munition column, which, of course, accompanies all artillery corps in the field. The reasons are obvious. The time for the reading of this paper is limited, and the subject is in such large proportions, that I must, therefore, curtail it, in order to keep within the bounds of what may be more or less interesting, without fear of diverting into boredom. But above all, Lieut.-Col. Montizambert last year read a most interesting paper "On the Supply of Ammunition in the Field," before the garrison at Quebec, and as I believe that paper is within the easy reach of any one wishing to read it, there is no object in my repeating here the principles therein laid down.

One of the first principles of the employment of modern artillery in the field is that care should be taken to have a superior number of guns to those of the enemy ready to bring into immediate action. To attain this object, care must be taken that guns are placed as near to the front of the column in marching as possible. It is also very essential that artillery should be used in masses of the greatest strength possible and brought up at the commencement of an engagement irrespective of the development of the other arms. Of course, should it be found necessary to advance artillery without escort, care must be taken that the front and flanks are clear of the enemy.

It is not advisable for small or detached bodies of artillery to push forward, in the early part of an action, into isolated positions, as such movements might interfere with the general's plan of action. In order to produce the fullest effect possible the fire of artillery must be concentrated, and in order that this concentration of fire may be best directed, the batteries must be sufficiently concentrated to be worked by one commander. A brigade division of artillery in action should never be broken up, except by order of the general commanding the troops, and then only for some special and temporary reason. Batteries advancing in brigades should take great care to keep to their brigade formation, and open fire in brigade, as batteries opening fire in succession are likely to be overwhelmed in succession. Therefore, as a simultaneous advance is advisable, the opening of fire simultaneously is essential. It is also very important to observe the proper intervals when advancing in brigade, in line under fire, the full intervals between batteries being essential, in order to facilitate observation of fire. Field artillery is really only effective when in action; therefore, frequent changes of position when in action are deemed unadvisable, as they lead to loss of time and consequently effect. Artillery advancing under effective fire should do so at the most rapid pace the ground will admit of. On the other hand, in retiring under fire, they should not move faster than a walk. Artillery in action must never retire except by the order of the officer commanding the force to which they belong. The fire of artillery may become slow from losses, but that can never justify abandonment of a position. To such an extent is this considered essential that it is a recognized fact that although a battery may have been obliged to cease fire, having run out of ammunition, still it must remain in action, even though under fire, till more ammunition has been brought up to it; and the reason of this is obvious, for were such a large unit as a battery or indeed even one gun, is seen to be retiring, it would tend to have a demoralizing effect on our friends and the contrary effect on our foes.

Great care must be taken when firing over the heads of friendly troops. At any distance under 1,500 yards on level ground it would be dangerous; at longer ranges on level ground friendly troops would be safe at a distance of 600 yards from either the guns of from the objective, so far as the artillery fire is concerned. As artillery is seldom of use after dark, they should, as a rule, be withdrawn from the front line after dark.

Artillery has to commence and carry on the action at long ranges, doing its destructive work before the action of the other arms is possible. In the attack it covers the deployment of the advance guards and aids them in pushing in the advanced posts of the enemy. In on the defensive it checks the deployment of the enemy, thus compelling him to form up in order of battle at a distance, and, consequently, delays his advance. In addition to commencing the fight it has also to maintain the fight—to keep down the fire of the enemy's artillery and infantry. The artillery by its fire must search the enemy's position. The approaches and ravines, woods and cover of all kinds, whether real or artificial, have to be successively dealt with by the searching fire of the artillery. When a force awaits attack in position its guns have to keep down the fire of the hostile artillery and delay, as long as possible, the forward movement of infantry. Brackenbury says that artillery is the arm that deteriorates the least during the combat, and is the one that can most effectively be kept in hand by the general in command. Guns can with rapidity be transferred from one point to another, and by means of their manoeuvering power can most effectively aid in the limited changes practicable on the field of battle. Again, it is the duty of the artillery to co-operate with the other arms in dealing the final blow at the enemy, following up his retreat, and, also in the case of defeat, covering the retirement of their own side. Prince Kraft lays down the following fundamental duties of artillery in the field: To commence the action; to lengthen out the fight; to prepare the decision; to draw off the enemy's artillery fire from the rest of the troops; to pursue the beaten enemy and, finally, to form a rallying point for the other troops.

The proportion of guns to the other arms, as laid down in the latest Artillery Manual, for an army corps is five batteries of horse artillery and thirteen batteries of field artillery, or 108 guns all told. In view of the increased tactical efficiency of modern artillery, it would appear as if one could not have too many guns, but it must be borne in mind that artillery can of itself do little without the aid of the other arms. In considering the proportion of guns, care must be taken in considering the available space for the guns to occupy. It is a noteable fact that, during the Franco-German war, the Germans had great difficulty in finding sufficient room for their guns from the tendency they had to always push their artillery in to the front line at the outset. At the battle of Spicheren and Worth the German artillery occupied a space equal to one-third of the whole line in the front attack, while towards the close of the battle of Gravelotte the guns occupied two-fifths of the line.

In the Franco-German war the Germans had a percentage of 3.7 guns per thousand men. Of course, they could not use this large percentage; but it must be born in mind that during the war of 1870-71 the Germans acted entirely on the offensive. In the Russo-Turkish war of 1877, the Russians, also acting on the offensive, had a percentage of 3.9 guns per thousand men, while the Turks only had a percentage of 2.2 per thousand. In proportioning the number of guns to an advance guard, it may be assumed that a division has one battery attached to the advance guard, while an army corps has generally two batteries, and sometimes as many as three batteries. The increased importance of artillery in the field will be shown when it is remembered that in Napoleon I.'s battles the advance guard, no matter of what strength, seldom had more than two guns with it, and their duties appear to have been simply to open fire when the enemy was found in force, so as to warn the army, although the percentage of guns to men in his army was considered by Napoleon to be about four guns per 1,000 men.

To give a slight idea of the number of guns employed in the single engagements during the Franco-German war, it might be of interest to mention the battle of Weissenburg, fought on the 4th August, 1870, when 66 guns were in action. During the battle of Worth, 6th August, 1870, 108 were in action at one time, and ready to be increased to 200. At the battle of Gravelotte, fought on the 18th August, 1870, by one o'clock in the afternoon 138 guns had been in action, although one battery had been completely annihilated. Still more batteries were sent forward till seventy batteries, or 420 guns, had been in action before the infantry were sent forward to decisive attack. At the battle of Koniggratz, in the Austro-Prussian campaign of 1866, the Prussians had only 32 guns in action. Their later war shows their thorough appreciation of artillery in the field.

The acknowledged percentage of guns per 1,000 men is from three to four in the British army, and the modern tendency seems to increase the numbers to the maximum. It has always been admitted that inferiority in other arms can be compensated for by an increase in the number of guns. Brackenbury says that in small forces there is scarcely a limit to the number of guns that can with advantage be brought into the field, as there will be plenty of room. During some of the minor engagements of the war of 1870 as many as ten guns per 1,000 men were engaged at the same time with effect.

Before moving into position to advance for action, a short halt will be necessary in order to collect the batteries and for a general advance. The officer commanding the artillery should sieze this opportunity to gallop ahead and reconnoitre the position he proposes to take up. The formation that should be adopted by the assembled batteries preparatory to advancing, should either be in brigade division, quarter column, full interval, if the country is open and ground favorable, or in line of battery columns if the country is intersected or ground bad. Waggons will conform to the movements of their own batteries at a distance of between 400 to 800 yards. If the nature of the ground is such, the advance may be continued in column formation, giving sufficient time to form into line at interval and become steadied in their new formation, before the final advance, preparatory to coming into action, which must be done at an increased pace. Should necessity arise to take up a position with cover on either side, care must be taken to have the cover searched before forming up up and opening fire.

Before selecting his position, or if compelled to accept a certain position, the officer commanding the artillery should make sure of certain requirements, so far as is practicable. A good position should afford a clear open range to the front and flank. The fire of guns should cover not only the country generally, but also every road and line of approach that the enemy might use. The experiments at Okehampton in 1875 proved that 4,000 yards was an effective range, even with the field guns then in use. Now it might be even longer. Of course, in the principles laid down in this paper, I am speaking of the field artillery as it exists to-day in the British army, which to all intents and purposes are applicable to the Canadian artillery, with the exception it may be, of the extreme range of our field guns, which is estimated at about 3,500 yards. It must be borne in mind, though, that the effect of shell, even with a powerful telescope, can hardly be observed at a range exceeding 3,000 yards, and to fire without knowing the effect of your fire entails a useless expenditure of ammunition.

Many opinions have been expressed by eminent artillerists, as to the best method of handling artillery in the field. Gen. Williams, D.A.G., R.A., says on this subject:

"Let us improve our brigade drill. There is tactical advantage to be gained by this drill; the men like it, it is invaluable as a means to discipline. Let us throw away our patched idea of moving independently and simultaneously. Let us rather make