. The second type is the Canadian Scout Car (Ford), known as the "Lynx". This is a four-wheel-drive vehicle, with a hull similar to that of the British Daimler Scout Car, and armed with a Bren gun and a Boys rifle ("Nomenclature of A.F. Wheeled Vehicles", file 1/AFV Gen/1/3). The third Canadian wheeled A.F.V. is the General Motors Armoured Car, known as the "Fox". This vehicle carries a heavy machine-gun armament (.50 gun, .303 Bren and .30 Browning), but no cannon. It is a four-wheel-drive vehicle carrying a crew of four men, and has a Humber-pattern hull and turret on a General Motors chassis. ("Nomenclature of A.F. Wheeled Vehicles", ibid.).

82. As of 1 Dec 43 the Canadian Army Overseas held 256 Fox Armoured Cars, 534 Lynx Scout Cars, and 648 Otter Light Reconnaissance Cars (Appx "B"). The "Lynx" has not proved to be entirely satisfactory and it is intended that ultimately both Scout Car and Light Recce Car shall be jointly replaced by a Universal Scout Car, described as a "General Utility Project" ("Nomenclature of A.F. Wheeled Vehicles", file 1/AFV Gen/1/3). In the meantime it is proposed to provide a modified Lynx from Canada. The Fox has likewise been found inadequate and will be replaced by the newer "Staghound" (T 17 E 1), an Armoured Car of American type (file 1/Armd Car/1). 51 Staghounds have already been provided (Appx "B").

### MECHANICAL TRANSPORT

83. With respect to mechanical transport vehicles ("B" vehicles) it is not practicable in a comparatively brief report to do more than present a few generalizations. The vast majority of these vehicles continue to come from Canadian sources, although certain specialist vehicles are still British-made. The return of British-made and Canadian-made "B" vehicles in the possession of the Canadian Army Overseas as at 31 Oct 43 (file 13/Veh Rets Prov/1/3) showed no really large group of vehicles as British in origin; the largest British-made group was made up of 197 Ford Commercial GS 3-ton Lorries (158").

84. As in Report No. 62, a few representative figures extracted from "Vehicle Situation in the Canadian Army in U.K." as at 1 Dec 43 (C.M.H.Q. file 13/Veh State/1) are given below:



<u>Type of Vehicle</u>	<u>Total W.E., C.A.O/S</u>	<u>Total Holdings, including stock</u>
Motorcycles Solo Light	7881	7366
Cars 5-cwt. 4x4 (Jeep)	2190	4128
Trucks 15-cwt. G.S.	2990	3361
Lorries 3-ton G.S. 158"	6083	4605
Lorries 3-ton Derrick	244	1
Lorries 6-ton G.S.	243	8
Tractors Breakdown Heavy	122	56
Tractors (Fd Arty & L.A.A.)	709	1315
Trailers 10-cwt. 2-whl. G.S.	370	1

85. The provision of "B" vehicles has always been a major problem, but the situation generally has improved. The field army is not fully equipped to war establishment, and its holdings include a number of vehicles for which there is now no requirement. But by making substitutions where necessary, First Cdn Army should have sufficient vehicles when it is required to take the field.

86. The delay in the provision of vehicles was due in great part to assembly difficulties. In September 1943 there were in England approximately 17,000 Canadian vehicles in crates awaiting assembly (Memorandum from D.Q.M.G., C.M.H.Q., to B.G.S., C.M.H.Q., 15 Sep 43, file 38/CMD Prod MOS/2). Civilian assembly facilities were inadequate to maintain a sufficient flow of completed vehicles to the Canadian Army Overseas. In order to augment the rate of assembly a Canadian Equipment Assembly Company was formed; this was soon expanded into 1 Cdn Eqpt Assembly Unit, comprising a headquarters and six companies (C.M.H.Q. Administrative Order No. 148, 17 Oct 43). Up to 5 Jan 44, this unit had assembled 3423 vehicles, of which 1902 were delivered complete and 1521 were awaiting final completion owing to shortages of parts (Weekly Report, file 58/Wksp Eqpt E A C/1). At the time of writing 1 Cdn Eqpt Assembly Unit and the civilian firms under contract with C.M.H.Q. have together assembled approximately half of the 17,000 vehicles mentioned above (Information from Mr. J. Douglass, Superintendent, Canadian Mechanization Depot).

87. The arrangement noted in Report No. 62, of acquiring a certain number of specialist vehicles from British sources, is still being followed to a considerable extent. At the same time the problem of specialist vehicles is being mitigated to some extent by the policy of modification of Canadian-made types in the United Kingdom. The system followed is to produce a minimum of basic types, and to modify these overseas to meet specific technical requirements. Present policy with regard to types authorized and the provision source of vehicles is summarized in C.M.H.Q. Equipment Policy Letter No. 92, 3 Dec 43 (file 1/Equip Pol Ltr/1/2).



88. One type of "B" vehicle which has appeared in the Canadian Army Overseas during the period under review deserves perhaps more than a passing mention. This is the American car 5-cwt 4 x 4, familiarly known as the "Jeep". This little vehicle has remarkable cross-country and hill-climbing performance, and has become very popular. All reports from SICILY seen by the writer emphasize the desire of units in the field in the Mediterranean area to acquire as many of these very useful vehicles as possible. On 22 Sep 43, Lt.-Col. A.F.B. Knight, lately D.A.Q.M.G., 1 Cdn Div, told the writer that formations and units of this Division in SICILY greatly preferred "Jeeps" to carriers for the conditions under which they were operating. (7)

#### GENERAL

89. It is interesting to compare the situation reflected in Appendix "B" of the present Report with that appearing in Appendices of Reports Nos. 46 and 62. These illustrate the comments with which this Report began, to the effect that the problem of supply has entered an entirely new phase. There are now surpluses of a great number of basic weapons which were formerly in short supply. Other weapons, the shortage of which was formerly a source of anxiety, have disappeared from Canadian War Establishments and have been replaced by others which in some cases are not yet available in adequate numbers. The extent to which this War has become a struggle of technicians, in which scientific effort is directed towards keeping the equipment of one's own Army constantly in a state of improvement and constantly in advance of the equipment of the enemy, is well illustrated by these summarized returns. There are still serious problems of equipment to be surmounted, but they are, in the main, different problems from those of 1941.

90. Of the specific items of equipment dealt with in this Report, the one which perhaps is the most serious source of difficulty at the moment is 20-mm. A.A. guns and mountings, but it is anticipated that receipts from Canadian sources will alleviate this situation (Equipment State of the Canadian Army in the United Kingdom as at 31 Dec 43).

91. The subject dealt with in this Report is very large both in point of matter and point of time, and it has been quite impossible to deal with it completely within the limits of a few thousand words. The topic is so large and so complicated that to keep every aspect of it adequately under review for historical purposes would in itself be a full-time task for one officer. All that has been attempted here has been to note the most important general developments and to collect the most pertinent overall statistics. If the

(7)

Cf. letter, Lt.-Col. Gilbride (A.A. & Q.M.G., 1 Cdn Div) to Brigadier Walford (D.A. & Q.M.G., First Cdn Army), 1 Aug 43 : "Jeeps! Jeeps!! and more Jeeps!!! you can't have enough - a fair no of M/C required here too but useless for LO's needed for convoy control" (Copy on C.M.H.Q. file 3/Sicily/1/3).



Official Historian requires further details on any special aspect, these must be sought in the voluminous files at C.M.H.Q. dealing with general equipment policy and the problems arising in connection with individual items.

92. The present report has been long in preparation. It was originally drafted in the summer of 1943 by Capt. G.T.J. Barrett. Later it was revised by Lt.-Col. C.P. Stacey and submitted for the comments of Brigadier N.E. Rodger (then B.G.S., C.M.H.Q.) and Brigadier J.H. MacQueen (D.Q.M.G., C.M.H.Q.). The substance of these comments has been incorporated, and the report has now been brought up to date by Lieut. J.R. Martin.

C.P.S.

(C.P. Stacey) Lt.-Col.,  
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APPENDIX A

EQUIPMENT STATE, CANADIAN ARMY OVERSEAS

30 Jun 42

Totals include both field army and units under C.M.H.Q.  
Extracted from Telegram GS 2459, Canmilitary to Defensor,  
24 Jul 42 (C.M.H.Q. file 13/Min Rets/1/2), and other  
returns for same date on same file.

	<u>Establishment</u>	<u>Held</u>	<u>Deficiencies</u>
Guns 5.5-inch G/H	72	32	40
6-inch How.	N11	16	Surplus
25-pdr G/H	344	315	29
2-pdr A.Tk.	36	221	Surplus
6-pdr A.Tk.	296	40	256
3.7-inch H.A.A.	28	4	24
40-mm. L.A.A. (Bofors)	280	110	170
Pistols	22907	18617	4390
Rifles	98863	83564	15299
M.M.G. (Vickers)	234	308	Surplus
L.M.G. (Bren)	5177	6039	Surplus
L.M.G. (Lewis)	18	26	Surplus
Machine Carbine (Thompson)	4446	4463	Surplus
A.Tk. Rifles (Boys)	2661	1138	1523
Mortars 2-inch	616	919	Surplus
Mortars 3-inch	221	308	Surplus
Carriers, Universal	822	1261	Surplus
Armd O.P.	154	N11	154
3-inch Mortar	213	N11	213
T.P.C.	77	57	20
Scout Cars (Cdn)	271	75	196
Lt Recce Cars (Cdn)	164	128	36
Armoured Cars	75	29	46
Tanks, Cruiser Med. MK II; Covenanter MK V	78	5	73
Cruiser Ram I & II	304	94	210
Infantry	205	192	13
Cruiser Close Support	68	18	50
General Lee (Trg)	N11	61	Surplus
General Stuart (Trg)	N11	8	Surplus
M.2 - A. - 4 (Trg)	N11	11	Surplus
LAA MK VI (Trg)	N11	9	Surplus



# EQUIPMENT STATE, CANADIAN ARMY IN THE UNITED KINGDOM

DECEMBER 1943

Totals include both stock and holdings of field army and units under C.M.H.Q. Figures for weapons are taken from Equipment State of the Canadian Army in the United Kingdom as at 31 Dec 43 (C.M.H.Q. file 13/Equip State/1/5). Vehicle totals are extracted from Vehicle Situation of the Canadian Army in the United Kingdom as at 1 Dec 43 (C.M.H.Q. file 13/Veh State/1). Returns are not available for the Canadian Force in the Mediterranean Theatre.

	<u>Establishment</u>	<u>Held</u>	<u>Deficiencies</u>
Guns 5.5-inch G/H	58	57	1
25-pdr G/H	230	144	86
2-pdr A.Tk.	N11	17	Surplus
6-pdr A.Tk.	378	449	Surplus
17-pdr A.Tk.	28	42	Surplus
40-mm. L.A.A.	284	355	Surplus
3.7-inch H.A.A.	29	29	--
20-mm. A.A.	1193	5	1188
Guns S.P. 25-pdr	32	33	Surplus
3-inch	80	58	22
40-mm.	84	42	42
105-mm. X	96	60	36
Pistols	12689	14953	Surplus
Rifles No. 4	76640	88263	Surplus
Rifles No. 1 Mk. III	N11	1220	Surplus
M.M.G. (Vickers)	98	128	Surplus
L.M.G. (Bren)	6748	6686	62
L.M.G. (Lewis)	18	2	16
Machine Carbines (Thompson)	N11	557	Surplus
Machine Carbines (Sten)	66234	55857	10377
A.Tk. Rifles, (Boys)	N11	40	Surplus
Mortars 2-inch	962	770	192
3-inch	204	247	Surplus
4.2-inch	66	124	Surplus
P.I.A.T.	2141	2332	Surplus
Armd Cars Fox	N11	256	Surplus
Staghound	139	51	88
Scout Cars Universal	369	N11	369
Scout Cars Lynx II	194	534	Surplus
Cars Light Recce	175	648	Surplus
Carriers Universal	1103	1946	Surplus
Universal T-16	484	12	472
3" Mortar	199	564	Surplus
Tanks Cruiser (Sherman)	736	292	444
Tanks Light	131	N11	131
Tanks Comd (Ram or Sherman)	85	N11	85
Tanks O.P. (Ram)	16	N11	16
Tanks Recovery (Ram or Sherman)	21	31	# Surplus
Tanks Cruiser (Ram I)	N11	14	Surplus
Tanks Cruiser (Ram II)	N11	1242	Surplus

X This item from Vehicle Situation of the Canadian Army in the United Kingdom as at 1 Dec 43.

Ø W.E. shown is included under Scout Cars Universal.

# Stock only.