

ARTILLERY MATERIAL.—GARRISON.

- Describe the kinds and classes of gun-powder in the service, and the results dependent on size, shape of grain, density, glazing, &c., distinguishing between quick burning, and quick igniting powder?
- Supposing Quebec was completely invested, and the supply of cannon powder ran short, could you utilize saw-dust, if so, describe the process, and a rough method of comparing its strength with service powder, so as to regulate the charges. What would be the probable cost compared with service powder?
- What number of service projectiles per gun, for land and sea fronts, (100 for land fronts 200 for sea fronts) left by the Imperial Government in Quebec, and how long do you calculate they would last in case of active operations?
- It was formerly thought necessary to replace cast-iron carriages and platforms with wooden ones before a siege. Considering the effects of heavy rifled projectiles, do you think the same objection to cast-iron holds good?
- State the latest regulations for the safety and ventilation of magazines, and the use of a wet and dry bulb thermometer in connection therewith?
- Describe the process of examining ordnance, as you have seen it done?

FIELD.

- What is the construction, system of rifling, weight, calibre, and charge of the 9 Pr. M. L. R. field guns lately sent out?
 - With the aid of a sketch describe its projectiles and fuzes, and state the instructions for preparing and firing them. Give Shrapnel length of fuze for 2,000 yards?
 - With the aid of a diagram, show the mode of packing ammunition and stores belonging to the 9 Pr. M. L. R. gun carriage and limber?
 - How would you produce a lateral dispersion of Shrapnel bullets on impact; what circumstances would render such a dispersion desirable; and would you prefer conical or Shrapnel shell for dislodging troops from woods?
 - Supposing a 12 lbs. projectile had been substituted for that of 9lbs. with the 9 pr. M. L. R. equipment, the charge of powder being the same, what would be the effect on initial velocity, flatness of trajectory, accuracy, length of range, effect of shell fire, and convenience of carriage in the limbers? Give reasons in full for your opinions.
 - A 9 pr. of 6 cwt. is being constructed for the Royal Horse Artillery, supposing the same charge is used, can it be put on a lighter carriage than that of the 9 pr M. L. R. of 8 cwt?
- What will be the probable gain on the whole equipment?

SHIFTING ORDNANCE.

- What are the various tackles used in shifting ordnance, and what is the power given by each, and what relation does the gain in power bear to the time required?
- Give a rough rule to find the size of rope to suit a given block?
- Detail the general duties in shifting ordnance, without a gun? What is the object of detaching numbers for special duties, and having recourse to various methods laid down, instead of using the triangle gun on all occasions?
- A 50 cwt. gun on a garrison carriage 12 cwt. has to be run up by four six feet handspikes, applied under the axletree arms giving a counter lever of six inches, what power has to be applied at each handspike,

supposing the action of well greased trucks on a smooth platform requires only a fourth the power necessary to lift the dead weight?

5. A 50 cwt. gun on a standing carriage was dismantled by recoil at practice last winter, describe how it was remounted by means of a single spar 15 feet long, and two ropes, calculate the pull exerted by each of a detachment of 15 in mounting the gun on a carriage of two feet six inches high?

6. A 25 ton gun has to be lifted from the bottom of the ditch of a fort, (full revolment 30 feet), and placed on the parapet; calculate the length of back guy required when the sheers are inclined towards 15° from the perpendicular, bringing the fall over the gun—the height of fork from gun being 60 feet, distance from gun to holdfast of back guy on the same level as bottom of ditch 120 feet?

7. By constructing a parallelogram of forces from the above data, calculate the strain on the back guy, the fall and shoor logs; what thickness of rope will be required for fall and guy respectively?

The trunnions of the new 9 pr M. L. R. field guns are relatively lower, compared to the axle of the piece, than those of the S. E. 9 pr. With the aid of diagrams explain the effect on the upsetting angle and the difference between unstable and stable equilibrium in the cases of guns carried by sling and platform wagons respectively, along the side of hill sloping in the direction of their axletrees?

FORTIFICATION.

- Define the terms, silent, and re-entering angle, dead angle, enfilade, defilade.
- Draw a section through a face of Number 2 Fort at Point Lewis, from memory; put in the dimensions, and give the names of the various slopes of the profile. What are the advantages of the Chemin de Ronde, and what was the object of closing the gorge with a bastioned trace?
- Would the complete investment of Quebec be difficult? What alterations and additions are required in the works and armaments, bearing in mind the report of Col. Jervis, R.E.?
- Give your ideas on the advantages and disadvantages of the Moncrieff system of fortification; compare it with the old system of Vauban, and the modern granite structures with their iron shields.
- Draw a trace and profile of a pair of Moncrieff gun pits on the summit of a gently rising ground. They are to form part of a system of detached forts and will require a magazine as well as a portion of bomb-proof cover for a small garrison. Substitute as far as practicable forest timber for masonry, taking into consideration the destructive effects of a Canadian climate, and the cheapest materials at hand. You will also provide for the drainage, and the accommodation of a few caretakers in time of peace.

TACTICS.

- Define the following terms for Infantry, Cavalry and Artillery formations: A rank, file, fours, section, sub division, division of artillery and what relation it bears to the battery, compared with that of the squadron and company to the larger unit of the other arms.
- For parade purposes what is the extent of front of a squadron, a battery in line at full intervals, a company of 40 files; what intervals should be left between battalion in line of contiguous columns, squadrons, artillery, and other troops, and how is the dressing of artillery regulated with reference to infantry?

3. State the most important points for consideration by a battery Commander in the choice of a position, and the principles which govern the notion of divisional, as well as of reserve or corps artillery in masses giving instances of the latter from the Franco-Prussian war.

4. Arrange the following corps of Military Districts, Nos. 5, 6, and 7, into a small corps d'armée according to the principle laid down by Sir G. Wolsley, supposing each battalion mustered 800 men in 10 companies, each troop 80 sabres, and each battery six guns. If you consider it necessary, increase cavalry, artillery, and engineers to the proportions required in a fair open country, with good roads.

Cavalry No. 5 District.	9 Troops.
" " 7 " "	3 " "
Artillery " 5 " "	2 Batteries.
" " 7 " "	2 " "
Engin'rs " 5 " "	2 companies.
Infantry " 5 " "	12 Battalions.
" " 6 " "	9 " "
" " 7 " "	13 " "

Transport and commissariat to be furnished by Civil contract.

5. Show by a diagram your disposition for an advance of the above corps d'armée in fighting order of march towards the frontier, by two parallel roads, sufficiently close together.

6. Suppose the advanced cavalry feeling the enemy falls gradually back on the advance guard, which seizing a good position, with open ground in front, holds its own until the main body comes up, and the enemy draws off for the night. Show with the aid of a sketch your arrangement of the corps d'armée, and the covering pickets, (supports and reserves not thrown out). State the strength of the pickets for a front of 1600 yards for each division: double the sentries with an average beat of 50 yards are required?

7. At daybreak the force must be drawn up for battle, with the aid of a sketch show the general outline you would adopt the sort of ground you would prefer, You are facing south perpendicular to your communications, those of the enemy running south west; in what direction would you expect the real attack; how, when and where would you prepare to use your corps artillery and endeavour to develop a counter attack; with what special object? With a second sketch detail the formation for attack of one of your divisions on a front of 2000 yards, skirmishers, supports, flank battalion, brigade, and division reserves, according to the plan proposed by Captain Hume. Supposing in this case no strong features of ground break the general idea.

Give your reasons for everything.

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REVIEWS.

Blackwood for December has been received, it contains:—The Parisians, Book XII; International Vanities, No. I.; Phidias the Elgin marbles; A Story of the Rock; The Conservative Party and National Education; The Count de Chambard and Conservatism. The Leonard Scott Publishing Company, 143 Fulton Street, New York.

It is reported that Eng'nd proposes to take the Peninsula of Yucatan from Mexico as an equivalent for the debt due by Mexico to Great Britain.