

1878/47

DOMINION ARTILLERY ASSOCIATION.

PRIZE ESSAY,

FOR THE MÉDAL PRESENTED BY HIS EXCELLENCY THE RIGHT HON. THE EARL
OF DUFFERIN, P.C., G.C.M.G., K.C.B., K.P., GOVERNOR GENERAL OF
THE DOMINION OF CANADA.

ON THE SUPPLY, CARE AND REPAIR OF ARTILLERY MATÉRIEL, INCLUDING
SMALL ARMS AND AMMUNITION, FOR CANADIAN MILITIA,

BY

CAPT. AND BT. LT. COLONEL C. E. MONTIZAMBERT,

"B" Battery, Canadian Artillery, School of Gunnery, Quebec.

JULY, 1877.

SECOND EDITION.



OTTAWA:

Printed by MacLEAN, ROGER & Co., Wellington Street.

1878.

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DOMINION ARTILLERY ASSOCIATION, *13.4.99 -*

PRIZE ESSAY,

FOR THE MEDAL PRESENTED BY HIS EXCELLENCY THE RIGHT HON. THE EARL
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EXTRACTS FROM MILITIA GENERAL ORDERS.

HEAD QUARTERS,

OTTAWA, 23RD MARCH, 1877.

DOMINION ARTILLERY ASSOCIATION.

MEDAL FOR ESSAY.

His Excellency the Earl of Dufferin, K.P., &c., Governor-General of Canada, has been graciously pleased to express his intention of offering a medal for the best essay on the Supply, Care and Repair of Artillery *matériel*, including Small Arms and Ammunition, for Canadian Militia, to be competed for by Officers of the Canadian Militia Artillery, being members of, or belonging to corps affiliated with, the Dominion Artillery Association. Officers or others who have served in the Royal, or Royal Marine, Artillery to be excluded from competition.

The essays to be distinguished only by a motto, not that of any Artillery corps, and the manuscript not to be in the handwriting of the competitors.

The essays to be sent to the President of Council, Dominion Artillery Association, Quebec, before the last day of July, 1877.

The judges to be Officers of the Royal Artillery, viz :

The Inspectors of Artillery, and the Professor of Artillery, Military College, Kingston.

The essays may be in English or French ; subject matter will be considered of more importance than style. Quotations and extracts from works bearing on the subject may be freely made use of, but the names of the authors so quoted must be given in foot or marginal notes.


The best essay will be printed at the expense of the Dominion Artillery Association, and distributed to members.

Ottawa, 28th September, 1877.

Adverting to No. 2 of General Orders (7) 23rd March, 1877, the best Essay "on the supply, care and repair of "artillery *matériel*, including small arms and ammunition, "for Canadian Militia," which obtains the medal presented by His Excellency the Earl of Dufferin, K. P., &c., is, in the opinion of the judges, that bearing the motto "*Potz blitz! das ist ja von Gustle aus Blaserwitz!*" Schiller.

Ottawa, 12th October, 1877.

Adverting to No. 1 of General Orders (19) 28th Sept., 1877, Captain and Brevet Lieutenant-Colonel Charles Edward Montizambert, "B" Battery School of Gunnery, Quebec, is the author of the Essay bearing the motto "*Potz blitz! das ist ja von Gustle aus Blaserwitz!*" Schiller, which obtains the medal.



THE SUPPLY, CARE AND REPAIR OF ARTILLERY
MATÉRIEL, INCLUDING SMALL ARMS AND
AMMUNITION, FOR CANADIAN MILITIA.

Potz blitz ! Das ist ya von Gustle aus Blaserwitz !

Schiller.

On the withdrawal from the Canadian Dominion of the Imperial Legions in the fall of 1871, a transfer was made of a considerable amount of warlike stores and *matériel* from the British to the Canadian Government, of which the late Sir George Cartier was then Premier, and Minister of Militia and Defence; Lt.-Col. Robertson Ross (late 25th King's Own Borderers), being Adjt.-General, and Col. Powell Dep.-Adjt.-General, of Militia. Lt.-Col. Wily, Director of Stores and Keeper of Militia properties, took over the numerous buildings, lands, guns and war *matériel* generally, given by the Imperial to the Dominion Government to start the latter fairly in the art of self defence.

After the march out from the Citadel of Quebec, of three batteries of the 3rd Brigade Royal Artillery, three companies Royal Engineers, and the 1st Battalion 60th Royal Rifles under Col. Gordon, the last British troops quartered in the Canadas, the keys of the strong old Keep were handed over by General Hamilton, R. E., Commandant, to Lt.-Col. Strange, R. A., who, with an incipient battery of Canadian gunners, undertook the important duties of the Garrison of Quebec, and has ever since kept flying over the Citadel that glorious flag the Union Jack, which for so many years has without interruption floated proudly on the grand old Fortress.

Portions of the then existing armaments of the military posts, St. John, Quebec, Montreal, Kingston and Toronto, came to us as a free gift; and the roll looks imposing enough as far as the number of pieces of ordnance is concerned,

We took over at St. John, N.B.....	26	pieces.
“ “ Quebec.....	187	“
“ “ Montreal.....	33	“
“ “ Kingston.....	85	“
“ “ Toronto.....	9	“

—
340 in all.

With the exception, however, of ten 7^{1/2} Armstrong B. L. R. guns at Quebec, these consisted of old S. B. cast iron pieces, guns, carronades, howitzers and mortars.

GARRISON ARTILLERY.

The guns, 68, 56, 32 and 24 prs., are of little use where now mounted, and are to be replaced in the principal fortresses by more modern weapons. These S. B. guns would be useful for the armament of gunboats on the lakes, nothing much heavier being likely to be brought against them on those inland waters.

Predominance on the upper lakes, especially on Lake Ontario, is of the first importance. On this subject Col. Fletcher, Scots Fusilier Guards, late Mil.-Sec. to H. E. the Governor-General, says in a very able lecture on Canadian Defence:—

“*Coûte que coûte*, the command of Lake Ontario must be “secured and maintained, * * * and, above all, Kingston “would have to be placed beyond the possibility of capture.”

Of the 68 prs. there are two mounted in coast batteries at St. John, N.B.

The 56 pr. class is represented by one gun in Fort Henry at Kingston, where it would doubtless give a good account of anything likely to be brought against it. Not so with the heavier 68 prs. at St. John, that port being open to the attack of armoured cruisers.

The carronades and howitzers, firing charges of case and grape, would answer very well for the flank defence of ditches and curtains; and those in artillery charge are, most of them, at present mounted in positions for that purpose. In more

modern armaments the caponnières would be armed with gatlings, probably of a calibre sufficiently large (say 65) to allow of the bullets breaking scaling ladders.*

The mortars given over were 13", 10" and 8", land and sea service.

There are also 12 and 18 pr. siege guns, one battery of the latter with carriages and waggons complete at Quebec, and another at Montreal.

Formerly the Royal Artillery had 40 pr. wedge Armstrong R. siege guns; these are about the same weight as the old 18 pr. S. B., and are of course an infinitely superior arm for the purpose for which they are intended; none of them, however, were left in the country on Dominion charge.

Of the ten 7" B. L. R. ordnance, four are mounted "*en barbette*" on the salient bastions of the citadel of Quebec; three, with their stores, carriages, platforms and racers, are lying, one in each of the splendid forts at Point Levis, opposite Quebec; but as yet the necessary concrete platforms have not been laid down.

The caponnières of these forts are armed with sixteen 32 pr. carronades; a poor substitute for the complete armament of rifled guns offered as a free gift by the Imperial Government, which was as follows:—

	ON B. TRAV'G. PLATFORMS.	ON TRAV'G. CARRIAGES.		
No. 1 Fort	7-7" B. L. R.	4-40 pr. B. L. R.	8-10" mortars.	12 capr. guns.
No. 2 Fort	10 " "	4 " "	7 " "	10 " "
No. 3 Fort .. .	10 " "	4 " "	7 " "	10 " "

One of these guns is lying in the park of the old Artillery Barracks at Quebec, intended to be mounted in an angle of the works commanding the head of Dorchester Bridge—the only

* An exhaustive pamphlet on "*Mitrailleuses* or Machine Guns," has been written by Capt. J. F. Owen, R.A., Capt. Inst. Royal Gun Factories, and their tactical use treated of in a Lecture, entitled: "The Gatling Gun: Its place in Tactics," by Capt. E. Rodgers, F.R.G.S.—Journal of the Royal United Service Institution.—No. LXXXII.

approach to the city from across the St. Charles River. Before leaving, the Royal Engineers laid down the racers for this gun; but the concrete has never been filled in. The remaining two were sent in 1874 to Kingston, where they now remain in charge of "A" Battery School of Gunnery.

This class of gun is almost obsolete in the British service. It is a good gun for land defence, is extremely accurate, and from the comparatively large capacity of its common shell, which weighs filled 98 lbs., bursting charge 7 lbs. 10 oz., would be very effective against earthworks. The other projectiles used with this gun are segment and shrapnel shell and case shot. We have no 7 inch shrapnel in the country. Large quantities of this projectile are, or were lately, lying piled in Woolwich Arsenal, and probably might be obtained at a low cost. The complicated and delicate breech mechanism is against the gun, and has been known in the severe winters of this climate to become immovable from the oil or drifting snow freezing between the bearings. An Armstrong armourer and peculiar tools are needed to keep it in order; the vent-piece requires constant attention; and the special stores and fittings used with it are many and varied.

Some years ago two 64-32 pr. Palliser converted, and three S. B. 32 prs., with their carriages and stores complete, were handed over by the Imperial authorities at Halifax as a free gift to the Dominion. They have been mounted for drill purposes by the Royal Artillery, and form an addition to the heavy ordnance on Canadian charge.

There are also three 32 prs. and an old iron 6 pr. mounted on an earthwork commanding the entrance of the bay of Charlottetown, Prince Edward Island.

FIELD ARTILLERY.

There are in Canada sixteen batteries in all. Until 1871 these corps, with one exception, were armed with S. B. M. L. bronze pieces, three guns and one howitzer to each battery. Since then, however, they have nearly all been provided with

the latest 9 pr. M. L. R. gun of 8 cwt., and the most modern wrought iron carriages with Madras wheels from the Woolwich Royal Gun and Carriage Factories.

There are sixty of these guns now in use by the Canadian Militia. The 9 pr. of 6 cwt. would perhaps have suited our purpose better.

The Halifax Field Battery alone was then and still is served out with six of the B. L. R. 6 pr. guns of 3 cwt. (Colonial Service.)

Waggons were not imported with the 9 prs. with the exception of four, which were given to the London Field Battery.

The two Schools of Gunnery have also these guns, and there are four at Red River in possession of the Winnipeg Field Battery.

The North-West Mounted Police have in charge four 7 pr. M. L. R. mountain guns, 200 lbs. weight, and two 9 pr. 6 cwt. M. L. R. guns. There are no other pieces in the North-West belonging to the Dominion except a few S. B. bronze field guns, and some Coehorn mortars at Fort Garry, Manitoba.

During a late discussion before the members of the Royal Colonial Institute, on Capt. Coulombe's paper on "Imperial and Colonial responsibilities in war," "Capt. Bedford Price, M. P., expressed indignation at the supineness of successive Governments with reference to the defenceless state of Vancouver's Island, the depot for all the stores for our naval force in the Pacific. If Russia within the next few months were to declare war against us, Vancouver's Island, with all the stores, would be at her mercy. As to our fleet, Russia, having a larger force, and means of telegraphic communication with them, which were not at our disposal, would be able, long before our ships on the Pacific station could hear of the declaration of war, to dispose of them in detail."

Our fellow-countrymen in British Columbia generally are alive to the fact of their having no adequate supplies of *matériel* wherewith to defend themselves; and several articles have of late appeared in the papers on the subject.

At St. Johns, Quebec, and Montreal, points liable to be

attacked by armoured ships, some of the heavier guns should be mounted, such as those at Halifax, 12, 18 and 25 ton guns; notably on the formidable fortress of Quebec, the key of Canada, where there is a Battery of Canadian Artillery to take care of and, if necessary, use them.

The fifteen 64-32 pr. R. M. L. Palliser converted guns of 58 cwt., now arriving, will be a great accession to the Canadian armament; but they are now used as shell guns only in the English service, and no Palliser projectiles have been sent out with them. With the Palliser chilled shot and a battering charge they could pierce, at short ranges, the weaker iron-clads.

From the high command of the Citadel of Quebec, projectiles from these guns aimed at the decks of iron-clads would tell with good effect. A vessel's deck, when she is approaching bow on, offers a favorable parallelogram of error, elevation being a far more difficult matter than direction.

The fact that the present supply of 32 pr. carriages and side-arms would answer also for these guns was an economical inducement for their purchase.

Some guns of a heavy nature mounted *à fleur d'eau* at Indian Cove, or at the head of the Island of Orleans, would command the channel.

It is to be hoped that the 64-32 prs. are but the *avant garde* of some of their larger brethren, and that the Eastern cities of the Dominion may be put in a position to reply in a sterner tone if called upon to speak at all—an event in these warlike times perhaps not wholly improbable.

Laisné in his "*Aide-mémoire portatif du génie*" (Paris 1861), lays down the formula for the whole number of guns to defend a bastion fort, as follows: No. of guns = $146 + 5(M - 2)$, M. being the number of bastions. Taking the Fortress of the Citadel of Quebec with five bastions we would have $146 + 5(5 - 2) = 161$ guns.

It is to be presumed that this formula would still hold good unless there existed a great difference in weight of metal between the guns of the besiegers and besieged. The strong-

hold just alluded to is armed, at present, with nine of the weakest class of garrison rifled guns in the service and a few obsolete smooth bores.

The armament proposed for this fortress by the Imperial Government was as follows :

For Quebec Citadel and works facing the river, as approved 9, 5, 68, Canada, $\frac{5}{913}$:

9" M. L. R. 12 tons.....	9
7" " 7 "	4
7" " 82 cwt.	13
Caponniere guns.....	39
64 pr. B. L.....	9
24 " S. B.....	10

As long as our present relations with the Empire continue, it is scarcely likely that we shall go into the manufacture of cannon, or even military small arms, however desirable it may be that the *matériel* used with them should be made in this country.

AMMUNITION.

The supply of ammunition, and artillery *matériel* generally, is exceedingly small. From the reports of Lt.-Colonel Wily, Director of Stores, it will be seen that about 100 rounds per gun for land and 200 for coast defence were given us in 1871.

Since then a considerable quantity of shot and shell has been expended at practice by the different batteries; what ought to be the service ammunition having to be so used, as there is no proper reserve in the country.

Cartridges are made up in the Laboratory at Quebec by the men of the Gunnery School, and supplied to the Dominion.

There is a proportionate supply of fuzes, tubes, &c. They are not however improving with age, and their district distribution is rather eccentric.

The Regulations on this head for the Royal Artillery are given in Army Circular, War Office, 1st December, 1876, Clause 170, as follows:—

“Garrison Artillery—Fuzes and Tubes—1st. The proportion of fuzes and tubes to be maintained for Garrison Ordnance will be as laid down in the details contained in the equipment warrant, 1876. (Revised Army Regulations, Vol. III, page 59 to 76.) 2nd. Half of these proportions will be in charge of the Royal Artillery; the other half will, in time of peace, be held in reserve by the Ordnance Store Department at the depot upon which the forts and batteries are dependant for their supplies.”

The Boxer wooden time fuze gets to burn slowly if kept too long, possibly from the sulphur in the composition deteriorating. These fuzes might with advantage be made in the country.

The 7" B. L. R. gun here has for its percussion fuze only the old obsolete Pillar fuze, fitting the Moorsom gauge of the shells on charge. These fuzes, besides being obsolete, are not now reliable from sheer old age. The Dominion Inspector of Artillery has applied for a supply of Pettman's G. S. percussion fuzes for these guns, and there should be a store of them on hand.

The wooden carriages, gyny, quoin, tampeons, skidding, levers, handspikes, platforms, sponge staves, rammers, and wooden stores generally which are used with Garrison and Field guns are decaying and being expended by wear and tear throughout the country, and there is no provision at present for their being replaced by any manufactured in the Dominion. We ought not, surely, to import wood goods into Canada, at a cost of probably about three times that at which they could be made here, the staple export of the country being timber.

Of the woods used for military purposes we have oak, beech, ash, rock-elm, fir (pine and spruce), cedar (for ammunition boxes, fittings, &c.,) chestnut, hickory, birch, rock-maple, walnut, and for ground platforms, juniper, hackmatack, &c.

It is said that a ship came into Halifax a few years ago from England, laden with birch-brooms, step-ladders, brushes, scrubbers, broom-handles, &c., for the use of the troops; and it is a matter of history that the flag-staff of the Citadel of Quebec had to make two voyages across the Atlantic before being qualified for its present elevated position.

Within our own Dominion we have also mines which can supply iron equal to any English or other obtainable—notably the mines and works at Londonderry, Nova Scotia, which turn out iron and steel of the finest quality.

SUPPLY OF SMALL ARMS.

There are at present in Canada about 80,000 stand of Snider-Enfield rifles, long and short, serviceable and *unserviceable*; also 2,500 new Martini-Henry rifles of the pattern now in use in the British service.

The latter have not as yet been issued; and it may become a question if they ever should be, unless the arm is adopted *in toto*, and supplied to all rifle corps of the Volunteer Militia. Confusion in the supply of ammunition might possibly happen, and would not be a good feature.

Besides the above, arms and accoutrements for one thousand men were sent in 1872 to Victoria, British Columbia.

The Snider-Enfield is an excellent soldier's weapon, and is most specially suited to the Volunteer services. The mechanism is simple, strong, and little liable to go out of gear; and when it does so it is easily repaired.

As an arm of precision it is wonderfully good up to any range likely to be often required in a thickly wooded country such as Canada.

Although having a slow twist in the rifling, and a cartridge containing a charge of only $2\frac{1}{2}$ drachms of F. G. powder, with a cylindro-conoidal bullet of $\cdot577$ diameter, great accuracy is obtained by the hollowing out of the centre of the bullet, giving increased centrifugal force. The space left in the head of the ball used to be filled up by a wooden plug; but in the later make this space is left void, and the top is spun over

with lead. The open space in the centre of the base is filled up with a pressed clay plug.

Including the reserve militia with the active force, the number of fighting men in Canada, liable in case of war to be called out, ranges from six to eight hundred thousand. Should there not be a far larger number of rifles in the country?

There must be in store in England any amount of serviceable Snider-Enfields, which have been replaced in the army by Martini-Henrys. Could not a number of the former, sufficient to form a proper reserve in Canada, be obtained from the Imperial Government by the Dominion at a low cost?

The Martini-Henry has certainly a flatter trajectory and longer range; but it is a more expensive and complicated arm, and has also a much greater recoil, probably owing chiefly to the high pitch of the rifling. This latter point is very much against it. No ordinary soldier will ever make cool and accurate shooting with a kicking weapon.

For pistols we have only a small supply of old Colt's revolvers, using the obsolete cap and paper cartridge. We ought to have Adam's Army Service pistol, a breech-loading central fire revolver, with copper cartridges.

The Snider ammunition has so far been all supplied by purchase from the Imperial Government. Much of it is very old, and greatly deteriorated. That of marks IV, V and VI, some dating back as far as 1862, is not to be depended upon; and now for rifle matches a later make up to mark IX is bought by private individuals from importers. There is a small supply of mark IX in store; but it is only issued on repayment.

These cartridges, and many other of the stores used, might advantageously be made in this country, at a saving to government sufficient to nearly double the amount now available from the Militia Grant for such purposes. We ought also to take into serious consideration the probable stoppage soon of the manufacture in England of Snider ammunition, that arm being no longer the weapon of the army.

Taking the statistics furnished in the yearly Militia Reports by the Director of Stores for the last two years (1875-76,) we find that the issue and sale of Snider cartridges, ball and blank, amount to no less than 2,503,184 rounds!!!

In the last year, 1876, the number of rounds sold to the different Rifle Associations, and for individual target practice, amounts to 511,302, with an issue by Government for Militia practice of 320,973; in all 832,275 rounds—exclusive of course of an immense number of cartridges purchased from importers for private practice, of which no statistics can be obtained.

Looking at the returns of the last three years, it will be seen that the sale of ammunition to the Rifle Associations, corps, and private individuals for practice, was as follows:—

1874.....	142,040 rounds.
1875.....	231,870 “
1876.....	511,302 “

Doubling every year! Surely this is most gratifying, as showing the great and increasing interest taken by all ranks of the Dominion Militia in perfecting themselves in the use of their weapons. Much of this good effect is doubtless due to the encouragement given by the various Rifle Associations, and notably by the “Dominion of Canada Rifle Association” under the presidency of Lt.-Col. C. S. Gzowski, whose exertions for and liberality towards Canadian marksmen can scarcely be over estimated.

In 1875 and '76, 36,261 lbs. of gunpowder and 22,000 Friction Tubes, with the usual proportion of shot, shell, fuzes, &c., were expended for Field and Garrison Artillery practice.

The Dominion Artillery Association, lately organized by Lt.-Col. Strange, R.A., Dominion Inspector of Artillery, is having the same good effect in fostering gun-practice; though it is only right to say that it cannot be expected to develop in the same way the expenditure of Artillery ammunition until the subscriptions to the Association are largely augmented, as private practice with this arm can rarely be carried on.

The above figures show conclusively the large and rapidly increasing expenditure of *matériel* controlled by the Dominion

Government. Let us hear what Lt.-Col. Robertson Ross, formerly Adjt. General of Militia, has had to say on the subject of these stores being manufactured in Canada. His remarks on this subject are embodied in his reports on the state of the Militia, and date back as far as 1872 :

“Hitherto the supplies of uniform, clothing, military equipment, small arms, small arm ammunition, rifled field guns, ammunition for field and garrison artillery, &c., &c., and military stores generally, have been obtained almost entirely from the Imperial Government, or from private contractors in England.

“It appears to me that the time has now arrived when an alteration in this system might be adopted, to a very great extent, with advantage.

“The desirability of expending in the country, as far as possible, the money voted for the annual supply of these stores is obvious, but I would especially call attention, on military grounds, to the necessity for commencing the manufacture of small arm ammunition, and such warlike stores as are annually required for practice, and for the maintenance of a sufficient reserve.

“As regards gunpowder, an article of the first military importance, and which could not be obtained in time from England, should a sudden emergency arise, Lt.-Col. French,* Inspector of Artillery and Warlike Stores, (formerly Inspector of Warlike Stores for the Imperial Government at Quebec, and consequently a competent authority,) has reported to me on this subject, as follows :

“Having reference to the ammunition required for gun practice for the current year, I have the honor to point out that, for various reasons, it would be desirable to ascertain if the powder could not be manufactured in the country.

“In December, 1871, I inspected the powder mills near Hamilton, and I feel satisfied from that inspection as well as

* This officer, while in the Dominion, did much for the Canadian Militia of his own arm.

from conversation with the manager and foreman, that a suitable powder for heavy guns could be produced at those mills.

“The fine brand of powder known as ‘Dominion Rifle’ is an excellent powder. I have used it a great deal myself; but the fact that it is used in a great measure by small-bore riflemen is sufficient proof of its excellence.

“It is, I suppose, needless for me to mention the advisability of encouraging the manufacture of gunpowder in the country; at the same time it will be necessary, if Government should contract with manufacturers for this article, to look closely after its manufacture, in order that the conditions may be as similar as possible to the manufacture of the powder at present in store.

“I have received from the Superintendent of the Government Powder Factory at Waltham Abbey, England, specifications for the supply of powder by contract, &c., &c. I shall be happy to submit the necessary conditions if required.”

Col. Robertson Ross continues, “and with regard to the general question of the manufacture and repair of warlike stores in this country, that officer reports to me as follows:”

“I have the honor again to bring to your notice the advisability of commencing, even on the smallest possible scale, the manufacture and repair of those warlike stores most needed for the defence of this country.

“I would submit for your information the following figures, which will be in themselves a sufficient proof of this fact on the score of economy; from a defensive point of view, however, the economy is a secondary consideration.

Imperial Gov't. Prices.	No. 1 Balance Sheet.			No. 2 Balance Sheet.			Vide “Priced Vocabulary, 1871.”
	£	s.	d.	£	s.	d.	
R. L. G. Gunpowder, per 100 lbs.....	2	10	11½	4	7	4½	
Snider Cartridges per 1000...							
{ Ball.	2	16	10	3	10	3	
{ Blank...	1	11	0	1	14	1	

“No. 1 Balance sheet is the cost of production; No. 2 is, I presume, a protection to British manufacturers.

“The Canadian Government have to pay five per cent. more than No. 2 Balance Sheet if the articles are purchased in England, or 15 per cent. more if purchased in the Dominion. Thus, the gunpowder would cost the Dominion almost 100 per cent. more than its cost in England.

“In addition to this 100 per cent. there is the fact that for making up cannon and small arm cartridges, repairing small arms, gun-carriages, &c., there are numbers of public buildings lying idle; the use of these, rent free, would be almost a set-off to the increased price of labor in this country, particularly if it be borne in mind that the labor of children is employed to a large degree in certain of the minor operations.*

“I would in conclusion submit that the establishment of an arsenal on a small scale may be pressed on the attention of the Government.”

Col. Robertson Ross says further, “with regard to the suggestions of the Inspector of Artillery and warlike stores, I concur entirely in the views submitted by that officer.”

“Reference to the Militia estimates shows that a very considerable sum is voted annually for military stores, &c. For instance, in the Financial Estimates for the year ending 30th June, 1872, the following sums were included, viz:—

“Ammunition.....	\$139,109 00
Clothing	130,000 00
Military Stores (including storage however).....	85,683 00
Ordnance Stores and Equipment for Field and Garrison Batteries....	33,606 00
For improved Fire-arms.....	142,055 00
	<hr/>
	\$530,453 00

“Although this amount exceeds the average expenditure, it is evident that a very large sum of money has hitherto (and

* In this year of grace, 1877, labor in Canada can be obtained as cheaply as in the mother country.

I believe unavoidably) been expended out of the country, the greater portion of which might now, on military and other grounds, be expended with advantage in the country.”

These sound recommendations have been strongly seconded by Lt.-Col. Strange, R. A., Dominion Inspector of Artillery, in his report of 1874, and also by Lt.-Col. Irwin, Inspector of Artillery.

The logic of such figures as the above seems undeniable, and it is only to be wondered at that our rulers, so keen in reducing the estimates, should not as yet have seen fit to take up the question.

Why should we not have an establishment started for the manufacture of *Munitions de Guerre*, when, besides other considerations, such an obvious saving can be made ?

There would, of course, be a certain outlay necessary in the purchase of “plant;” but the difference in price between Balance Sheet No. 1 and Balance Sheet No. 2 is so great that it is only fair to suppose that the saving to the country in the first year alone would amply cover such expense.

No General would like to have to fight in a theatre of operations more than 3,000 miles from the base of supply; and the problem is not improved by the base in question being nearly inaccessible during about five months in the year.

The reserve of both artillery *matériel* and small arm ammunition is so small* that in the event of hostile attack, large supplies would be wanted from the mother country. At such a time she would be driving her magnificent factories of war *matériel* at high pressure for her own needs, and our demands would come at a truly inconvenient season.

Would it not be in our interest in every way to do something in this line for ourselves ?

*In his report for 1876, the Major-General commanding says:—“Our reserve of rifle ammunition is particularly small; we have only 150 rounds for each stand of rifles in the country. This is, at least, one-half too little, keeping in view the rapidity with which breech-loading arms can be fired. In the item of powder, too, our reserve is too small for Garrison or Field Artillery in time of necessity. In 1875 the General Reserve in store throughout the Dominion was only:—

Gunpowder	188,576 lbs.
S. A. Ammunition.....	6,902,163 rounds.
Snider Rifles, long and short.....	19,820
Camp Equipment for about.....	50,000 men.

On Government land at Quebec, and surrounded by vacant ground to a safe distance from the dwellings of the city, lies a group of laboratory dwellings, built for Imperial uses by the Royal Engineers, and well adapted as workshops for the purpose suggested. They are in perfect order; and a part of them is at present used by the Quebec Gunnery School for making up cartridges, &c., for the Dominion. Large earthen traverses are erected between each building, to lessen the effect of an accidental explosion should such a thing occur.

There is plenty of Government ground for store-houses; and in this place a second class Arsenal, which is what we need, could be easily established.

Here, under the guns of the Citadel, and the supervision of a scientific officer of the Royal Artillery, might be commenced a manufacture, on however small a scale, of *matériel* needed and used in Canada.

Artillery officers superintending the manufacture of material, even on a small scale, in such an arsenal, would furnish data as to cost of production which would be useful in checking the prices of contractors on a larger scale. Here also all warlike supplies furnished could be tested for acceptance.

The new and delicate means for proof and examination of gunpowder as carried on at Waltham Abbey are given in detail in the "Hand-book of the manufacture and proof of gunpowder," as carried on at the Royal Gunpowder Factory, Waltham Abbey, by Capt. F. M. Smith, R. A., Assistant Superintendent.

Le Boulengé's Chronoscope used there in testing the action of the gunpowder when fired has been very fully described by Lieut. C. Jones, R. A., (a Canadian), in a pamphlet on this subject.

In that ably written book, the "History of the Royal Artillery," by Major F. Duncan, R. A., we read how in the olden time the command of Albert Borgard, 1st Colonel of the Regiment, and a well *foughten* old man he was, contained within itself, with its quaint old staff of engineers, petardiers, mat-

rosses, tinmen (whatever they may be), tent-makers and artificers of every kind, the skilled artisans necessary for supplying all the wants of an Artillery "Trayne."

Coming down to a later period, the immense depot Brigade of Artillery drivers at Woolwich and elsewhere, doing all the carting work previous to the Crimean War, furnished the means of an immediate and great extension to the Artillery.

Gunners also were largely employed in the arsenals and work-shops—thereby obtaining a thorough knowledge of the stores they would have to use, and ought to be familiar with.

Turning from great things to small, it is admitted that for purposes of instruction many more horses are needed at the two Gunnery Schools; but they cannot be given, for economical reasons.

It is said that at one station, over \$3000 per annum is paid to contractors for cartage for general militia purposes. This sum would keep 25 or 30 horses more at the School, and an efficient Field Battery could be maintained, doing all the work and drill besides, without any extra expense to the country.

In such work-shops as have been proposed above, the questions of supply, care and repair meet on a common ground; and the efficient attainment of all these three vital ends would be much fostered by such establishments.

Labor is extremely cheap in Canada, and more especially in Quebec, in the winter months. In the manufacture of fuzes, tubes, cartridges and small stores of sorts, child labor is largely employed.

The following quotations are from the R. A. Institution prize essay of 1872 on the establishment and organization of an Arsenal, by Lieut. E. H. H. Collen, R. A., Staff College, Sandhurst. Out of that clever work we will try to choose some portions which bear on our subject. He says:

"If then it may be conceded that the time is fast approaching when the soldier who aims at distinction must understand and appreciate every part of the great machine by which an army is worked, I may hope to attract to the subject of this essay the attention of those who would pass it by as not con-

cerning the active duties of their profession, and as a matter that might well be left to the few who have made this branch of the Artillery Service the business of their lives. It requires, however, but little consideration to show how deeply and intimately is connected the duty of supply with those military operations which form the chief study of soldiers. Few of us indeed may be actually called upon to organize an arsenal; but still every Artillery Officer should consider the principles which should govern the working, while our brother officers of other branches of the service will not find it vain and unprofitable labour to look into a matter which may be of deep importance to a General and his staff, whether in the defence of this country or in foreign expeditions or wars.

“The national scheme of military organization which has been so lately placed before the public recognizes completely that decentralization in respect to warlike stores which must accompany an attempt to form a force of the higher tactical units, each complete in itself.*

“An arsenal is an establishment for the construction, repair, receipt, storage and issue of warlike stores,

“Arsenals may be divided into two classes:—

First-class Arsenals.

Second-class “

“In first-class arsenals every want of an army and the military service in respect to the munitions of war must be provided for.

“With this class we have not however at present to deal, but will consider the subject of a second-class arsenal only.

“ * * * * In an arsenal of the second class the great manufacturing establishments of the first class arsenal are compressed into work-shops for partial construction and for repair: the store department being of equal magnitude

* “According to these arrangements the troops of the reserve would be equipped for either of the foregoing objects, in respect to arms, accoutrements clothing, or expense ammunition from the depot centres: the regular and reserve forces both obtaining camp equipage, field stores, and reserve ammunition from the district issuing stores.” Report on the organization of the various land military forces of the country, by a committee assembled by order of the Secretary of State for War:

and importance with that of the first-class arsenal. Provision must, however, be made for manufacture to a limited degree, so that by the judicious position and arrangement of our arsenal we may be prepared to utilize the manufacturing resources of the district in time of pressure or danger.

“With the construction of guns, and the various elaborate processes to which the metal is subjected before being placed in the hands of the Artilleryman, a second-class arsenal is hardly concerned, although its workshops must be adapted to perform certain minor operations connected with ordnance.

“While it would be necessary to provide for the chief kinds of ammunition used for field purposes, it would not be possible to have such an establishment as would suffice to manufacture the numerous varieties of ammunition required for siege and naval purposes.

“Again, while the second class arsenal in peace time would be unable to turn out large batches of carriages, it should be able to make and repair gun-carriages, and other carriages used in the field, and form the nucleus of a larger establishment for this purpose. In addition, the second class arsenal should possess workshops for the repair of small arms, and for the manufacture on a limited scale of harness, saddlery and accoutrements.”

Here it may be remarked that any one who had an opportunity of seeing Canada's show of saddlery and harness at the late Centennial Exhibition at Philadelphia would scarcely doubt our capability of turning out a make of these articles which would contrast favorably with anything to be obtained elsewhere.

Further on, the author from whom these quotations are taken, continues :

“Such an arsenal would probably consist of large establishments for storage, with small factories or workshops for repairs and replacement, * * * combined with the adaptation of any existing factories to the manufacture of such munitions of war as could be made in the country.”

With regard to the conditions which govern the position of an arsenal, which should invariably be based upon strategic considerations, he adds :

“An arsenal should be situated at the base of operations, whether for offensive or defensive purposes. Jomini draws a distinction between the base of operations and the base of supply ; but this distinction cannot apply to the furnishing and replacement of munitions of war. In defensive operations it must be situated near that point which is the best adapted in all respects to form a last stand-point against attack, and from which a successful counterstroke may be launched at the assailant.

“ It must be secure from attack, placed at that point from which the transport of stores can be effected with the greatest facility, whether by rail, water or road—a combination of all these means of transit being the most to be desired—to the various parts of the area to be supplied.

“ It should never be too near the frontier or the outer line of defence.

“An arsenal should be placed so that it can, with facility, draw in the resources of the country in minerals, timber, and the great mass of raw material required for the construction of munitions of war.

“ Safety and facility for supply and transport are the chief considerations which must decide the position of an arsenal ; and whether for offensive or defensive war, it must be protected by such fortifications as shall ensure its defence by a small force against superior numbers, and oblige the latter to undertake its siege or investment with every probability of final failure.

“ Provided these conditions are fulfilled,” he continues (and they certainly seem to be, in the case of Quebec, in every particular), “at or near the centre of a manufacturing population would be found the most suitable position for the establishment of an arsenal ; for in a position of this kind we might expect to find men, machinery and material which could in a great emergency be diverted from their ordinary business,

and applied to the production of warlike stores, supplementing and extending the smaller organization of peace time.

“In foreign states we look for large arsenals at the great pivots and bases of offensive and defensive operations guarded by fortresses* which have grown up with the necessity for the supply and renewment of the manœuvring armies.”

With regard to the administration of such an arsenal, our essayist goes on to say :

“* * * * * I think few will be inclined to dispute the assertion that the manufacture and supply of warlike stores require special training; and that in addition to the knowledge required of stores in their passive state, the officer charged with supply should have a practical knowledge of the use of the same. Without this, while it is possible that a department might supply stores with regularity in the time of peace, it would probably fail in the time of war or emergency, because it would not know what stores should take precedence in manufacture or despatch, nor what may be supplied in lieu of those of another kind when the stock of the stores required is exhausted.

“But it may be asserted that it is impossible to obtain a man practically acquainted with, and competent to deal with all natures of stores. This is perfectly true; but an artillery officer who knows his profession and the requirements of the other branches of the service, who has passed through the manufacturing courses, will probably be found to best fulfil all the necessities of the case, provided he is assisted by men capable of dealing with the work to be done, in a practical fashion.†

* “But these should be something more than fortresses—they should contain sufficient material for a great army in Artillery fire-arms, provisions of all kinds, workshops, arsenals, hospitals; in fact, collecting all the raw material which naturally flows from the surrounding district into a great city, they should be capable of converting it, by means of a large population of artizans, and of extensive manufactories, into the material of war—of turning brass into cannon, iron into projectiles and rifles, wood into trains of waggons, wheat into biscuit, canvas into tents, &c.”—*Hamley's Operations of War, 2nd Edition, p. 307.*

† Upon this portion of the subject, the recommendation of the two Committees known respectively as Lord Strathnairne's Committee on Supply and Transport, 1867, and Lord Northbrook's Committee on the conduct of Business in the Army Departments, 1870, bear very strongly.

The opinion of the former was, as is well known, in favor of a distinct

“The magazines, although forming an integral part of the administration of an arsenal, would be placed in positions of safety, consistent with facility of supply. The chief points to be attended to are:—

“(1) Precautions for safety.

“(2) Freedom from damp.

“(3) Ventilation.

“The regulations for the safety of magazines do not need repetition here, as every officer is expected to know them as contained in the Queen’s Regulations.

“The separation of combustible stores is an important point, *i. e.*, the division of powder, which should be kept by itself, from other stores; tubes, fuzes, cartridges, (empty and filled,) &c., being kept in a separate magazine. In all magazines very clear arrangement is necessary; and a list of the stores contained should always be placed on the exterior door, the quantity being inserted in a column which may be renewed from time to time by pasting over strips of paper. All cases and barrels should be legibly labelled. * * *

“In a second-class arsenal, * * * large factories would be replaced by work-shops for the performance of minor processes analogous to the larger operations. We should require:—

“1. A work-shop containing lathes, and all machines for turning, boring and fitting.

“2. Smith’s shop and forges.

“3. (a) Carpenter’s and wheeler’s shops, where carriages might be made and repaired; (b) cooper’s shop; (c) painter’s shop.

ordnance department, and was as follows:—“That the custody and management of arms and munitions of war is so special a duty that it could not be conveniently connected with that of other supplies, but that it should be a distinct branch in close connection with the Royal Artillery, who are trained and professionally qualified for such duties.”

Lord Northbrook’s Committee, however, considered that this would destroy “unity of administration” and recommended “that the Control Department should consist of two main sections in the War Office, and in the Field:—One for providing and issuing articles required for the daily consumption of an army—such as food, forage, fuel and light, and for the administration of transport, and the other for the receiving and issuing of all other stores. The latter division should be placed under an officer who has a professional acquaintance with munitions of war. * * * * * The education and training which an Artillery Officer receives is precisely that required for an officer of this division of the Control Department.”

* * * * *

“4. Collar-maker’s shop, for repair of harness, tents, &c.

“5. Laboratory, where all the simpler kinds of ammunition might be made up.

“6. Armoury workshops, with all the lathes and tools for the repair of small arms.”

CARE.

The care of the heavy ordnance, which is mounted and in Artillery charge in Canada, is now almost exclusively in the hands of the Gunnery Schools, in which—working under the orders of the Inspectors of Artillery—the officers, master gunners with their staff of district gunners, Armstrong armourers, sergeants, &c., keep the armament in a high state of efficiency.

The S. B. cast iron guns are examined, scraped and painted regularly; those on land fronts once in two years, and those on sea fronts once a year. Gutta-Percha impressions when thought necessary are taken at the bottom of the vent, to detect the commencement of cracks round the lower extremity of the copper bushing.

This should always be done after every 200 rounds fired with projectiles.

If found necessary the guns are re-vented, through-vented or condemned, as the case may require, by the Inspectors of Artillery, after examining the impressions taken by the Armstrong armourers.

The 64-32 pr. M. L. R. guns have a space for a shoulder cut in the metal of the bore where the bushing enters, and the copper is set up from below into this. With the appliances now available, these guns could not be re-vented in Canada.

Owing to the impossibility of furnishing the sentries who used to mount guard during the old regime, those guns not in use have their sights removed, preserving screws put in, and their vents stopped with putty.

The latest regulations for the examination of rifled guns are given in a pamphlet containing “Directions for the Preservation of the Sights and Fittings, and for the Examination of Muzzle Loading Rifled Guns, etc.” War Office, August, 1872.

As regards the guns we have in Canada, the 7" B. L. R. and the 64 pr. M. L. R. (converted), should be examined regularly after every 100 rounds with projectiles; smaller guns after every 150 rounds.

On the subject of "care" the Directors say, "It is necessary in order that rifled guns may be always kept in a serviceable condition that the bore of such guns, whether B. L. or M. L., from which practice is carried on, should be kept slightly oiled to prevent rusting. At the close of each day's practice they will accordingly be washed and placed under metal, and as soon as dry will be oiled with a sponge and the muzzles closed with tampeons. When guns are not in constant use the bores will be lacquered, and the bright parts about the breech of the B. L. R. guns greased with the following mixture:—

Tallow, 3 parts.

Lard oil, 1 part.

White lead, about 1 lb. to a gallon.

The vent-pieces, and all other fittings except the screws, will be removed."

The M. L. rifled guns are liable to scoring of the bore, an erosive action due to the rush of gas round the projectile, particularly over the seat of the shot, and to cracking of the steel inner tube. The extent of both is ascertained by gutta-percha impressions, and the occurrence of the latter in the 64 pr. and larger natures is indicated by the tell-tale hole, or gas escape.

Our 64-32 pr. being a converted cast-iron gun is much more dependent on the strength of its tube than a wrought-iron one.

The 9 pr. M. L. R. field guns and fittings should be kept clean and slightly oiled, and require attention from time to time when not in use to prevent rusting. Except during the annual training they are usually looked after by men employed for the purpose by the Commanding Officers of Batteries.

If any of these latter are of the "spit and polish" school, they may keep their guns very bright by the use of the following receipt:—

A lacquer of,

Rectified Spirits of Wine....	1 quart
Dragons Blood.....	4 drs.
Shellac.....	1¼ oz.

Put on with a soft brush ; it requires no rubbing.

For repair of the carriages see “Notes on the Manufactures of the Royal Carriage Department,” and supplementary chapter on the “Examination and Repair of Artillery Carriages, etc.,” arranged by Major Oldfield, R. A., Assistant-Superintendent Royal Carriage Department, in Griffith’s Artillerist’s Manual, a book that ought to be in the possession of every Artilleryman.

Memoranda of examination, or the “Medical History,” as they are called, of each gun should be carefully kept ; and this is regularly done at the Gunnery Schools, as far as the guns in their charge are concerned.

In this record are stated the defects of the gun at the time of its issue, the number of rounds it has fired, and the result of the examinations it has undergone.

The wooden carriages are also looked after and painted and puttied ; but there is at present no provision for their repair, which is constatly needed, nor for that of platforms ; and both are rapidly decaying everywhere.

It is scarcely necessary to remark how important it is that every officer in charge of gunpowder magazines should be fully informed in every particular in connection with their care. Full instructions as to the use of the wet and dry bulb thermometer for finding the dew point, and ascertaining the proper lays for ventilation, and many other most important points, are given in the “Regulations for gunpowder magazines,” issued with Army Circular, July, 1874. Every officer of our Military Store Department, which has sole control of the magazines, doubtless is familiar with these regulations, and has the necessary instruments for enabling him to carry them out. Every fine day is by no means necessarily a suitable one for purposes of ventilation.

Fuzes and tubes can be kept in any safe and dry place.

They are not allowed to be stored in a powder magazine, on account of containing detonating composition. The same rule applies to small arm cartridges.

The other gun-stores and materials, such as side arms, tackles, &c., require little care, but much repair and constant renewing.

As for the care and repair of small arms, Major-General Sir E. Selby Smyth, K. C. M. G., in his report on the Militia, 1875, writes as follows:—

“My former suggestion for a permanent Adjutant on the Staff of each Battalion* I do not urge. Though fully persuaded of the advantage, yet I find the idea not generally accepted, besides being a greater expense than the estimates can at present afford. I still adhere, however, to the proposal for a permanent Sergeant-Major capable in the highest degree of instructing in drill, discipline, and the duties of guards and sentries, who could also be the care-taker of the armouries and clothing stores.

“The care of arms and clothing is full of difficulties in the peculiar constitution of the Canadian Militia organization. I know they should always, with certain unavoidable exceptions, be kept at the head-quarters of the battalion. When rifle matches occur in rural companies a case of arms could easily be sent for the purpose and afterwards returned.

“The rifles have been in use so long without examination by an armourer that I believe I am not exceeding the fact when I say that a large proportion of them are not fit for active service. This is really a very serious state of things—a soldier without his rifle or carbine would be useless. I last year urged the necessity for skilled armourers who should examine every rifle in use once a year, and effect the necessary

*The appointment of a permanent Adjutant and Sergeant-Major, and one trumpeter for each corps, was also a feature in the Militia Bill of Major-General Sir P. L. McDougall, when that distinguished officer was Adjutant-General of Canadian Militia. This Bill was most eminently suited to our requirements, and was, like its author, very popular with the Canadian Volunteers. Major-General Sir Daniel Lysons, K. C. B., Quarter-Master-General, then Col. Lysons, when serving in this country, also drew up a Militia Bill which contained a suggestion of this nature. The Government of the day lost office by failing to carry this efficient measure, but, well watered, it forms the basis of our present system which, however, like the original, is weak in proper provision for the Artillery arm.

repairs. I again draw serious attention to this most important defect, and earnestly advise that skilled armourers should be imported from the small arms factory. Whether they should go round the various battalions and rural companies to repair the rifles on the spot, or whether the rifles should be assembled at certain fixed stations, is a matter of detail easily determined by ascertaining the most economical method. But, pray give us armourers to render these delicate weapons fit for use."

To these able remarks nothing remains to be added. Arms kept together at the battalion head-quarters, as is the case with city corps, are sufficiently numerous to require the attention of a paid care-taker: and the rifles are properly looked after, as far, at least, as being kept clean is concerned.

In the country, on the other hand, in many cases the Captains of companies have the care of their own arms, for which duty they receive an allowance of \$40 per annum.

They doubtless have the weapons properly cleaned, oiled, and stored away after the training; but if they are not looked at and gone over again from time to time, before the next year's turn-out they will be in anything but good condition. Even the best rangoon oil will rust a rifle if left on any length of time; and if they happen to use any other, new rifles would probably have to be furnished before the next training.

There are depots of *matériel* at Toronto, Kingston, Montreal and Quebec, which ought, however, to be much larger.

The most important stores are those at Montreal and Toronto. Both these places are unfortified, and perfectly open to hostile attack.

It was at one time proposed to fortify Montreal, or rather to build a line of forts at St. Lambert on the opposite side of the river, with a keep on St. Helen's Island, guarding the approaches to that magnificent work, the Victoria Bridge; but this scheme has since been abandoned.

Lt.-Col. Strange, R. A., Dominion Inspector of Artillery, in one of his yearly reports recommends instead to guard the *Tête du Pont* with an *enciente* of Monterieff pits (armed with guns on Monterieff carriages,) double revetted with timber,

and protected from assault by reverse fire palisaded galleries in the counterscarps of their ditches. This would afford protection to the commercial capital at a minimum of cost.

It would not be advisable to have large armouries in cities when no guard over them of any kind can be maintained. There are splendid corps of Volunteer Militia in each of the above-named places; but should a riotous mob attempt to arm itself by a seizure of Government property, the consequences might be serious. In the nature of things, a Volunteer corps, however good, takes, unless actually under training at the time, many hours to muster to any considerable strength.

Chair à canon," if not exactly Artillery *matériel*, is, at least, its *raison d'être*—so this much it may be allowable to say, that these difficulties, and many others not coming under the subject of this paper, would be met by the embodying of corps as schools of cavalry and infantry, so strongly recommended by the Major-General commanding, or still better, by increasing the number and strength of the present Schools of Gunnery, and making them schools of all arms. The present Instructional Staff would almost suffice, with perhaps a slight addition; the great gain would be that the present necessarily employed men would suffice for the whole.

For instance, at each of the Schools of Gunnery there are, of necessity, guards, cooks, tailors, shoemakers, shoeing smiths, orderly-room clerks, a hospital establishment, mess establishment, provost, and in addition in this country the heavy duties of wood cutting, snow shovelling, etc., have to be done.

These duties, done by a small isolated corps, would absorb nearly all available men,—and render very difficult that instruction which should be the first object of a Military School.

At Halifax, Quebec, Kingston and Ottawa, should be the principal armouries and depot centres, with issuing stores in every military district. The three former cities are fortified posts, and the latter is a long distance from the frontier, and has moreover a very efficient Militia force, including a fine Field Battery, a strong Brigade of Garrison Artillery, with a

Battery of 24 prs. at Nepean Point, and the smart regiment of the Governor General's Foot Guards.

The supply of British Columbia ought to entail separate arrangements.

A depot of *matériel*, and, perhaps, an arsenal, naval and military, might be established at such a place, for instance, as Penetanguishene.

Everything connected with the supply and equipment of our first line, the Active Militia, ought to be in the most perfect order, and so constituted as to be capable of indefinite extension, without confusion, should a sudden strain come upon it. Writing about what would probably occur in the event of anticipated hostilities, Col. Fletcher, in the lecture before alluded to, says :

“What would the Government of Canada at once do? First, embody the Active Militia; then complete to war strength the several Batteries and Regiments of Cavalry, adding guns, troops and battalions, so as at least to treble the strength of the present Active Militia, bringing up, at the very commencement of hostilities, the number to above 100,000 men.”

We have only 80,000 stand of arms in the country, and of these the General says, “*a large proportion of them are not fit for active service.*”

The days of fighting *à l'arme blanche*, are gone forever among civilized nations.

Our reserve of small arm ammunition ought to be nearer forty million rounds than six million rounds as at present; and there should be camp equipment for at least the hundred thousand men above mentioned.

That such a force would at once spring to arms is beyond question, as has been often proved of yore, and in more recent days, at the time of the Mason and Slidell affair, and in 1866 when the frontier farms of Canada were wrecked, and her sons shed their blood in repelling the Fenian hordes.

If supplies for this number of men were on hand, and

they could take the field at once, sufficient time would be gained for the equipment of the paper army of the reserve; our undrilled *landwehr*.

Those corps now efficient, and there are many very fine ones, should be found in every requisite of a soldier, and be really ready to take the field at short notice in marching order complete in every respect. Probably but few could do this now ; perhaps, strictly speaking, none, with the exception of those embodied at the Schools of Gunnery.

One regiment has no valises, another no havresacks ; and none have any proper boots or shoes.

As articles of the very first necessity these latter have had honorable mention from Marshal Saxe, Wellington, and many a soldier since.

In this country, the men of our City Volunteer Militia Corps principally wear a boot with elastic sides, a narrow sole, and very high heels ; the first day's march would lame half a regiment.

A large reserve of good boots for the mounted services, and strong shoes, something like the ammunition shoe of the British Line Regiments, might be kept on hand.

Should they show signs of deteriorating from age before being wanted they might be issued free to the force—which does not get too much encouragement at present—and a fresh supply obtained. It is presumed that boots may be treated of under the head of *munitions de guerre* ; they are not, at all events, *munitions de bouche*, except perhaps in very extreme cases.

It behooves us in these warlike times to see that our house is in order, and to remember that we are part and parcel of a great Empire over which the Eastern war-cloud looms rather darkly just now.

That we ought to do something more towards providing for our own defence, considering the protection so generously afforded us by Great Britain, will hardly be denied.

Even putting aside the sentiments of loyalty and patriotism so strong in all classes in the Dominion, and taking the

practical and material view, let us remember that our merchant service is the third largest in the world, and, as has been pointed out by a late writer in the *Pall Mall Gazette*, in every sea sails under the ægis of the glorious old flag and backed by the full power of the Royal Navy of the Mistress of the Seas.

In every port our seamen claim the aid and protection of the British Consul, and all this at no cost to ourselves.

True it is that our neighbours across the line keep up but a little standing army; but their case is not at all analogous to ours in Canada.

They maintain a formidable naval force for the protection of their mercantile marine. We have not a single Canadian ship of war, and rely entirely upon the splendid navy of the little island which we proudly call our mother country; and yet, with all the heavy insurance paid for us so generously by her, we have as yet scarcely shouldered any of the burden of the defence of the Empire.

The Kingston Military College is a step in the right direction; the establishment of a small arsenal of our own would be another.

We do not too greatly centralize our store of war *matériel*, an error which told so disastrously against the gallant French in the late war. Their bravery and desperate valour were fatally handicapped by the want of supplies.

We do centralize, however, in peace time at least, the power of ordering the issue of our military stores. Doubtless this system would be modified in time of danger; but a great military principle is sacrificed—that of practicing in peace what will have to be done in war.

The story of the Franco-Prussian War shows plainly a tale of sad disaster consequent upon these questions not being thoroughly worked up and arranged on a proper basis before the commencement of hostilities. France, thinking herself ready, and clamouring for war, had her fields bathed in blood, and the two fair provinces of Alsace and Lorraine wrested from her Empire,

One writer says:—*

“Bazaine’s first march was a short one, and impeded by an enormous quantity of baggage; he gives a further reason for delay in the fact that the French *Intendance*, or Control Department, had stowed away six millions of cartridges without telling him where to find them, and moreover had themselves forgotten their whereabouts. This gave the Germans time; they pushed forward as far as Mars-la-Tour, with cavalry and guns, and struck the head of the French advance, also cavalry, apparently without guns. The French prepared to charge, but the German cavalry, who masked their guns, wheeled right and left, opened out and left the guns to work their deadly destiny, and thus turn the tide of French retreat.”

This was no isolated case, and the reasons are not far to seek and are matters of history.

Another author writes:—†

“Instead of having, as is the case with Prussia, army corps always in an organized state recruited in the Province itself and possessing on the spot their *matériel* and complete accessories, the troops of France were dispersed over the whole country, and the *matériel* stored in crowded magazines in the most diverse places, so that in the case of a division of the army being ordered into the field for active service, the artillery had to be ordered from one point, the train equipage and ambulances from another, and the soldiers of the reserve from every point of the compass. To this fundamental defect must be added another, of which no military man in France could be ignorant. While so much depended on the intelligence and firmness of individual officers to bring order out of this chaos, the officers had no sufficient authority. The most trifling thing, a sauce-pan, a camp-kettle, a havresack, an extra biscuit, required a Ministerial authorization—an express order from the office of French *Contrôle* at Paris.”

The last paragraph describes pretty nearly our system Surely an officer entrusted with a high and responsible com-

*Lt.-Col. Strange’s Retrospect of the last great war.

†Elihu Rich’s “History of the Franco-German War.” Vol. 1, page 224.

mand might be allowed to draw a saucepan or a biscuit. He could always be Court-martialled afterwards for any malfeasance.

To quote another:—*

“The *Intendance* had concentrated all its stores at Rheims, without providing in the least for smaller magazines on the lines of march of the troops. There was probably so much hesitation in determining what operation was to be undertaken that the march *Tableaux* were not communicated to the *Intendance* in proper time.”

The French cry of “*Nous sommes trahis*,” was incredible at the outset; but in the light thrown upon the subject by documents that have since been found it does not seem so very unaccountable.

It is not meant that they were deceived by intent, but rather by the circumstance that a proper system of supply had not been thought out.

That Napoleon dared not trust his army supplies out of Paris is a theory that may account for much that happened.

Dispatches from French Generals, found afterwards in the Tuilleries and published by the *Commission des Papiers*, are almost incredible. In the *Histoire de la Révolution de 1870-’71*† we read:—

“*Pour montrer en quel état de désordre était l’armée, il suffit de citer les dépêches incroyables trouvées aux Tuilleries, publiées par la Commission des papiers.*”

“L’ENTREE EN CAMPAGNE.”

“*Général de Failly Commandant 5me Corps. à Guerre, Paris. BITCHE, le 18 Juillet, 1870.*

“*Suis à Bitche avec 17 bataillons infanterie. Envoyez-nous argent pour faire vivre troupes. Les billets n’ont point cours.—Point d’argent dans les caisses publiques des environs.—Point d’argent dans les caisses des corps.*

DE FAILLY.”

“*Point d’argent*” is a cry not totally unknown in connection with our own military supplies.

* “The Franco-German War,” by Col. A. Borbstædt and Major F. Dwyer. † Jules Claretie. Paris, 1876.

An *Intendant Général* writes:—

METZ, le 20 Juillet, 1870.

“*Il n’y a à Metz ni sucre, ni café, ni riz, ni eau-de-vie, ni sel, peu de lard et de biscuit. Envoyez d’urgence au moins un million de rations sur Thionville.*”

The General commanding the 4th Corps at Thionville says:—

“*Le 4me corps n’a encore ni cantines, ni ambulances, ni voitures d’équipage pour les corps et les états-majors.*”

“*Tout est complètement dégarni.*”

There are many dispatches in the same strain. One leader alone was not troubled on this score. *Général Michel* writes:

“*Suis arrivé à Belfort; pas trouvé ma brigade; pas trouvé général de division. Que dois-je faire? Sais pas où sont mes régiments.*”

Such correspondence shows a state of fearful confusion as regards the supply of the army; and in the fatal consequences that followed we can see the great importance of the subject.

Doubtless the Germans, so well informed on everything concerning the matter, were not ignorant of this state of French organization, or rather disorganization, and precipitated matters accordingly. History repeats itself; what often happened before occurred in this case and will occur again—not to us let us hope? Germany was ready; France was not, and the latter was attacked and defeated in consequence.

So true still, though so little thought of here, is the saying of the wise old Roman—

“*Si vis pacem, para bellum.*”



