DEVELOPMENT OF SMALL ARMS.

The Progress of the Construction of Military Weapons.

What Can Be Expected of Magazine Rifles and Smokeless Powder.

The Prospects for the Adoption of a New Gun for the United States Army Which Will Be Up to Date.

The following interview with an expert on the subject of new weapons for the army will be found of extreme interest. Lieutenant Collins is perhaps the best informed man in the army on the subject, and his opinions are naturally of great value.

"The development of small arms," said Lieutenant Collins, General McCook's Inspector of Small-Arms Practice, "has kept pace with the advance in other mechanisms. The history of the final abolition of the smooth-bore (which performed its work well during the stirring times of '60 to '65, simply because our adversary had nothing better) and the adoption of the present Springfield rifle of calibre .45 need not be referred to. Suffice it to say that the gun now in use is about the best of its kind ever put in the hands of troops. I have frequently seen men armed with this weapon fire eight and nine shots in 30 seconds at a target, with excellent results as to accuracy. This was well enough, however, as long as other powers were similarly armed with single-shot guns. One of the drawbacks to our present weapon has been its lack of range, as also the fact that the trajectory (the curve the bullet takes after leaving the muzzle) is so great that, firing at troops 600 yards distant, the bullet at 300 yards, or half-way point, is 13 feet above the ground, and all that space, from 30 yards in front of the gun to 27 yards in front of the object aimed at, is practically safety space. Since our fighting in the future is to be in deployed order, it is quite necessary that the entire field between our skirmish lines and the enemy be covered by dangerous fire."

"But how is that to be accomplished?" asked the reporter.

"The present relation between the weight of the bullet and the charge of black, or, commonly known as, gunpowder, has reached a maximum. It becomes necessary to see what reductions of the one, or additions to the other will accomplish better results. It was conceded by all that a longer range than 1000 yards, and that by the way is very nearly the extreme limit with accuracy of our present gun, was necessary in future warfare, as also a weapon which in every way could develop rapid and demoralizing fire. This question was first taken up practically by foreign armies, and it is the results of their earlier experiments that now makes our course more clear. Germany, in 1886, adopted a small caliber gun. Caliber, you must understand, is simply the diameter of the bullet; .45 is our present bullet, and Germany adopted .310. Other nations also determined on small calibers, and smokeless powder was also called into play. Smokeless powder is of many forms and kinds, the base constituents, however, in most being nitro-glycerine and guncotton. Its action gives longer ranges, with diminished recoil, and obviates to a large extent the fouling of the piece so common with ordinary gunpowder. With a charge of 70 grains of black powder, which is in our present .45 caliber cartridge, a muzzle velocity of about 1266 feet is obtained, whereas with the smaller caliber a charge of 36 grains of smokeless powder gives an initial velocity of about 2000 feet, with a very much flatter trajectory. By muzzle velocity is meant the speed with which the bullet leaves the barrel, and is measured by the number of feet it would pass over in one second, as it leaves the muzzle.

"Is the smokeless powder made in this country?"

"Not as yet, but our ordnance people are experimenting, and it is only a question of a short time before a suitable explosive (one that will not deteriorate with age or moisture) will be determined upon."

"What is the difference in effect between the present bullet and the one to be adopted?"

"Well, that is hard to answer. Practically speaking the new bullet is about the size in diameter of an ordinary lead pencil and about one inch and a half in length. It is made of hardened lead and covered with a copper jacket, insuring greater resistance and penetrative power. In a recent lecture to his students, Professor Bilroth of Vienna showed a collection of bones from persons wounded in the wars of 1866 and 1870. He stated that the damage done by the rifles then in use could not be compared to the terrible effect of the repeating rifles of today. A bullet from a Mannlicher rifle, one of the weapons tested by our board, pierces a brick wall at a distance of 500 to 600 paces, and it would be well nigh impossible to obtain shelter from an enemy's fire. There can be no marching in dense lines, as the ball would go through three or four men. Smokeless powder affords better means of correct aim, and woe to the army that should cross the road in the face of an enemy in a sheltered position. 'Thank God,' concluded the lecturer, 'I cannot show you any bones that have suffered from weapons as they now are.'"

"It is claimed by many that wounding is preferable to killing on the battle field, since a dead man is done with, whereas a wounded man at times requires to be carried from the field, thereby weakening the force of combatants. However all this may be, it seems necessary for this government to adopt some rapid fire gun. I mean by this some weapon that can be used as the present one is, loaded for each individual shot, and yet have a rapid fire reserve which can be called into play in close quarters when directed by the commanding officer. Such a weapon is known as a magazine gun. While the magazine type has been adopted by foreign powers, yet there is a distinction that creeps in. Some nations patronize weapons that fire from the magazine alone; others those that are loaded and fired as single-shot gun, with magazine which by a simple device can be 'turned on and off.' The former are simply a class of repeating rifles, the latter the true magazine type."

"What has been done towards adopting such a rifle for this country?"

"This country, after realizing the necessity for a change in the armament of its troops, organized a board in November, 1890, of which Colonel Hall was afterwards president. The board consisted of officers of infantry, cavalry and ordnance. The main object of this board was to report upon the magazine system of service arms as applied to the necessities of a modern army, and to recommend such a system as might seem the most advantageous. The board met in New York city, at the army building, in the early days of its session, and afterward conducted its tests at the Springfield armory. The fact that such a board was in session was largely advertised and American inventors were solicited to send in models of guns conforming to requirements stated to them. The first work of the board consisted in furnishing information to inventors, as also specimens of the .30 calibre ammunition to be used; a .30 calibre bullet being adopted by this government as differing from any other nation, since most had decided on a slightly larger calibre.

The board remained in constant session, and up to last fall had tested and examined 53 guns. These included, besides the product of American inventors, the small arms officially adopted by Austria-Hungary, Belgium, Denmark, England, France (for cavalry), Germany, Japan, Portugal, Roumania, Russia and Switzerland. In its report the board states:

Each of the different magazine guns examined can be placed in one of the two general classes, dependent upon the manner in which their fire can be delivered.

First—Those which, while the magazine is charged, can be used as single loaders. These arms should be more properly termed repeating guns.

Second—Those in which the magazine can be charged and then held in reserve while single fire is delivered, magazine fire being, however, available at any moment.

Therefore guns of the first class can be employed as single-loaders only when the magazine is empty; those of the second class when it is either empty or loaded.

The small arms of Austria-Hungary, Germany and Roumania are typical of the first class; for them the cartridges are habitually carried in the ammunition trains, and by the soldiers in packets of five, the packet being introduced bodily into the magazine.

Typical of the second class are the arms of Denmark, England, Switzerland, and the improved Mauser gun. With the best developed of this class the cartridges are carried by the soldier, both singly and in packets, the latter being employed to facilitate rapid charging of the magazine, though not essential thereto.

This classification compelled the board to consider not merely the mechanical features of the guns it has examined, but all their merits and defects as an armament; and from such a consideration the board is of the opinion that magazine systems of the second class are more suitable for our service than those of the merely repeating type.

A number of guns of both classes were subjected to supplementary examination and test, the Springfield .30 single-loader being introduced as a standard comparison.

"Amongst American weapons submitted, California, Kentucky, New York, Michigan and several other states were represented. It was decided by the board that each weapon should be submitted to the following series of uniform tests, carefully conducted:

Rapidity with accuracy—Piece to be fired from the shoulder at target six feet by two feet, range 100 feet, under following circumstances, cartridges disposed at will or in packets upon a table:

(a) Time of firing and number of hits for 20 shots; magazine to be loaded before beginning test and then held in reserve until remainder of cartridges have been fired, using gun as a single-loader; then firing those in magazine.

(b) Number of shots and hits firing for two minutes, using gun as single-loader; tests begun with empty chamber.

(c) Number of shots and hits firing for two minutes, using gun as magazine arm only; test begun with magazine empty.

Any cartridge missing fire in this or other tests to be tried with a prick punch, or opened, to ascertain cause of failure.

Rapidity at will—Same as test 1, except that each piece will be fired from the hip, without aim, at stop butt at short range; hits not considered, and time of firing for parts b and c reduced to one minute.

Endurance—(a) Each gun to be fired 500 continuous rounds without cleaning, using magazine. The state of breech mechanism to be examined at the end of every 50 rounds.

(b) With magazine loaded but held in reserve, each gun to be fired as a single loader 100 continuous rounds without cleaning; condition of breech mechanism and of the cartridges in magazine to be examined at conclusion of firing.

Dust—With the mechanism closed, the piece to be exposed in the box prepared for that purpose to a blast of fine sand dust for two minutes, removed, surplus sand removed by blowing thereon and wiping with bare hand, and then fired 20 rounds under the following conditions:

(a) Magazine empty when exposed. Before firing load magazine, fire balance of cartridges as single-loader, then those in magazine.

(b) Magazine loaded when exposed. Remove and wipe cartridges, reload and fire as above.

Defective cartridges—Each gun to be fired once with each of the following defective cartridges: (1) Cross-filed on head to nearly the thickness of the metal; (2) cut at intervals around the rim; (3) with longitudinal cut the whole length of the cartridge from the rim up; a fresh piece of white paper marked with the number of the gun being laid over the breech to observe the escape of gas, if any occur.

Excessive charges—The piece to be fired five times as a single loader, with cartridges in which the charge of powder is so increased as to produce a pressure in the chamber about one-third greater than that caused by the Frankford arsenal experimental cartridge.

Ease of manipulation—Facility of manipulation by members of the board. Any gun whose breech action or magazine system fails in any of the foregoing tests will not be submitted to further tests.

Supplementary tests—To be applied only to such arms as have passed through the regular tests in a manner satisfactory to the board.

Defective cartridges and dust—(a) As a single loader: To be fired with two defective cartridges, Nos. 1 and 2, and then to be dusted five times, the mechanism being in the mouth of the blowpipe and closed, but at full-cock; then to be fired five shots, the last two defective, Nos. 1 and 2; then without cleaning to be dusted with the breech open and fired five shots. The piece to be freed from dust only by pounding or wiping with the bare hand.

(b) As a magazine arm: Same as a, except that the cartridges for the subsequent firing will be placed in the magazine before dusting, and fired therefrom afterward.

Rust—The breech mechanism, receiver and magazine to be cleansed of grease, and the chamber of the barrel greased and plugged and breech action closed; the butt of the gun to be inserted to the height of the chamber in a solution of sal-ammoniac for 10 minutes, exposed for two days to the open air standing in a rack, and then fired 20 rounds, loading magazine and holding it in reserve until remainder of cartridges have been fired, using gun as single-loader, then firing those in magazine.

Explosions in magazine.—The liability to accidental explosion of cartridges in tubular magazines will be tested by charging the magazine and then giving the gun a vertical jolting motion for two minutes, repeating with the magazine but half loaded.

Dismounting and assembling.—The comparative ease and relative time required in dismounting and assembling the breech and magazine systems of the different guns will be determined.

To further determine the comparative rapidity of fire and facility of manipulation of various arms each gun will be fired 20 shots by three men to be selected by the board, loading from the cartridge box and firing from the shoulder, with aim at an "A" target 100 yards distant. The average of the three trials to be the recorded time of firing 20 rounds. The magazine to be loaded from the cartridge box before the start, the remainder of the cartridges to be fired away first, using the gun as a single-loader, and the magazine to be emptied last.

Such additional tests or repetition of previous ones as may seem advisable will be made by the board in its discretion.

"What is the general magazine system?" was next asked.

"With the exception of some weapons, such as the arms adopted by Portugal and Japan, the magazine is commonly a clip or packet, or a receptacle for such, holding from four to six cartridges and inserted into the piece either above or below the barrel. A bolt working longitudinally serves to close the breech. When this bolt is withdrawn to the rear it releases a spring or other mechanism in the magazine which projects a cartridge into the chamber. The closing (or forward motion) of the bolt shoves the cartridge in place, causes the firing pin to be engaged by the trigger, and when the bolt is locked or secured the piece is ready for discharge. The withdrawal of the bolt causes the withdrawal and ejection of the discharged shell and the projection of another loaded cartridge into the chamber."

"Was any decision arrived at by the board?"

"Yes. After the most careful tests the Krag-Jorgensen gun was finally selected by the board as the weapon possessing the greatest merits. It would take too long to give you the details of the careful examinations of the various arms, both new American models and those officially adopted by foreign powers. I should mention here that the weight of these guns with magazine empty, ranges from 8 to 10 pounds. As a result of the tests the Krag-Jorgensen seems to have had the best of it, six different models of this weapon being submitted before the requirements of the board were apparently met with. This weapon is a modification of the arm adopted by the Danish army. The gun, as recommended, weighs 8 pounds 14 ounces with magazine empty, and uses a magazine of five cartridges, to be held in reserve. With the magazine full, the weight is 9 pounds 2½ ounces. The muzzle velocity is 2000 feet. In the test for 20 shots it was found that 15 shots as a single loader, and 5 shots as a magazine gun scored 16 hits, the whole in 54 seconds, 9 seconds being consumed in firing the magazine. The German rifle (also firing 15 shots as a single loader and 5 as magazine) required 91 seconds, 14 seconds to discharge and fire magazine. As a result of firing 500 shots, the board reports as regards the German infantry rifle: "Much force frequently required to free cartridges from loading packet. As to the Krag-Jorgenson, 'worked well and easily.' Other tests of some defective cartridges, etc., seem to favor this arm."

"The Krag-Jorgensen gun, as now in use in Denmark, is a calibre .315. The magazine holding five cartridges is of a fixed type, horizontal, under, and also to the side of the receiver. The gun has a cut off. The magazine can therefore be held in reserve while single loading fire is conducted. Modifications, however, of this system were submitted to the board to conform to the requirements of this government, both for calibre and shape of cartridges."

"The board in its report states:

'"This arm was placed in the hands of three soldiers of the ordnance detachment, one of whom had served in the marine corps, one in the Tenth infantry, and one in the Second cavalry; none of these men were considered particularly expert in target practice. A distance of 100 yards was selected, and a target (the one commonly in use for short range practice) erected. Before commencing firing, the magazine was charged and put in reserve. Commencing firing, 15 shots were delivered as a single loader, loading from the cartridge belt, in 1 minute and 28 seconds. The magazine was then turned on and its five cartridges fired in 22 seconds. Total for 20 shots, 1 minute and 50 seconds.'"

Compare this with the Springfield (single loader), our present system, a gun of .30 caliber having been specially submitted for the test. The board reports: "After ten preliminary shots (eight failures in the automatic seating of the thumbpiece) the gun was fired by the recorder, loading from the cartridge belt, at an 'A' target, at a range of 100 yards, 20 shots in two minutes and six seconds, 16 hits. Time of firing was unduly prolonged by nine failures in the automatic seating of thumbpiece and the considerable force required to operate block after each discharge."

It would seem, therefore, as a result of the present investigation that the Krag-Jorgensen gun, as modified, is about what we want, and is so recommended by the board. A number of American inventors have, however, petitioned congress to reopen the question and allow them an extension of time in which to submit their models, which I presume will be done. Of course if home talent can fit us, then a gun pure and simple American is what we are looking for. In this connection I will read you an extract from a letter from an officer high in authority on the subject of small arms.

"The newspaper writers are all wrong as to the gun recommended. It is not the Krag-Jorgensen known in Europe, but a very essential and radical modification of it. The inventors submitted the real Krag-Jorgensen, which did not stand the racket. Afterwards they put in five different modifications of it, making six in all from them, and we recommended No. 5. I think it will be liked after the service becomes accustomed to the bolt system. It will be habitually used as a single-leader, and it is a better single-loader than the Springfield. It has an ingenious device by which the magazine can be thrown on or off instantly, and the officer in charge of the firing line can see at a glance whether a man is using his magazine or not. I have freequently seen the five shots fired from the magazine in five seconds. The initial velocity of the bullet will be 2000 feet a second. As sound does not travel that rapidly, the enemy will be struck without hearing any report and without seeing any smoke. How is that? The trajectory will be flat for 600 yards, but the bullet will strike with killing effect at 2 miles, about. As you say in your report, the target practice business must be all done over.'"

A Great Favor.

He was in his study on a Saturday night when a visitor was announced, and there entered one of his subterranean parishioners, who, having cautiously looked round to see that there were no listeners, addressed his clergyman with an air of grave, mysterious importance: "Mester Whitworth, you've been very kind to my ould girl when she wor sick so long abed, and I want to do yer a good turn, and I can do yer a good turn. There's going to be the gradeliest dog fight in this place tomorrow,' and I can get yer into the inner ring!"—Dean Hole's "Memories."

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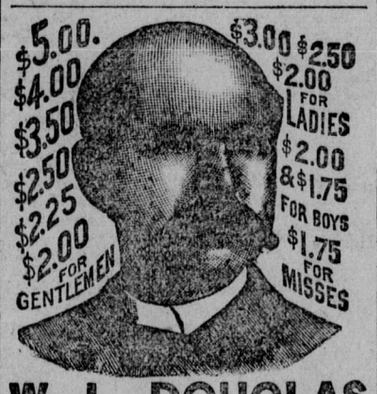

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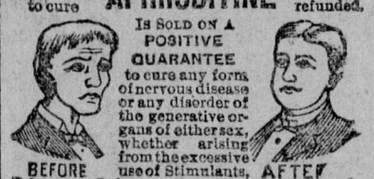

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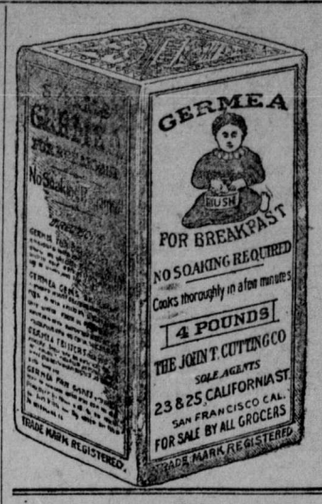

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FORTY-EIGHTH ANNUAL REPORT —OF THE— NEW YORK LIFE INSURANCE CO.,

OFFICE: 346 AND 348 BROADWAY, NEW YORK.

JANUARY 1, 1893.

This is the only Company holding an Official Certificate of Examination of recent date from the State Insurance Department. The Assets, Accounts, and Surplus to policy holders have been certified to under the seal of the State by the Insurance Superintendent.

ASSETS.

Real Estate		$12,531,016 75
Stocks and Bonds		86,680,177 51
Bonds and Mortgages		24,236,735 51
Loans secured by collaterals		3,916,000 00
Premium Loans		1,096,850 03
Cash in Office and in Banks and Trust Companies		4,201,253 68
Interest and Rents due and accrued		971,810 14
Net amount of uncollected and deferred premiums		3,865,275 37
Total Assets		$137,499,198 99

LIABILITIES.

Reserve, or value of outstanding policies	$119,075,888 00	
Other liabilities	1,618,362 89	
Total Liabilities		$120,694,250 89
Surplus, being the same amount which will be shown to be the Company's Surplus by the annual report of the New York State Insurance department as of December 31, 1892		$16,804,948 10

INCOME.

Total Premium Income	$25,040,113 93
Interest, Rents, etc.	5,896,476 90
Total Income	$30,936,590 83

DISBURSEMENTS.

Losses paid	$ 7,896,589 29	
Endowments paid	1,114,361 99	
Annuities Dividends, Surrender Values, etc.	4,984,121 05	
Total paid policy holders	$13,995,012 33	
Commissions	4,178,316 60	
Agency Expenses, Physicians' Fees, Advertising and Printing	1,851,246 18	
Taxes, Salaries, and other expenses	1,629,715 65	
Total Disbursements		$21,654,290 76

Number of Policies issued during 1892, 66,259. New Insurance, $173,605,070. Total number of Policies in force January 1, 1893, 224,008. Amount at Risk, $689,243,629.

NOTE AS TO STATEMENT.

The above statement corresponds in all respects with the official report of the Company, as it will be published by the State Insurance Department. No assets not acceptable under the law of the State, or the regulations of the Department, are included, and the SURPLUS ($16,804,948 10) IS THE EXACT SUM THAT WILL BE SHOWN BY THE SUPERINTENDENT'S ANNUAL REPORT.

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