

The Modern War Gun.

"The ball is crazy, the bayonet alone is sensible," said the brave Souwarof after forcing the lines of Joubert at Novi. The Russian general had some reason for speaking thus. In one of his attacks he had the audacity to have his grave dug by his grenadiers under the fire of the French foot soldiers. "If you do not advance," exclaimed he to his troops "you will bury me here." Legend or not, it must be agreed that guns were not very formidable at this epoch.

Souwarof and Joubert would be obliged to change their opinion were they to return among us, for owing to the adoption of rifled arms loaded at the breech, the fire of the infantry has become much more efficacious.

The war of 1866 marks the starting point of true revolution in armament. We think it superfluous to rewrite here the history of the chassepot, and to pass in review all the improvements of detail made for a period of twenty years up to 1886.

It seems to us more useful to sketch a comparative study of the various types of war guns now in use among the principal powers.

In France, the last type adopted is, as well known, the 1886 model, called the Lebel gun. The preparatory work of the School of Chalons upon movable breeches and upon projectiles, and the discovery of a new explosive by Engineer Vieille, have permitted of uniting the majority of the conditions required for a weapon of small caliber and rapid fire.

However, the system of repetition might be better. There has been too much haste to adopt a mechanism that is already old, since in America Lee devised a very practical magazine that, through a single spring, carried the cartridges one by one to the breech box, and, in Germany, Mannlicher still further simplified and improved (if that were possible) the invention of Lee.

However this may be, the successive transformations made in armament from 1887 to 1889 are derived from the principles applied in inventions of French, American or Austrian origin. The three models that we represent herewith show us the latest improvements made by the manufacturers in France and other countries. They much resemble one another externally, and differ only in the system of repetition.

The Dandeteau gun is provided with a movable breech analogous to that of the Lebel gun. Ingenious arrangements permit of filling the magazine by a single movement of the thumb, by the aid of a fire-cartridge loader, or else of introducing the cartridges therinto, one by one, with the fingers. The weapon may be used for firing shot by shot, the magazine being filled or not.

The latest type of the Mauser gun is the least simple of the three weapons. The assembling of the various pieces of the movable breech leaves much to be desired, and although it

has been possible to conceal the magazine in the stock it has been at the cost of complications that ought to be avoided in weapons of war. This loader is not very strong. The Mannlicher gun, manufactured at Steyr (Austria), is a very strong weapon. Its breech closer is simple, and its repeating mechanism has but one defect, and that is of requiring loaders. If the latter chance to give out, the weapon cannot be supplied and the loading of it charge by charge is very difficult. Moreover, the fire-cartridge loaders are very well adapted for packing, and keep the ammunition in a good state.

These three 6.5 mm. guns fire balls of about 10 grammes with an initial velocity of 750 meters, in the case of the first, and of 710 meters in that of the two others. The ball of the Daudeteau gun traverses at 50 meters 1.45 meter of juxtaposed spruce planks, or 12 mm. of hard steel.

The following are some figures that will give an idea of the progress of ballistics during the last twenty years that is to say since the adoption of the 1878 model of the Gras gun. This weapon used a cartridge weighing 43 grammes, the ball of which propelled with a velocity of 450 meters was capable, without the aid of the breech-sight, of sweeping the ground up to about 45 meters. At great distances, toward about 400 meters, for example, the dangerous zone for a standing man was 9.4 meters. The expression "Sweeping the ground," we use purposely. In fact, at the distances at which battles will take place in the future the enemy will no longer be seen, but an endeavor will be made to render the ground that he occupies untenable. It will therefore be necessary for the infantry officer to be able to estimate distances accurately, and to recognize at once the grounds whose inclination recedes from or approaches the curve of the trajectory, in order to obtain as often as possible a rasant fire and avoid a darting one.

After a comparative examination of the most recent 6½ mm. models, a question very naturally arises: Is it possible to obtain a more reduced caliber? With the Lebel, whose cartridge weighs 29 grammes, the 15 gramme ball has a velocity of 615 meters. A shot may be fired without the breech-sight as far as to about 600 meters. At 1,400 meters the dangerous zone for a man standing is 17 meters.

As for the Daudeteau gun, that gives the 10 gramme ball with a 22 gramme cartridge a velocity of 750 meters. The ground swept without a back-sight is about 700 meters. At 1,400 meters, the dangerous zone is 22 meters.

With equal weight, the soldier would carry in his cartridge box 160 cartridges of the Daudeteau gun against 80 of the Gras gun and 118 of the 1886 model. He might sweep the ground in front of him to a greater distance and more easily, since the new weapons are lighter and their recoil is more insignificant.

The first condition to be required of this new weapon would be a greater initial velocity. Now the experiments made up to the present teach us that when we exceed the maximum velocity furnished by the 6½ mm. gun we reach pressures in the smaller calibers such that we scarcely dare to continue such experiments. So we think that, in the present state of metallurgy, with the existing powders, and with lead and German silver as materials for projectiles, the caliber of the 6½ mm. is the one that gives the best results.

Is that as much as to say that it is impossible to construct 6 mm. or even 5 mm. guns? Certainly not. The 5 mm. gun exists. Devised by the Austrian manufacturer Kruka and the Swiss professor Hebler, it operates in a satisfactory manner; but it is not a weapon of war, according to the manufacturers themselves. It is a weapon for personal defense for colonists, planters and expedition troops. This gun, which shoots well to short distances, say as far as about 500 meters, could not be used in the wars that are waged between European armies.

The velocity of the 5mm. projectile is too feeble to allow the dangerous zones to be extended to great distances. Finally, the effects of this very light and fine ball are doubtful. The advantage of such a weapon is its extreme lightness and especially the lightness of its cartridge, which weighs scarcely 10 grammes.

What, then, will be the weapon of the future? A portable gun firing, with an initial velocity of 850 or 900 meters, a projectile that preserves at great distances a sustained trajectory would be for the foot soldier the weapon that is the dream of tacticians.

But, in order to create weapons superior to those just mentioned, it would be necessary to find other powders capable, under a very small volume, of producing the same effects. If a special fulminant placed in the heel of the projectile, or a liquefied or non-liquefied gas, permitted of firing projectiles with initial velocities of from 800 to 900 meters, one might then seek the semi-automatic gun of three or five shots spoken of by the *Revue des Sciences Militaires*. Such gun having been found, there would still be reason to ask whether, the human gun carriage not being very stable and being very impressionable, it would not be very dangerous to put this weapon into the hands of troops.

While awaiting the invention of the new explosive, we should congratulate ourselves for possessing at the present time the but of the war powders in existence. It is owing to the powder that the Lebel, which is in the rear as regards repetition, always gives the most rasant and surest fire of all the weapons in service, inclusive of the 6½ mm. guns manufactured in foreign countries.

Briefly, we cannot better conclude than by the statement, re-assuring from the standpoint of national defense, that the French gun is superior to all the analogous weapons now in service among the other powers.

If, by reason of the progress that