

lue with a rapidity far exceeding the most hopeful anticipations.

It is apprehended that the Provinces of Nova Scotia and New Brunswick would not feel warranted in burdening themselves with so large an amount of interest as a loan to be affected on their own credit would involve, and it therefore seems necessary that the Imperial guarantee promised by Lord Grey should be extended to the bonds of these Provinces to the extent of their respective contributions. This guarantee would enable them to raise the money at such a reduced rate of interest as would justify their incurring the obligation.

First.—A guarantee of the bonds of the provinces of Nova Scotia and New Brunswick.

Second.—The conditional discharge of Canada's debt of 1,500,000.

And as a direct equivalent there would be secured, not only a military road from Halifax to Quebec, but continuous railway communication, for the transport of men and stores, from Québec to the Western extremity of the Province of Canada.

We do not pretend to hold out the prospect of an immediate direct return on the outlay, because we have no data on which to base reliable calculations; but we must express the conviction that, in a financial point of view, the cost of the road, although the entire outlay were assumed by the Imperial Government, would ultimately be more than saved by the lessened expenditure, which England will be called upon to bear after its completion, by enabling her to reduce her military establishments in Canada.

But in the scheme submitted, the Provinces, cherishing, and sensible of the value of, their connection with England, offer substantial aid and co-operation.

It will be seen that our object is to involve the Imperial Government in an undertaking with the hope of a pecuniary return, or to assume a liability in the special interest of any Colony. If the best interests of the Empire, the extension of her commerce, and the permanence of British power on the continent of America, do not warrant the immediate construction of the work, and the contribution of England towards it we desire to abstain from urging considerations of minor weight on behalf of the enterprise; but the material aid which the Colonies are ready to extend affords sufficient proof that, in their opinion, its importance on national grounds has not been exaggerated.

We trust that a consideration of these views (which it is to be understood are made subject to the approval of the Executive and Legislative of Canada,) may meet with the favourable and early attention of Her Majesty's Government.

If provisionally acquiesced in, no time will be lost in seeking to obtain the sanction and co-operation of the other Provinces.

(Signed,) JOHN A. MACDONALD.
JOHN ROSE.

RIFLE PRACTICE. By Colonel John Jacob, C. B., of the Bombay artillery.

(From the North British Review.)

(Continued from our last.)

But no machine-made gun had been produced till after the Crimean War; and the Birmingham makers are of opinion, that it is not bedded together with the same solidity as the Birmingham made gun, and that it will not stand the same length of wear. From the inspections both of the machines and of the work produced by them, we should imagine that there cannot be the slightest doubt as to the ultimate success of the Enfield system; and the best evidence of the prospective triumph of machinery, is the fact that private makers—the London Armoury Company for instance—have already supplied themselves with similar machines from America, for the purpose of executing their contract with Government, for the supply of 30,000 rifles of the Enfield pattern.

The Enfield Rifle, then, represents a long thin tube, with a slow pitch of rifling, and a bullet consisting of a cupped cylinder with a rounded end. It performs well up to 800 yards, and as a half pike, can be no doubt of its unquestionable excellence. The steel bayonets, as now manufactured, have not only never had an equal, but have never had anything in the shape of a rival that could approach them. They appear to be as nearly perfect, both in quality and finish, as anything of the kind can possibly be. As

a whole, we need not hesitate to repeat, that no such weapon was ever before placed in the hand of the soldier.

But Colonel Jacob can beat the Enfield rifle in shooting; and it will become a question whether some new modification will not be requisite in the national arm. If the Enfield rifle can only perform well, as to accuracy, up to 800 yards; and if Colonel Jacob has "prepared a pattern-rifle for the army far more handy and convenient in every way, than the rifles hitherto in use of 32-gauge bore, only with which a tolerably good shot can, certainly, strike an object the size of a man, once out of three times, at a thousand yards distance, and of which the full effective range is above 2000 yards—the ball at that range still flying with deadly velocity," it stands to reason, that our troops would have a poor chance with a foreign enemy, armed with the Jacob rifle, as our cruisers, armed with carronades had with the American ships, armed with the long 32's. Troops armed with the old musket, would be immolated in the presence of the Enfield rifle; but if the Enfield rifle can be itself surpassed almost as much as it surpassed the musket, it would be satisfactory to know that Great Britain was the first to take advantage of the discovery.

Before advertent to the performances of Colonel Jacob, we may state concisely that we conceive to be the essence of the whole of the modern improvements in the rifle.

To project a round or spherical ball through the air is very much the same as to sail a washing tub through the water. The problem of constructing a bullet is, in fact, very similar to that of constructing a ship or a boat. For the smoothbored gun the round bullet was naturally adopted, both on account of its convenience in loading, and because it has not been found that other forms can be projected from the smooth bored gun with greater advantage than the sphere. We do not affirm that a form of projectile may not yet be discovered, that shall shoot better than the ordinary round ball "or sphere" from a smooth barrel. We merely on this occasion advert to the fact, that the round bullet was used universally with the smooth bore, and naturally enough was used also with the rifle. But to project a sphere through the air is much the same as to sail a round tub through the water. Improvement in rifle practice, therefore, must depend in suiting the form of the bullet to the requirements of its intended flight; and the problem is much the same at that of building a clipper ship, supposing that we were to start from the washing tub. The Pritchett bullet or Enfield bullet represents a trough with a rounded end, and of course a trough with a rounded end is superior to a tub. The flight of the Enfield bullet depends upon its form, and not upon any principal of expansion produced by a cup, to be acted upon by an iron capsule, or by the force of the powder alone, or by a plug of boxwood. And this assertion can be proven in this way—let a bullet of the same shape be cast with flanges, so as to lay hold of the rifling, and it will still fly as well as before, provided its fittings be air tight. But it is quite evident that a trough with a rounded end is not the best form for making its way either through the water or the air. The shipbuilder, looking at the elegant curves of his own beautiful water line, would stand aghast at the section of even the Enfield bullet, and would reckon it as no great advance upon the washing tub. Colonel Jacob comes in with a modification in the right direction, and puts a sharp bow on the ball, which he makes two diameters or two and a half diameters long, but leaving the butt or stern of the ball flat, and this flat tendency appears to be the prevailing fashion of the present time, apparently on the supposition that the powder hits a flat ended ball harder than one that should be finished with a graceful curve like the run of ship. But Colonel Jacob's bullet that has a bow is an approach to the truth, and of course it flies both further and more accurately than the round ended trough. The next improvement is to put a proper stern on the bullet, so as to deliver the air round a proper and becoming curve instead of at a sharp edge; and then the bullet, with a little modification of its whole curvature, will be as nearly perfect for flight through the air as a clipper ship is for passage through the water. The advantage of the flat end or square stern is we apprehend, purely chimerical; because the powder strikes the bullet like a punch, and a punch fitting a cone will strike the

point of the cone as hard a flat punch would strike the base of the same cone. Progress is the law of the rifle bullet, and sooner or later it will come to the elegant curves of the ship, otherwise it will not fly so far as it might do. The designer of a rifle ball might study with advantage the process of draughting a ship's lines.

The modern improvements in the rifle, then, resolve themselves into the improvement in the shape of the bullet, by which it is adapted for flight through the air, and into the use of a bullet that can be easily loaded, but which expands under the action of the powder either—first, by the use of a cupped butt; or, secondly, by the use of one or more rings, which enable the after part of the bullet to jam up and lay hold of the rifling. With a long bullet we have little doubt that the lead will jam up even without rings, if the bullet be made sufficiently near the size of the bore to fit properly with a greased patch, the lead is easily compressible, and a much smaller amount of hold than is usually supposed enables it to take the rifling. The phenomena called *stripping* is we apprehend, one which most riflemen may have heard of, but none can say that they have observed. It is a myth.

Colonel Jacob's improvement, then, consists, in the first place, in giving a better form to the bullet, by which the resistance is diminished and the range increased. To fire this bullet he uses a shorter, heavier barrel, with a more rapid twist and a smaller bore; and in these particulars we entirely concur with him. Even during the Enfield experiments it was found that a barrel thirty inches long afforded the best shooting that was then obtained, but the extra length was considered requisite for a military weapon,—for the half-pike service.

But the improvement in the form of the bullet is not Colonel Jacob's only claim to be ranked as the first experimental rifleman of the day. He has constructed and applied to the rifle bullet, a small shell, consisting of a copper tube filled with gunpowder, and primed with detonating powder. The shells are made of various sizes, and are now supplied by the gun trade. The bullet is cast upon a cone, which leaves a cavity into which the shell can be placed without difficulty. The point of the shell is of course in front, and the moment the bullet strikes, the shell explodes, and does damage proportioned to its size and the nature of the surrounding materials. These shells, for military purposes, appear to be the most formidable adjuncts that have yet been applied to the rifle; and it may safely be presumed, that they would render the fire of a body of men wonderfully effective where the ammunition waggons of an enemy could be approached. We shall state what Colonel Jacob has been able to do with them. At Kurrachee, on the 23d August, 1856, an ammunition waggon was constructed out of an old country cart, with a box on it, about the size of a pair of the ordinary ammunition boxes in use with a field battery. The box was four feet long and two feet high on the side next the rifleman, which was one inch and a half thick; the lid and the other sides being an inch thick. The box was filled with damaged gunpowder, in cotton bags, each containing 2 lbs.—the whole charge being about 100 lbs. The box was properly secured, and a tarpaulin nailed over it. The cart was placed at the foot of the shooting butt, 1200 yards from the shooters, who, on this occasion, were Mr. Gibb, C. S., Captain Gibbard of the Artillery, Colonel Jacob, and Captain Scott of the Lancers. The morning was cloudy, and the cart not very distinctly visible. About twenty shells in all had been fired without exploding the powder, when the ninth shell from Mr. Gibb's rifle (32 gauge only) "struck the box and exploded the powder; with the most brilliant effect." Some of the officers, however, still entertained the opinion that the manner in which the shot and cartridges are packed in the artillery ammunition waggons would prevent the possibility of the rifle shells reaching the powder, even if they burst among the shot in the boxes. The test this opinion another waggon was prepared, with four boxes on it, similar to those of an ammunition waggon in a field battery. These boxes were packed with round shot, cartridges, etc., like those of a regular field battery, and the proceedings were resumed on the 25th August, at the same distance, of 1200 yards. The seventh shell from Cap-

tain Gibbard's rifle exploded one of the four ammunition boxes. The fifth shell from Colonel Jacob's rifle entered another box, and a second explosion took place. The gentlemen present proceeded to the butt to examine the effect, and found the waggon burning, although two of the boxes were still unexploded. The neighbourhood being dangerous the spectators retired, and the third box exploded. The fourth was blown up by another shell, and the waggon was totally destroyed.

But Colonel Jacob's practice was not limited even to the range of 1200 yards, as will be seen by the following memorandum, which we quote entire, believing it to be the record of the most notable feat ever performed with so small a weapon as a shoulder rifle:

"RIFLE PRACTICE AT KURRACHEE.

Friday, 5th Sept. 1856.

"A powder box was prepared for explosion, by rifle shells, at a range of (1800) one thousand eight hundred yards. The box consisted of two boards, one and a quarter inches thick, and ten feet square, put together with a space of one inch between their surfaces; the space was filled with gunpowder, and was found to contain a charge of above 500 lbs. The box was placed against the butt on the ground, and after being loaded was well started over. At 7 A.M. on the 5th September, 1856, rifle practice was commenced with shells at this box from a distance of 1800 yards. The morning at first was dark and cloudy, but after a few shots had been fired the weather improved, and soon became favourable as regards light, although a fresh breeze was blowing across the range from right to left. The shooters were:

Captain Gibbard, Artillery 24-gauge Rifle
Captain Thatcher 16-gauge Manton
Colonel Jacob 24-gauge Manton
Captain Scott, A.D.C. 32-gauge Manton

The undermentioned gentlemen were also present:

Colonel Trevelyan, Artillery; Lieutenant De Nitre, Artillery; Captain Pirie, Lieutenant of Police.

For the first few rounds the shells struck near the foot of the butt, but as the morning brightened the practice improved, and many shells in succession struck close over and around the box—so close, indeed, that to strike it. The practice was steadily and deliberately continued, but the powder still remained untouched, till Colonel Jacob's little double rifle had been fired twenty times. The last four shots from this rifle were all very near to the box; and when fired for the twenty-first time, the shell from the second barrel struck the box and exploded the powder. The effect was magnificent, the distance being so great and the charge in the box so heavy. So violent was the explosion, that it was thought at first that the butt wall had been blown down; but when the smoke cleared, the wall was seen standing uninjured. This wall it built of stone, ten feet thick at the base, and one and a half at top is one hundred feet long and fifty feet high. A large portion of surface near the powder-box was a good deal shattered, but the damage was only superficial, and the butt was not seriously injured. Throughout the practice at Kurrachee no rest of any kind was used. The rifles were always fired from the shoulder, the shooter standing up.

We regard to the penetration of the bullets used by Colonel Jacob, we may take the following instructions.—At Kurrachee, on the 26th September 1856, a 24-gauge iron-pointed ball, fired with a charge of 2½ drachms of powder, at a distance of twenty-five yards, penetrated clean through eighteen deal planks, each three-quarters of an inch thick, and smashed itself all to pieces against stones on the other side. And, on the 29th September 1856, "a 24-gauge iron-pointed bullet, with a charge of 3½ drachms of powder, was fired at twenty-five deal boards, each a little more than three-quarters of an inch thick—the whole thickness of all boards being twenty inches. The boards were packed close one beyond the other, and wedged fast into a box. The rifle was fired at twenty-five yards distance. The bullet penetrated clean through the whole twenty-five planks, and buried itself its whole length in a block of hard wood, two and a half inches thick, which was beyond the mass of boards, breaking this block into two pieces.

Colonel Jacob objects to a long thin bar