

PROPOSED AMERICAN PNEUMATIC CANNON.

PROJECTILES FILLED WITH DYNAMITE TO BE FIRED BY COMPRESSED AIR.

On the glacis of Fort Hamilton, New York harbour, is mounted an experimental dynamite gun of the Gun Company. The gun is 28 feet long, 2-inch bore, and throws a projectile of a little less than four pounds weight. It is mounted on a tripod and connected with a flask of compressed air near the breech by a hose. The gun is fired by opening a valve and admitting compressed air from the flask to the gun. With a pressure of 400 pounds per square inch the gun throws a projectile across the "Narrows" (about a mile and a quarter) and some hundred yards beyond. For accuracy the firing gives results quite as good as can be attained by any light gun with similar weight of projectile.

A gun which will throw a four-pound projectile a mile and a half is not of itself a wonderful thing. But this remarkable gun does it without noise or smoke. The report, such as it is, is like the hissing noise heard when the engineer loosens the air brakes of a railway train. Within ten days the company will replace the experimental gun built at Norwalk with a four-inch brass gun constructed on a different system. This is now mounted and undergoing its finishing touches at the Delameter Iron Works in New York. It is 40 feet long, weighs about a ton, and will work with about 800 pounds air pressure to the square inch. It should have a range of three miles, and will be far more perfect in its mechanical fittings than the No. 1 gun it will replace. It is expected to throw a 24-pound projectile with great precision up to two or two and a half miles.

The guns referred to are smooth-bore. The projectile to fit them but slightly resembles any missile known to artillerymen. It is more like an arrow or "quarrel" thrown from the ancient arbalest. The "feather" is a conical piece of turned wood or of hollow brass. The "pile" is a heavier tube of iron or brass, which contains the bursting charge. The two-inch gun at Fort Hamilton drives these projectiles, filled with sand, through a foot of oak timber at a mile range. But dynamite and not sand will be the material with which these thunderbolts will be loaded for service.

Dynamite of the higher grades has about one hundred times the destructive force of gunpowder. Beginning with a half-ounce, the experimental gun has thrown projectile after projectile charged with dynamite until it was found that a full bursting charge of two pounds could be safely handled. More than a hundred shells loaded with dynamite have been so fired, and the use of that explosive has passed beyond experiment. The four-inch gun will throw a charge which, in its explosion, will do the destructive work of a ton of gunpowder.

Krupp's last gun, now building, is 55 feet long, weighs 125 tons, and will cost \$250,000. A gun to throw 200 pounds of dynamite, of equal length, would weigh one-tenth as much, and cost less than a tenth of the money. Krupp's gun, with all the facilities of his monster workshops and 30,000 workmen, must be a year in building. Any locomotive factory can build a compressed air dynamite gun in thirty days.

As a slight shock will explode dynamite, and the explosion of a few ounces would burst any gun in existence, it has been impossible to fire it from a gun loaded with gunpowder, and compressed air is made use of for that purpose. The flask holds ten or twenty charges of air for the gun. If twenty, then the pressure runs down five per cent., and to insure even shooting the air thus lost must be supplied again before the next shot. With a good compressor this can be done while the projectile is being placed in the breech of the gun.

Will it be safe to send out a ship armed with such guns and such projectiles? Will not the danger of explosion of the dynamite be likely to destroy your own vessel rather than the enemy? These are practical questions, but the difficulties are not insuperable. Dynamite cannot be safely flung around loose, but with care it can be handled nearly as safely as gunpowder, although in a different way. It is easily made.—*Proceedings R. A. Institution.*

A MOVING AND DISAPPEARING TARGET FOR RIFLE PRACTICE.

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I would feel some diffidence in submitting for publication in these "Proceedings" the description of the apparatus mentioned in the heading of this Paper, were it not that, in addition to the subjects congenial to their own profession, our officers take a strong and wide interest in all that concerns the efficiency of the army at large. Having this in mind, I venture to forward a description of a simple target that will, I hope, afford our brethren in the other branches of the service an easy means of practising and perfecting their

men in a part of the instruction in military rifle shooting that hitherto has been practically neglected.

The plans of the system I advocate will place it within the reach of anyone to construct a working target for himself, and any description beyond a very brief one will be unnecessary.

A lever is mounted on an universal traversing pivot, so as to permit of motion to the right or left, and also of vertical movement. It is worked by a man in the marker's butt, who, by means of a counter-weighted T-headed hand-lever, can effect these motions with a minimum of exertion to himself.

At the end of the pivoted lever is bolted, or bent, an upright arm terminating in two sockets, into which the feet of the target-frame are fixed. The lever may either be of wood or iron.

The target is made of a light frame of iron rod, over which canvas has been stretched, and presents a surface of 2' x 2', or rather more than what would be shown by a man rising from behind the shelter of a parapet in order to fire a shot. A colored paper representation of the above portion of a man (or, say, from the top of his cap to the elbows) should be pasted on to the canvas, in order to make the target as natural and life-like as possible. The frame should have a central standard, terminating in two feet to fit the sockets on the top of the upright arm of the working lever, so that when much knocked about the target may be detached and replaced by another.

The normal position of the target is slightly below the crest of the parapet of the marker's butt, and consequently out of sight at the firing points, until it is raised and moved about by the marker pressing down and traversing the lever. He will thus readily be able to simulate the movements of a man partially covered by a parapet rising to fire, moving to right or left, disappearing and re-appearing at some other point. These movements may be varied almost *ad infinitum* by a clever marker.

The practice at a target such as has been described should be the finishing part of a soldier's course of rifle instruction, and should be looked forward to by him as the means of bringing into practical use all the elementary instruction he has been put through. It should only be carried on by men who at a range of 300 yards can make an almost perfect certainty of hitting a stationary target of the dimensions given above—the ability to do so would not be too much to ask from any marksman deserving the name.

I will not lay down any system of instruction beyond the following hints below. I think that the course might be divided into three sections:—

1st, I would recommend practice at the target rising and disappearing;

2nd, at it in horizontal motion;

3rd, at it, the marker being allowed to combine horizontal and vertical motions in manœuvring the target.

The time of exposure in any case should not exceed twenty or be less than ten seconds.

For the skirmishing practice with a section, or smaller body of men, the horizontal movements of the target may be dispensed with: the markers, sheltered by a long butt, would simply have to work a number of levers arranged like those in a railway signalman's box, and would give vertical movements to a number of dummies placed at the interval they would occupy were they men manning a parapet.

Finally, the men under instruction should be directed to advance by successive rushes, firing at the halts, and thus, in peace time, would have an opportunity of realizing and attempting to remedy some of the many disturbing influences they would have to contend against in actual warfare.

If the above or some similar or better system of rifle practice were adopted, and the instruction carried on throughout the year, instead of being massed into a short space of time as it now is, the shooting of the army when brought to any practical test would be much improved. The men would acquire and keep up the habit of decision in the selection of a field object, of rapid and accurate aiming and firing, and of such confidence in their own powers as marksmen that the musketry fire of the British Infantry would regain the prestige it has lost of late years, and become in the wars to come as dreaded as it was in times now long gone by.—*Proceed. R. A. Inst.*

Graduates of the Royal Military College have been pouring into Kingston ever since the announcement was made that extra commissions would be given this year in the Imperial service; but almost every graduate has gone away disappointed, having been over the age. It was not announced at first that there was to be any special age, and some came to see the commandant from as far away as the Rocky Mountains to have their names put on the list for commissions and their disappointment may easily be imagined. The branches of the service that appear to be the favorites are the Royal Engineers and Royal Artillery; some of the commissions may not be filled.